

# Vehicle Service Fluid Control Systems

## Lincoln's LFC Family of Fluid Inventory Control & Management Systems

**LFC 3000**  
Hard-Wired  
with PC, Tank  
Monitoring and  
High-Flow  
Capabilities  
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**LFC 1000**  
Entry-Level  
Hard-Wired  
System  
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**LFC 2500**  
PC-Based  
Wireless System  
pg. 10

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**LFC 2000**  
Entry-Level  
Wireless System  
pg. 11

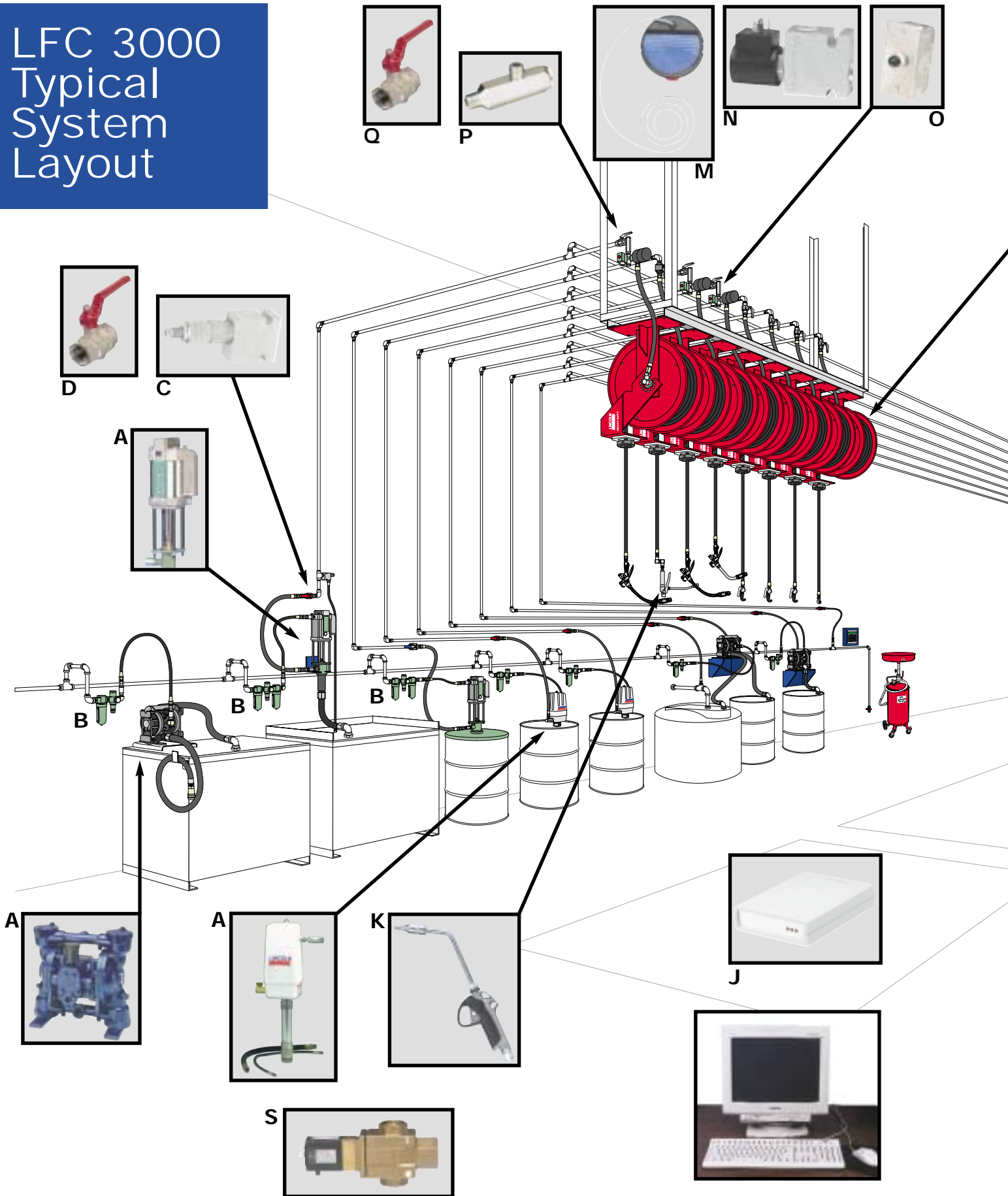
A complete offering of systems to meet the varying needs of vehicle service centers! Each system offers increased control over the authorization, management and recording of fluids used to service the growing fleets of private and commercial vehicles.

- Control systems save money and time by accurately tracking and accounting for dispensed fluids
- Choice of four unique systems to meet the varying needs of vehicle maintenance centers
- Supervisor and operator levels of security let you decide who can use, program, and monitor the system
- Manage up to sixteen fluids and 128 dispense locations with a single system
- PC interface packages offer enhanced set-up, control and reporting capabilities
- Complete System Source: controls, pumps, reels



Featuring the LFC 3000 complete fluid control, management, and reporting system

# LFC 3000 Typical System Layout



## Lincoln Pumps and Accessories

Ref.	Component	Description	Model	Qty.
A	Pump	Std. 3:1 / Series 25 Stub / Basic Fluids	282398	
		Med. 5:1 / Series 40 Stub / Basic Fluids	84934	
		H.D. 12:1 / PowerMaster III / Basic Fluids	2001	
		H.D. 12:1 / PowerMaster III Stub / Basic Fluids	2014	
		1/2" Diaphragm Pump/Polypropylene Santoprene/Water & AF	85622	
		1" Diaphragm Pump/Aluminum, Buna-N/Water & AF	85627	
B	Airline Filter, Regulator, Lubricator	1/4" for Series 25 & 40 Stub Mount	85387-4	
		1/2" for Diaphragm Pumps	85388-4	
		1/2" for H.D. 12:1 PowerMaster III	85387-8	
		1" for Diaphragm Pump	85388-8	
C	Pressure Relief Valve	1000 PSI (69 bar)	282876	
		150 PSI (10.2 bar)	282902	
D	1/4 Turn Valve	1/2" NPTF, 2000 psi (139 bar)	69503	
OPT	Suction Kits	Universal Drum and Tank for Series 25 & 40	85949	
		Remote (Wall Mount) for Series 25 & 40	85945	
		For Polypropylene Diaphragm Pump (55 gal)	240994	
	Mounting Brackets	Wall Mount - Series 25 & 40	84940	
		Tank Flange - Series 25 & 40	84942	
		Wall Mount - PowerMaster III	84826	
		Tank Flange - PowerMaster III	84963	
	Low Level (Pump)	Wall Mount - Diaphragm Pumps	84817	
		For 1.5" NPTM Suction Pipe	82439	
		For 1" NPTM Suction Pipe	84946	

See page 12 for LFC 2000 and LFC 2500 and page 9 for LFC 1000

## Lincoln LFC 3000 Fluid Control Components

E	Input/Output Module	1 for every 8 dispense points, maximum 16 I/O modules	282860A
F	Power Supply	1 for every I/O module in network	282865
G	Keypad	1 each control location, 128 maximum	282868A
H	Serial Printer	Packaged Report Printer with cable	282889
		Packaged Ticket Printer	282887
		Packaged Ticket Printer Cable	282879
I	Bar Code Reader	Optional, 1 per keypad	283091
J	PC Interface	Optional 1 per network	282880A

## Lincoln Hose Reels and Dispense Components for LFC 3000 & 1000

K	Control Valve for Basic Fluids (include with water and AF reel)	Standard / Rigid Extension	758
		Standard / Flex Extension	758F
		Heavy Duty / Rigid Extension	774
		Heavy Duty / Flex Extension	776
		Heavy Duty Hi-Flo / Flex Extension	282930
L	Hose Reel / Ball Stop	Standard Duty / 1/2" x 30' / Basic Fluids	87334
		Standard Duty / 1/2" x 50' / Basic Fluids	87354
		Standard Duty / 3/8" x 50' / Bibb Cock / AF & Water	87753W
		Heavy Duty / 1/2" x 30' / Basic Fluids	83463-30
		Heavy Duty / 1/2" x 50' / Basic Fluids	83464-50
		Heavy Duty. / 3/8" x 50' / Bibb Cock / AF & Water	85065
M	Pulse Meter	Universal - All Fluids	85544
N	Fluid Solenoid	24 VDC - 1/2" NPTF, 16 Watts	282873
O	Ready Light	24V - 1 each dispense location	83929
P	Filter	1/2" - 140 micron	84004
Q	1/4 Turn Valve	1/2" NPTF, 2000 PSI (139 bar)	69503
R	Decorative Cabinet Option	Standard Duty Cabinet (1 each reel)	85640
		Standard Duty Mounting Kit (single reel)	85642
		Heavy Duty Cabinet (1 each reel)	85240
		Heavy Duty Mounting Kit (single reel)	85242
		Universal Mounting Kit (1-12 reels)	85641
S	Master Air Solenoid Valve	24 VDC, 145 psi (10 bar), 1.8 W 3/4" NPT	282886

# Lincoln LFC 3000

## Fluid Inventory Control and Management System



- Simultaneously control, dispense and monitor up to 128 locations using modular "building block" system components
- Create reports by product, user, customer or location and monitor stock level with standard software package
- Assign degrees of system access and control with three distinct security code levels
- Enhance set-up, control and report capability with PC interface package
- Assured dependability and reliability with components designed specifically to "live" in the shop floor environment
- Advanced system set-up allows for 100 different operators, and the capability to log 2000 transactions
- Transaction to disk feature allows data transfer to Dealer and Maintenance Management software systems

# LFC 3000 Technical Data

## System Specifications

Maximum number of dispense points (24 VDC fluid solenoids & pulse meters)	Per Input/Output (I/O) unit: 8 Per network: 128
Maximum number of fluids	16
Number of Input/Output boxes (I/O) per system	1 - 16
Maximum number of I/O's per 24 VDC power supply	1
Maximum number of Keypads	per I/O box: 16 per network: 128
Printers	1 - 128
Used oil tank level input (per I/O)	1
Main air supply output (per I/O)	1

## Electrical Specifications

Power supply input	90 to 120 VAC, 50/60 Hz
Power supply output	24 VDC with 310 VA of power available
Input/Output	2VA @ 24 VDC
Keypad	3.6 VA @ 24 VDC
Network printer extender	3.6 VA
Fluid valve 282873 and lamp 83929	17 VA @ 24 VDC
Air valve 282866	1.8 VA @ 24 VDC

## Network Cable Specifications

Description	Type	Distance
Network	Belden "Apple Talk" 9999 Belden 8451, 8760 Alpha 24561	Total Network: 2460 feet (750 meters) Junction Box to Network Component: 9 feet (3 meters)
Printer	3 wire, 24 AWG with shield	STD. 45 feet (13 meters) from keypad or I/O Longer distance use 282884 printer-extender

## Component Cable Specifications

Wire Size	Power Supply to I/O	Fluid Sol. - 282873 Lamp - 83929	Air Solenoid 282886	Pulse Meter 85544	P/S to Keypad or Display
18 AWG	10 ft.	150 ft.	600 ft.	600 ft.	500 ft.
16 AWG	20 ft.	250 ft.			
14 AWG	30 ft.	400 ft.			
12 AWG	50 ft.	400 ft.			

## Report Capability

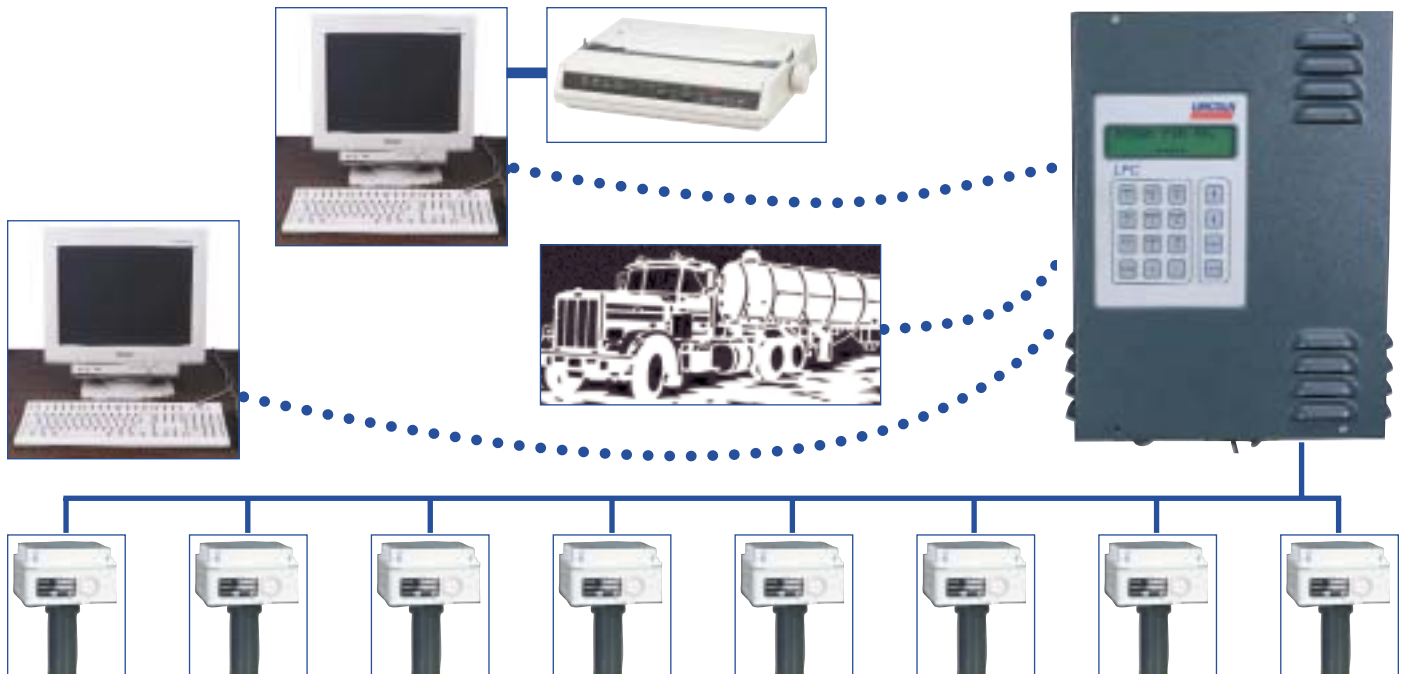
Transaction ticket	Audit trail of all completed jobs
Stock level	Current level/minimum stock level for all products
Product delivery	Date, quantity, corrections for all products delivered to tanks
Transactions (product usage and totals)	By product By dispense location By user By all transactions
Alarm ticket	Indicates high used oil level
Low level ticket	When minimum tank level is reached
Job report	(PC level only)
License plate number	Historic report by license plate number (PC level only)
Configuration	Records system "set up" for reconfiguration and service

## Operating Capacities

Number of different operators	100
Simultaneous dispenses	128
Transaction logs	1500

# LFC Tank Monitoring System

The LFC Tank Monitoring System electronically manages, maintains and verifies product deliveries, inventories and dispenses. The tank level readings are based on real time fluid levels using an ultrasonic probe that adjusts fluid levels as product is dispensed. The system automatically records product delivery providing independent verification of amount delivered. It functions as an integral part of the LFC 3000, but can also be used as a stand alone unit.



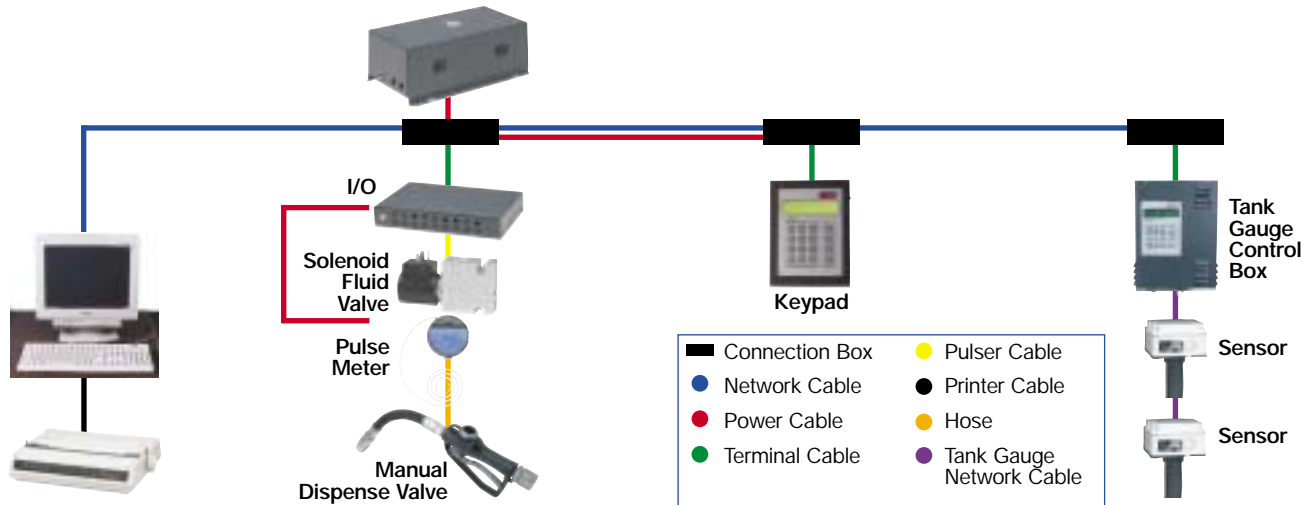
## Features

- Manage up to 8 ultrasonic tank gauges by tracking volumes and monitoring warning levels
- Control box contains a keypad, LCD display, power supply, and land line modem and controls all aspects of the system
- Remotely monitor the system via land line modem. Links the oil company directly to their customers to improve logistics and schedule deliveries
- Select "active" or "passive" system configuration:
  - Active: System dials out whenever a low/high oil event or a delivery occurs with any of the monitored tanks
  - Passive: Control box stores up to ten warnings or deliveries and will update the PC when it dials in
- Secure remote transfer of data with unique site IDs, security codes and keypad phone numbers
- Run PC reports by site, product, forecast, event log and level log
- Configure tank size and shape
- Each tank sensor has a secondary input for float switch to warn of possible leaks in double-walled tanks, and for high level warnings in used oil tanks

# LFC 3000 Tank Monitoring System & Technical Data

- Wire into the LFC3000 network for controlled dispenses and automatic, ultrasonic measured stock levels

- No need to manually enter deliveries, the tank sensors automatically update the LFC 3000 system.



## System Specifications

Control box / display keypad	1
Ultrasonic tank gauge	1 - 8
Number of fluids	1 - 8
Tank calibration	Gallons, liters
Delivery / warning log	10

## Electrical Specifications

Control box input	120 VAC, 50/60 Hz
Control box output	12 VDC
Internal modem	9600 baud

## Report Capability at PC

Site	Site details including address, contact, phone and security code
Product	Reports by product
Forecast	Indicates product, monthly forecast and actual per site
Event log	Logs received, scheduled deliveries and tank warnings by site and tank
Level log	Records order quantities, upper/lower limits and actual quantities to date, delivery urgency

## Network Cable Specifications

Description	Type	Distance
Network	Belden "Apple Talk" 9999 Belden 8451, 8760 Alpha 24561	Total Network: 2460 feet (750 meters) Junction Box to Network Component: 9 feet (3 meters)

## Lincoln LFC Tank Monitoring Control Components

Component	Description	Model	Quantity
Gauging Control Box	One for each system controls 1-8 ultrasonic tank gauges		
Ultrasonic Tank Gauge	Ultrasonic probe with extended tube- maximum 300 mm and 2" bung adapter. Maximum 8 per gauging control box		
Tank Level Management PC Software	PC software located at the oil company or control site		
Remote PC Software	Remote PC software for access to data		

# LFC 3000 High Flow System

Lincoln has all the components to control and monitor high flow applications with the LFC 3000. Use with Lincoln's reliable PowerMaster/PileDriver Pumps and the Heavy Capacity Hose Reels to create a system allowing rates up to 15 gpm and 800 psi to service large vehicles quickly and efficiently.

## Control System

### LFC 3000 Fluid Inventory Control and Measurement System

- System rated 15 GPM, 800 psi
- Up to 128 dispense locations with all features of LFC 3000 systems
- PC interface or stand alone capability

## Heavy Duty High Capacity Hose Reels for Light-Medium-Heavy Viscosity Lubricants

- Hose choices from 50' to 75' length by 1/2"- 3/4" diameter
- Dual needle roller bearings
- Ball bearing inlet swivel design
- Quick connects on delivery and connecting hoses
- Quarter-inch thick steel welded base and roller outlet arm

## PowerMaster/PileDriver Pump for Light-Medium-High Viscosity Lubricants

- Fully pneumatic air motors reverse stroke direction without mechanical linkages and are simpler and more reliable than older designs
- Only 5 moving parts with no metal-to-metal contact
- Air Motors are 3-4-6-8-10 inches in diameter
- Full 6" stroke for greater output per cycle
- Ratios from 6:1 to 84:1
- Flow rates up to 28 GPM

## High Flow Dispense Components

### High Flow Pulse Meter Model 282925

Flow rate	up to 32 gpm
Pressure rating	800 PSI
Inlet/outlet thread	1" NPT
Pulses per gallon	136.3

### High Flow Fluid Solenoid Valve Model 282940

Flow rate	40 gpm
Pressure rating	3000 PSI
Inlet/outlet thread	1" NPT
Drain thread	1/4" NPT
Coil rated	24 DVC

### Pressure Relief Valve Model 282945

Pressure rating	3000 PSI
Inlet/outlet thread	1/2" NPT

### High Flow Fluid Dispense Valve Model 282930

Flow rate	up to 15 gpm
Pressure rating	1500 PSI maximum
Swivel and swivel inlet	3/4" NPT thread
Fluid outlet	3/4" NPT thread
Nozzle	Manual
Fluid compatibility	Engine oils, transmission fluids, anti-freeze/anti-boil engine oil, diesel oil, and lubricating oils to SAE 140



# Lincoln LFC 1000

## Entry-Level Fluid Inventory Control and Management System

- Low cost introduction to fluid inventory control and management
- Manage up to four fluids at four dispense locations
- Easy upgrade to LFC 3000 for enhanced management and reporting capability—utilizes same pulse meters and solenoid valves
- Optional external serial printer to create reports



## LFC 1000 Technical Data

### System Specifications

Maximum number of dispense points (24 VDC fluid solenoids & pulse meters)	4
Maximum number of fluids	4
Control box/display keypad	1
Levels of authority	3
Tank Calibration	Gallons/liters
Dispense units	Gallons, quarts, liters

### Operating Capacities

Simultaneous dispenses	2
Number of different operators	96
Transaction logs	2,048

### Electrical Specifications

Control box input	120 VAC, 50/60 Hz
Control box output	24 VDC

### Cable Requirements

Solenoid cable	2 wire w/ground (see wiring chart for size)
Pulse meter cable	1 twisted pair w/shield (see wiring chart for size)
3 Conductor power supply cord	Minimum 18 AWG, 10 ft length Colors: black, white and green

### Wiring Chart

Wire Size	LFC1000 unit to Fluid Solenoid 282873 & 83929 Ready Light	LFC1000 unit to Air Solenoid 282886	LFC1000 unit to Pulse Meter 85544
18 AWG	150 ft	600 ft	600 ft
16 AWG	250 ft		
14 AWG	400 ft		
12 AWG	400 ft		

### Lincoln LFC 1000 Fluid Control Components

Component	Description	Model	Quantity
Control Box	One for each system controls 1-4 dispense valves	283090	
Serial Printer	Packaged Report Printer with cable	282889	

# Lincoln LFC 2500

## Wireless Fluid Inventory Control and Management System



- Manage up to 16 fluids and 99 simultaneous dispense locations with a single system
- Easy to install: Attach the dispense valves to the hoses; plug the keypads into a standard 120 VAC outlet. There's nothing else to connect!
- PC interface for enhanced capabilities and logical network set
- Mount up to 12 dispense keypads directly in the bays to maximize productivity
- Multi-department communication and control
- Unlimited job stacking allows mechanic to select preloaded repair orders
- Set up the system to match your process—preauthorized or mechanic controlled dispenses. Both setups manage and record all the dispensed information
- Assign special work order number for dedicated oil change bays allowing monitored after-hours fluid dispensing
- Totally wireless communication directly between keypads and dispense valves—no hard wiring required to install system
- Wide operating band seeks open frequency that minimizes interference at each installation location
- Four standard AA batteries in the dispense valve last up to two years

Contact your Lincoln representative for specific site survey and bill of material content.

# Lincoln LFC 2000

## Entry-Level Wireless Fluid Inventory Control & Management System



- Totally wireless communication directly between keypad and dispense valve—no hard wiring required to install system
- 2-Way frequency hopping spread spectrum allows the system to seek open channels to minimize interference
- Supervisor and operator levels of security let you decide who can use, program and monitor the system
- Manage up to 8 fluids and 48 simultaneous dispense locations with a single system
- Built in ticket printer delivers a written record for each transaction
- Optional external printer to run reports by fluid, user, or meter
- Easy upgrade to LFC 2500 for enhanced capabilities—utilizes the same dispense valves
- One department communication and control

Contact your Lincoln representative for specific site survey and bill of material content.

# LFC 2500 and 2000 Technical Data

System Specifications:	LFC 2500	LFC 2000
Console/Keypad	1 Master, 1-12 Dispense	1
Dispense Valve-Meters	1 - 99	1 - 48
Number of Fluids	1 - 16	1 - 8
Serial Printer Port	1	1

Console/Keypad Specifications		
Supervisor Accounts	1	
Supervisor Authority	Initialization, Configuration, Communication, Report	
Operator Accounts	1 - 50	
Operator Authority	Dispense Orders	
Tank Calibration	Quarts, Liters, Pints, Gallons	
CPU	TI MSP430, 8 bit	
Communications- U.S. and Canada	2-Way 902-928 MHz Frequency Hopping Spread Spectrum	
Communications- Latin America and Mexico	2-Way MHz Frequency 868 MHz Hopping Spread Spectrum	
Power Requirements	120 VAC, 60 Hz	
Operating Temperature Range	14° F to 140° F (-10° C to 60° C)	

Dispense Valve - Meter Specifications		
Maximum Flow	8 gpm (30 lpm)	
Minimum Flow	0.25 gpm (1 lpm)	
Maximum Operating Pressure	1000 psi (67 bar)	
Minimum Operating Pressure	5 psi (0.35 bar)	
Operating Temperature Range	20° F to 120° F (5° C to 50° C)	
Accuracy	+/- 0.5%	
LCD Display	5 char; 10mm H x 5mm W	
Calibration	Quarts, Liters, Pints, Gallons	
Inlet/Outlet Connections	1/2" NPT	

Lincoln LFC 2500 Wireless Fluid Control Components			
Component	Description	Model	Quantity
LFC 2500 Master Keypad	One for each system controls 1-99 dispense valves	283095	
LFC 2500 Dispense Keypad	Maximum 12 per system	283100	

Lincoln LFC 2500 and 2000 Wireless Dispense Valves and Accessories			
Component	Description	Model	Quantity
Dispense Valve-Meter	915 MHz dispense valve	915	
Special Fluids Dispense Valve	915 MHz dispense valve for water based fluids	915SF	
Remote Antenna Kit	Remote antenna kit with 17' cable	272082	
External Printer	Report printer	282889	
Printer Cable	Required for use with external printer	282912	

Lincoln LFC 2000 Wireless Fluid Control Components			
Component	Description	Model	Quantity
Console/Keypad LFC 2000	One for each system controls 1-48 dispense valves	282900	



Lincoln Industrial Corp.  
One Lincoln Way  
St. Louis, MO 63120-1578

Phone (314) 679-4200  
Fax (314) 679-4359  
www.lincolnindustrial.com

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