

# 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  
pg. 4

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**LFC 1000**  
Entry-Level  
Hard-Wired  
System  
pg. 9

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**LFC 2500**  
PC-Based  
Wireless System  
pg. 10

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

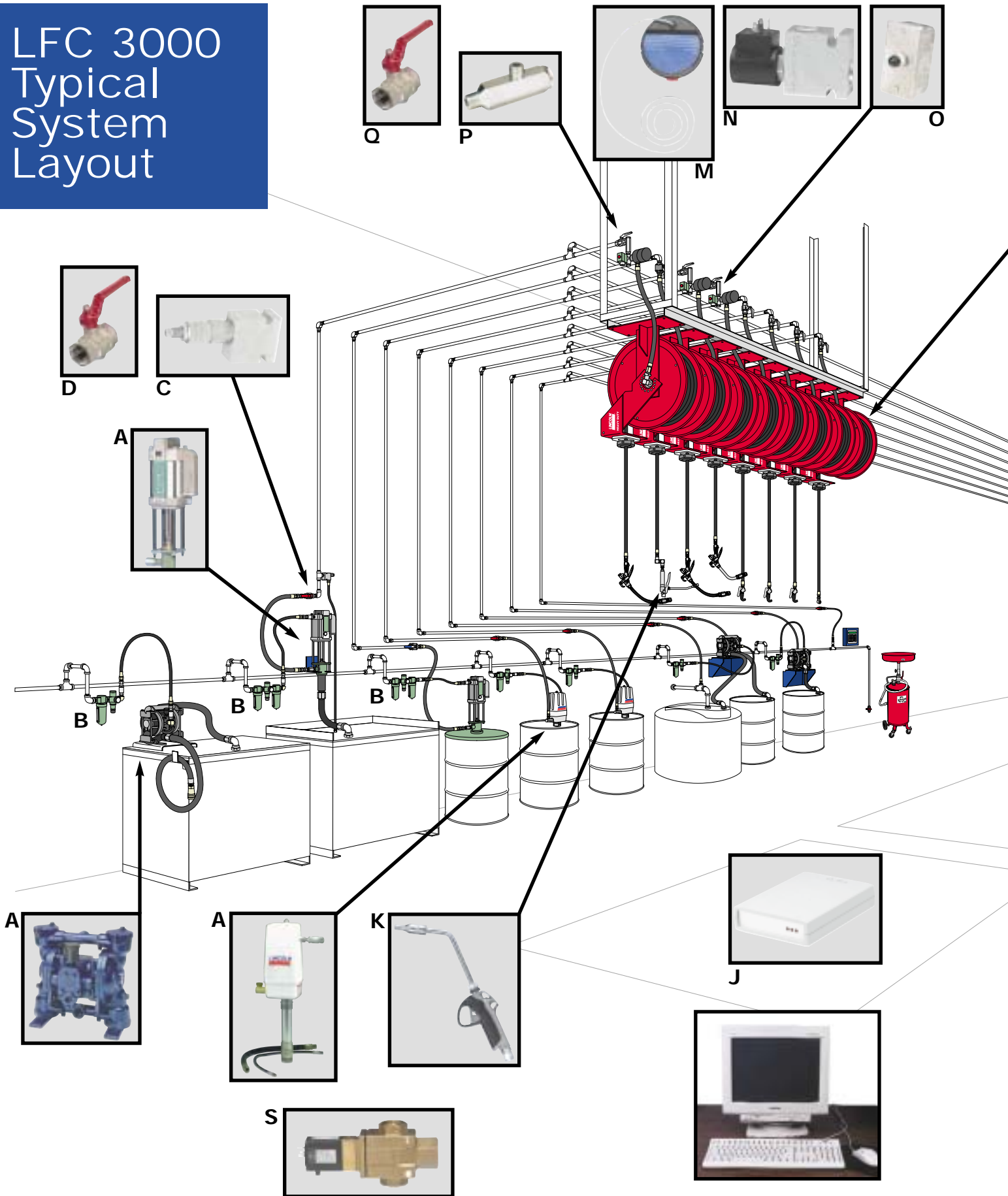
A complete offering of systems to meet the varying needs of vehicle service centers! Each system offers increased control over the authorization, management and recording of fluids used to service the growing fleets of private and commercial vehicles.

- 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<br>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<br>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<br>Belden 8451, 8760<br>Alpha 24561 | Total Network: 2460 feet (750 meters)<br>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<br>Longer distance use 282884 printer-extender    |

## Component Cable Specifications

| Wire Size | Power Supply to I/O | Fluid Sol. - 282873<br>Lamp - 83929 | Air Solenoid<br>282886 | Pulse Meter<br>85544 | P/S to Keypad<br>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

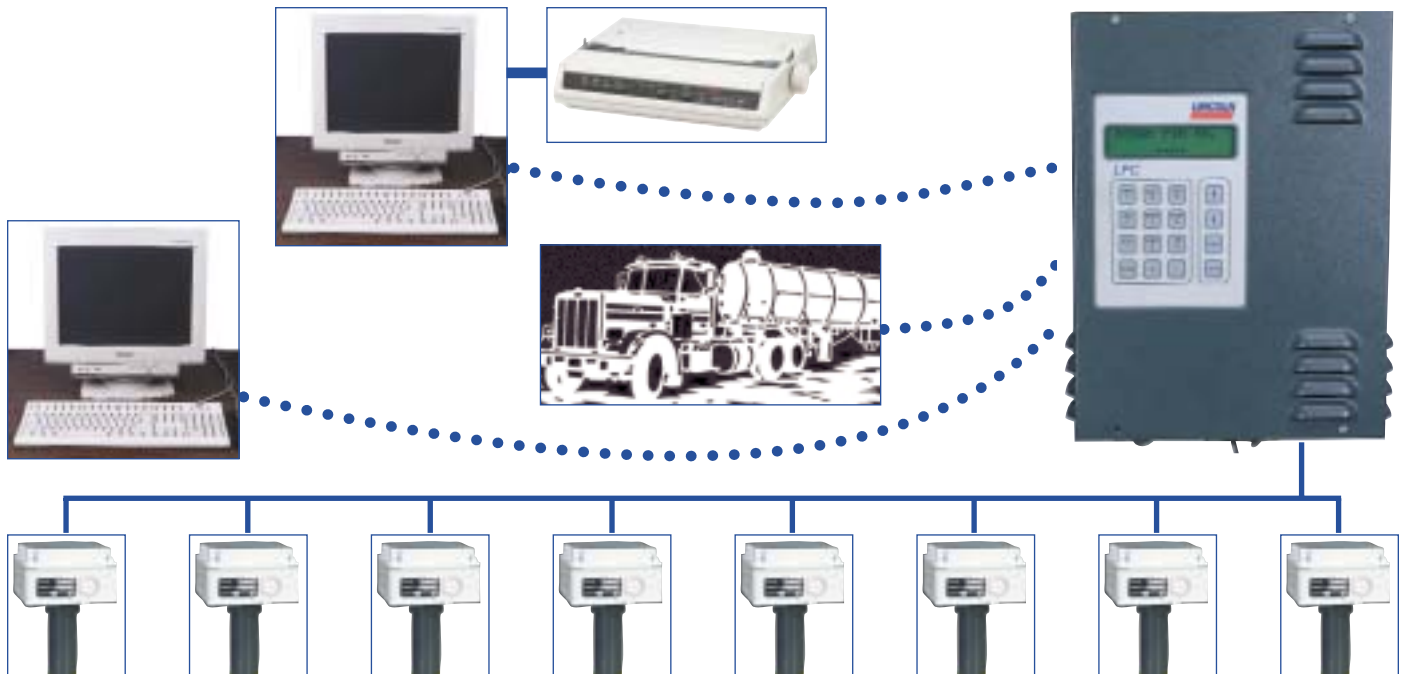
|   |  |
|---|--|
| Transaction ticket                      | Audit trail of all completed jobs                                    |
| Stock level                             | Current level/minimum stock level for all products                   |
| Product delivery                        | Date, quantity, corrections for all products delivered to tanks      |
| Transactions (product usage and totals) | By product<br>By dispense location<br>By user<br>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.



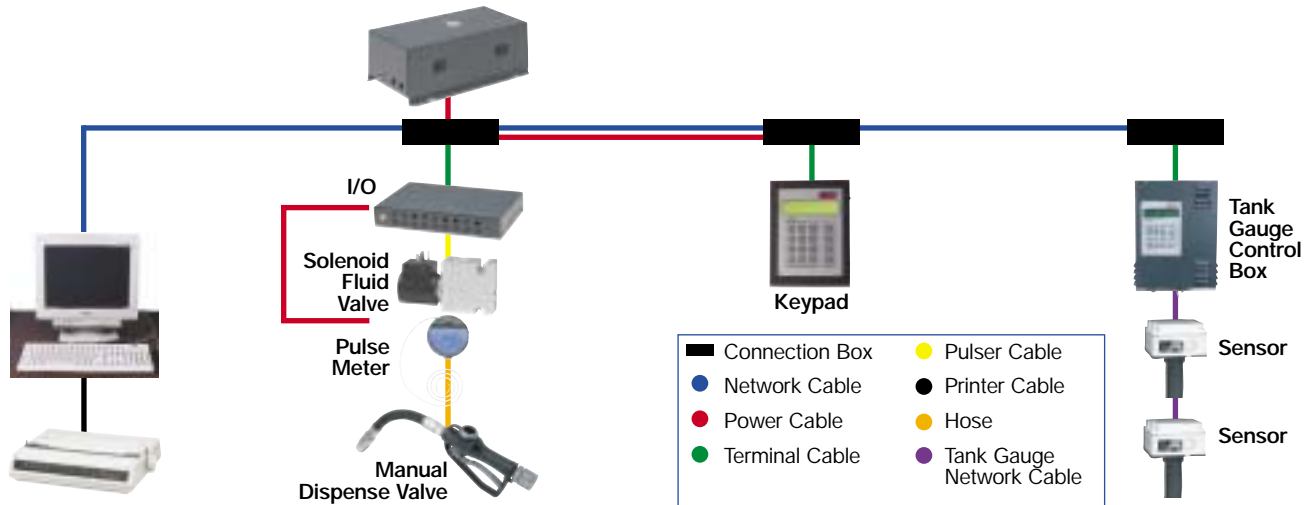
## Features

- 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<br>Belden 8451, 8760<br>Alpha 24561 | Total Network: 2460 feet (750 meters)<br>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 |



High Flow Dispense Valve Model 282930



# 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<br>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<br>LFC 2000                         | One for each system controls 1-48 dispense valves | 282900 |          |



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