Electronic lubrication control unit

Model 85307; Dual line system

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Description

Controller 85307 is a universal electronic control unit compatible with dual line, single line parallel and progressive lubrication systems. It gives flexibility and control over traditional single line systems.

Controller layout displays what is happening and quickly diagnoses problems. Programming controller requires only simple information so that operator can focus on particular system in use.

Features

- Runs progressive, single line and dual line lubrication systems.
- Timing intervals from 5 seconds to 24 hours.
- Cycle counting.
- 10 V to 30 V operation.
- Short circuit/open circuit detection with audible warning.
- External fault lamp drive (Flash or steady output).
- Low level reservoir monitoring.
- Two sensor switch inputs.
- Visual and audible fault indication.
- Non-volatile memory.
- Built in “blown fuse” indicator.
- 3 digit LED display indicates exact status of system.
- Simple setup procedure.
- Test mode allows testing of all circuits connected to controller.
- Practical housing with mounting bracket.

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>10 V to 30 V</td>
</tr>
<tr>
<td>Current drain</td>
<td>150 ma maximum (no load) 70 ma nominal</td>
</tr>
<tr>
<td>Pump output</td>
<td>7A rms. maximum</td>
</tr>
<tr>
<td>Lamp output</td>
<td>3A maximum</td>
</tr>
<tr>
<td>Switching</td>
<td>Solid state short circuit protected</td>
</tr>
<tr>
<td>Fuse</td>
<td>8 Amp fast blow 0.79 in (20 mm) glass</td>
</tr>
<tr>
<td>Connection</td>
<td>14 way MOLEX MINIFIT - JR</td>
</tr>
<tr>
<td>Communications</td>
<td>RS232 Type</td>
</tr>
<tr>
<td>Dimensions</td>
<td>2.8 in X 5.7 in X 1.5 in (70 mm X 145 mm X 38 mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>0.66 lbs (300 g)</td>
</tr>
<tr>
<td>Protection</td>
<td>IP54</td>
</tr>
<tr>
<td>Temperature range</td>
<td>5 °F to 122 °F (-15 °C to 50 °C)</td>
</tr>
</tbody>
</table>

1) Includes mounting bracket.
Safety

Read and carefully observe operating instructions before unpacking and operating equipment. Equipment must be operated, maintained and repaired exclusively by persons familiar with operating instructions. Local safety regulations regarding installation, operation and maintenance must be followed.

Operate equipment only after safety instructions and this service manual are fully understood.

Operational precautions

User must have total understanding of controller specifications. Never connect any other voltage supply other than specified in manuals contained within.

Operator/owner must ensure installation or inspections are executed by authorized personnel who have thoroughly read operating instruction manual.

Any setting up or work on controller must be done while machine is off. Machine must be in position that will not cause harm to any person should machine be switched on for setting up of controller. In the event that the machine needs to be on for setting up of controller, it must be under condition that operator or personnel working on machine are advised.

Never switch machine on without prior knowledge of operator/owner or somebody that has full knowledge of machines operation.

Explanation of signal words for safety

**NOTE**
Emphasizes useful hints and recommendations as well as information to prevent property damage and ensure efficient trouble-free operation.

**CAUTION**
Indicates a dangerous situation that can lead to light personal injury if precautionary measures are ignored.

**WARNING**
Indicates a dangerous situation that could lead to death or serious injury if precautionary measures are ignored.

**DANGER**
Indicates a dangerous situation that will lead to death or serious injury if precautionary measures are ignored.

- **WARNING**
  - Never weld on machine while main switch of machine is on. Ensure main switch is off and correctly tagged. Welding on machine can cause serious damage to controller.
  - Do not alter or modify any part of controller.
  - Ensure controller is mounted in suitable area.
  - Do not mount controller near an area with excessive heat.
  - Always use right specified fuse rating for controller.
  - Never exceed voltage rating of controller.
  - Never expose controller to direct sunlight.
  - Never expose controller to water or other substances.
Keypad layout

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enter button</td>
</tr>
<tr>
<td>2</td>
<td>Run/Pause</td>
</tr>
<tr>
<td>3</td>
<td>Setup indicator</td>
</tr>
<tr>
<td>4</td>
<td>Mounting bracket</td>
</tr>
<tr>
<td>5</td>
<td>LED display</td>
</tr>
<tr>
<td>6</td>
<td>Cycle indicator</td>
</tr>
<tr>
<td>7</td>
<td>Second indicator</td>
</tr>
<tr>
<td>8</td>
<td>Minute indicator</td>
</tr>
<tr>
<td>9</td>
<td>Hour indicator</td>
</tr>
<tr>
<td>10</td>
<td>Select value down or silent buzzer</td>
</tr>
<tr>
<td>11</td>
<td>Blown fuse indicator</td>
</tr>
<tr>
<td>12</td>
<td>Fuse holder 8A</td>
</tr>
<tr>
<td>13</td>
<td>Power positive/negative</td>
</tr>
<tr>
<td>14</td>
<td>Ignition input/Aux power output positive</td>
</tr>
<tr>
<td>15</td>
<td>Sensor 1 positive/negative</td>
</tr>
<tr>
<td>16</td>
<td>Sensor 2 positive/negative</td>
</tr>
<tr>
<td>17</td>
<td>External lamp</td>
</tr>
<tr>
<td>18</td>
<td>Reservoir sensor connection</td>
</tr>
<tr>
<td>19</td>
<td>Pump motor positive/negative</td>
</tr>
<tr>
<td>20</td>
<td>RS 232 connection</td>
</tr>
<tr>
<td>21</td>
<td>Reservoir low level status indicator</td>
</tr>
<tr>
<td>22</td>
<td>Sensor 2 status indicator</td>
</tr>
<tr>
<td>23</td>
<td>Sensor 1 status indicator</td>
</tr>
<tr>
<td>24</td>
<td>Pump status indicator</td>
</tr>
</tbody>
</table>
Panel description

SLS = single line systems

PLS = Progressive line systems

dls = dual line systems

n-O = normally open (sensors)

n-C = normally closed (sensors)
**Fig. 7**

L - $S$ = External lamp steady (continues supply)

**Fig. 8**

L - $F$ = External lamp flashing (pulsed supply)

**Fig. 9**

nFE = non fatal error (pump continues on Low Level Fault)

**Fig. 10**

$r$ = Run time in cycles

**Fig. 11**

$P$ = Pause time in seconds, minutes or hours
**Fig. 12**
- **SETUP**
- **F** = Fault time in seconds, minutes or hours

**Fig. 13**
- **SETUP**
- **U** = Vent time in seconds, minutes or hours

**Fig. 14**
- **SETUP**
- **rCC** = Run cycle counter

**Fig. 15**
- **SETUP**
- **YES** = Confirms program changes

**Fig. 16**
- **SETUP**
- **tSt** = Test mode for checking installed devices
Fig. 17

\[ t = \text{Time out or dwell time for sensors} \]

Fig. 18

\[ \text{FE} = \text{fatal errors (pump stops on Low Level Fault)} \]

Fig. 19

\[ \text{nO} = \text{Do not select selection} \]

Fig. 20

\[ r = \text{Run time in seconds, minutes or hours} \]

Fig. 21

\[ . = \text{Standby mode} \]
Dual line system using 2 pressure switches and hydraulic change over valve

1. To enter setup mode press and hold ENTER while switching on power source to controller.
2. Release ENTER and red LED next to SETUP illuminates. Green LED next to PUMP flashes. PLS (progressive line systems) appears in display (Fig. 22 A).
3. Press Δ to select type of system required. Continue to press until dLS displays (Fig. 22 B).
4. Press ENTER to confirm use of dual line systems (Fig. 22 C).
5  **P** (pause) appears in display. Press **Δ** to change time (Fig. 23 A). LED changes from seconds to minutes to hours. Amount displayed indicates what pause time functions at when applied.

6  Press **ENTER** to confirm pause time. In example, pause time of 4 hours is confirmed (Fig. 23 B).
7 Adjust the time out for pressure switches displays. Time out is substantially greater for larger systems. Time out is the actual time it takes pressure switch to close contacts. When pressure switch closes, signal is sent to controller to inform that system is now pressurized. Should pipe break, pressure switch will never close. This is a safety and control feature to indicate to controller when system can change over. Time out setting in Proxy 1 will apply by default for that of Proxy 2 when using two pressure switch system.

8 Press △ to increase time out.

9 Press ENTER to accept (Fig. 24 A).

10 n-O (normally open) displays indicating whether pressure switch is normally open or normally closed. n-O Switches are used for dual line systems.

11 Press △ to choose between n-O or n-C.

12 Press ENTER to accept choice (Fig. 24 B).
13 No displays. Green LED on PROXY 2 illuminates. Because two pressure switch system is being used, press Δ to select YES.
14 Press ENTER to accept and proceed to next part of setup (Fig. 25 A).

15 System skips PROXY 2 setup and defaults to settings made in PROXY 1. Number of cycles dual line system will run for before going into pause cycle displays. Controller has unique feature of running multiple cycles because system actually monitors state of pressure switch, closed or opened, to allow for next cycle to commence.
16 Press Δ to select number of run (r) cycles.
17 Press ENTER to accept settings (Fig. 25 B).
18 nO displays. Green LED on reservoir illuminates. Option of low level detection displays. If low level detection is not required, push Δ and select nO.

19 Press ENTER to accept.

20 In this example low level option is selected. Press Δ until YES displays.

21 Press ENTER to accept choice (Fig. 26 A).

22 n-O displays indicating whether sensor is normally open or normally closed. Press Δ to choose between n-O or n-C.

23 Press ENTER to accept choice (Fig. 26 B).

**NOTE**

10 second delay takes place on startup when using low level sensor to ensure paddle assembly is positioned correctly with sensor.

Sensor activates on low level after 10 seconds. Low level warning displays when unit reaches pause status.
24 **FE** (fatal error) or **nFE** (non fatal error) appears in display. Option **FE** (fatal error) is used for pump to stop on low level warning. This is mostly used on pumps with reservoir capacities of 0.26 gal to 2.6 gal (1 to 10 l). It is preferred to stop pump at low level in order to maintain layer of grease above pump element area. This helps by not allowing air pockets to form around pump element when filling up reservoir. In case of **nFE** (non fatal error), it is mostly used on larger pump reservoirs where distance of pump tube to bottom of reservoir is substantial. Select choice and press **ENTER** (Fig. 27 A).

25 **L - F** (lamp flashing) displays. This option is for an external warning lamp to be installed. Typically this function is used if monitoring is installed.

Press \(\Delta\) and change status from **L - F** (lamp flashing) to **L - S** (lamp static).

**L - F** is a pulsed output supply and **L - S** is a constant output supply.

26 Press **ENTER** with either choice selected to move to next part of programming (Fig. 27 B).
tSt appears in display indicating test mode of setup procedure. Press Δ for pump to start turning (Fig. 28). Correct pump from turning in wrong direction by changing polarity of wiring. It is possible to check other sensors by energizing them manually and watching if green LED illuminates. If LED does not illuminate, there is a problem with wiring or setup procedure. With external warning lamp, press ↓ and LED will either flash or show steady, indicating external device is working.

If all is correct, turn off power to controller and then back on for unit to proceed into normal mode. Red setup LED will not illuminate when unit is in normal run mode.

NOTE

:tSt must appear in display before switching off power to unit. System does not save changes if power to unit is turned off during any part of programming. tSt must appear in display for changes to be confirmed.
Run mode

Unit proceeds in run (r) mode after power is terminated on unit and then switched on again. All devices selected display (Fig. 29).

**NOTE**
After each cycle received, amount decreases by 1 until all cycles have been reached and unit will proceed to pause time.

Running system (pump run)

Run (r) time displays when controller is switched on. Time appears from actual time set and counts down to zero. Green LED indicates minutes (Fig. 30). Green LED next to PUMP flashes to indicate pump is turning or pumping.
Running system (pump pause)

Controller goes into pause time when required run time is reached. Pause (P) time counts down from what it was setup for to zero and then resumes run time (Fig. 31). Green LED is steady next to PUMP indicating pump is there by not turning while in pause mode.

Running system (vent cycles)

In dual line system when U (vent) displays, pump stops pumping until line A or B pressure switch opens or that line is totally vented. As cycles complete, cycle count in U display counts down (Fig. 32).
Stage 1

Cycle begins to pump lubricant through line B. As line begins to pressurize, pressure switch closes. Green LED on controller illuminates. Pump continues to pump until it reaches pressure set on change over valve. At this stage, pressure switch remains closed.

Diagram 1

Stage 2

As pressure reaches change over valve, direction of flow changes. Grease in line A begins to pressurize while line B vents. As line A reaches 290 psi (20 bar), pressure switch closes and shuts pump off until line B is totally vented. Pressure switch in line B must be open before cycle will continue. Both LEDs illuminate.

Diagram 2

1) Set at 5 076 psi (350 bar).
2) Set at 290 to 580 psi (20 to 40 bar).
Stage 3

As line B vents, pump continues to pressurize line A until it reaches pressure setting of change over valve. LED for line A pressure switch remains on in this process. In display, r indicates cycles set have not yet been completed.

Stage 4

As pressure reaches line A, it switches over change over valve and changes direction of flow. Line B begins to pressurize until it reaches 290 psi (20 bar). As pressure switch in line B closes pump stops to wait for line A’s pressure switch to open. Both LEDs illuminate. In display U 2 is indicated (in vent) and two cycles remaining.
Stage 5

As line A pressure switch opens, pump begins to pump again. Display shows one complete cycle has finished and same process begins once again. Once last cycle is reached, pump resumes pause cycle.

NOTE

It is possible to set up as many run cycles as desired.
Two pressure switches and hydraulic change over valve

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>External warning</td>
</tr>
<tr>
<td>2</td>
<td>Low level sensor</td>
</tr>
<tr>
<td>3</td>
<td>Motor</td>
</tr>
<tr>
<td>4</td>
<td>Power switch</td>
</tr>
<tr>
<td>5</td>
<td>Power supply</td>
</tr>
<tr>
<td>6</td>
<td>Pressure switch 1</td>
</tr>
<tr>
<td>7</td>
<td>Pressure switch 2</td>
</tr>
</tbody>
</table>

1) Top row represents back of controller.
2) Bottom row represents front of controller.
Unit must perform one complete cycle of run and pause to cancel existing fault out of memory in order for fault to be reset. Unit is designed to memorize total time of any specific fault. Unit must run one complete cycle in order to function correctly without same fault occurring.
Dual line system using 1/2 cycles and hydraulic change over valve

1. Refer to steps 1-9 on pages 10 through 12.
2. n0 displays. Green LED on PROXY 2 illuminates. When using micro switch monitoring half cycles select n0.
   Press ENTER to accept and proceed to next part of setup (Fig. 34 A).

3. n0 appears in display. Green LED on reservoir illuminates. Setup procedure allows for selection of low level detection. Should low level detection not be required, push Δ and select n0.
4. Press ENTER to accept.
5. In example shown, low level option is selected. Press Δ until YES displays.
6. Press ENTER to accept choice (Fig. 34 B).

**NOTE**
10 second delay takes place on startup when using low level sensor to ensure paddle assembly is positioned correctly with sensor.
Sensor activates on low level after 10 seconds. Low level warning displays when unit reaches pause status.
7 n-O (normally open) appears in display. This indicates if sensor is normally open or normally closed. Press Δ to choose between n-O or n-C.

8 Press ENTER to confirm choice (Fig. 35 A).

9 FE (fatal error) or nFE (non fatal error) appears in display.
FE (fatal error) is for pump to stop on low level warning. This is typically used on pumps with reservoir capacities of 0.26 gal to 2.6 gal (1 to 10 l). It is preferred to stop pump at low level in order to maintain layer of grease above pump element area. This helps by not allowing air pockets to form around pump element when filling up reservoir.

nFE (non fatal error) is typically used on larger pump reservoirs with substantial distance from pump tube to bottom of reservoir.
Select choice and press ENTER (Fig. 35 B).
10 L - F (lamp flashing) appears in display. This option is for external warning lamp to be fitted. Typically if monitoring is installed, this function is used.

Press Δ to change status from L - F (lamp flashing) to L - S (lamp static). L - F is a pulsed output supply and L - S is a constant output supply.

11 Press ENTER to move onto next part of programming (Fig. 36 A).

12 tSt appears indicating test mode of setup procedure. Press Δ and pump starts turning (Fig. 36 B). Correct pump turning in wrong direction by changing polarity of wiring. It is possible to check all other sensors by energizing them manually and watching if green LED illuminates in process. If LED does not illuminate, there is either problem with wiring or setup procedure. By pressing down button with external warning lamp, this will either flash or show steady.

If all is correct, turn off power supply to controller and then back on for the unit to proceed into normal mode. Red setup LED illuminates when unit is in normal run mode.

NOTE
tSt must appear before switching off power to unit. System does not save changes if power to unit is turned off during any part of programming. tSt must appear in display for changes to be confirmed.
Run mode

Unit proceeds in run mode after power is terminated on unit and then switched on again. All devices selected display. Devise counts up in seconds to minutes depending on how long it takes for lubrication to reach change over pressure. Once change over pressure is reached, change over valve activates micro switch and in turn sends pulse to control unit. As control unit receives pulse, system stops pumping and resumes in pause cycle that it has been setup for.

Once pause cycle has counted down system begins to work. Same process continues. As per example, system pumps line B for predetermined time depending on change over pressure. System pauses for 1 hour. As pause time elapses, system begins to pump line A for same sequence as line B. System resumes next 1/2 cycle of pause time.

Running system (pump run)

Run time displays when controller is switched on. Time appears from actual time set and counts down to zero. Green LED indicates minutes (Fig. 38). Green LED next to PUMP flashes to indicate pump is turning or pumping. In dual line systems 1/2 cycle mode, run time continues until change over pressure is achieved.

NOTE

When unit is switched off, on default time of 5 seconds appears.

Running system (pump pause)

Controller goes into pause time when required run time is reached. Pause time counts down from what it was setup for to zero and then resumes run time (Fig. 39).
Stage 1

Cycle begins pumping lubricant through line B. Run time in display starts time from 1 second up until system reaches pressure to activate change over valve. As soon as change over valve activates, it switches a micro switch. Pump led on control unit will flash while pump is working.

![Diagram 7]

1) Set at 5 076 psi (350 bar).
2) Micro switch n-o/n-c.

Stage 2

As micro switch activates, pump stops working and resumes pause time. Display indicates time left of pause cycle. All other LED's illuminate. Pump LED does not flash.

![Diagram 8]

1) Set at 5 076 psi (350 bar).
2) Micro switch n-o/n-c.
Stage 3

As pause time completes cycle, pump begins to pump and pressurize line A. Time to reach pressure setting might vary to that of line B because of different configurations that will effect back pressures. Pump LED flashes while pump is working.

Stage 4

As pressure in stage 3 is reached, change over valve activates and changes position of micro switch. At this point, pump stops and system resumes its pause cycle. This process continues as explained above.
Diagram 11

Dual line system using 1/2 cycles and hydraulic change over valve

---

**Item** | **Description**
---|---
1 | External warning
2 | Low level sensor
3 | Motor
4 | Power switch
5 | Power supply
6 | Micro switch

1) Top row represents back of controller.
2) Bottom row represents front of controller.
Fault indications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Press <strong>RUN/PAUSE</strong> to reset faults.</td>
</tr>
<tr>
<td>2</td>
<td>Fault indication - counts up from seconds to minutes to hours indicating how long fault has been active.</td>
</tr>
<tr>
<td>3</td>
<td>Press down button to silence buzzer.</td>
</tr>
<tr>
<td>4</td>
<td>Blown fuse indication. Replace with 8A fuse.</td>
</tr>
<tr>
<td>5</td>
<td>Change fuse here. Replace with 8A fuse.</td>
</tr>
<tr>
<td>6</td>
<td>Low level fault - possible cause, reservoir empty.</td>
</tr>
<tr>
<td>7</td>
<td>Proxy 1 fault - either blockage in system or faulty sensor.</td>
</tr>
<tr>
<td>8</td>
<td>Pump faulty - either short circuit or wires have come off.</td>
</tr>
</tbody>
</table>

**NOTE**
Unit must perform one complete cycle of run and pause to cancel existing fault out of memory in order for fault to be reset.
Unit is designed to memorize total time of any specific fault. Unit must run one complete cycle in order to function correctly without same fault occurring.
Warranty

The instructions do not contain any information on the warranty. This can be found in the General Conditions of Sales, available at: www.lincolnindustrial.com/technicalservice or www.skf.com/lubrication.