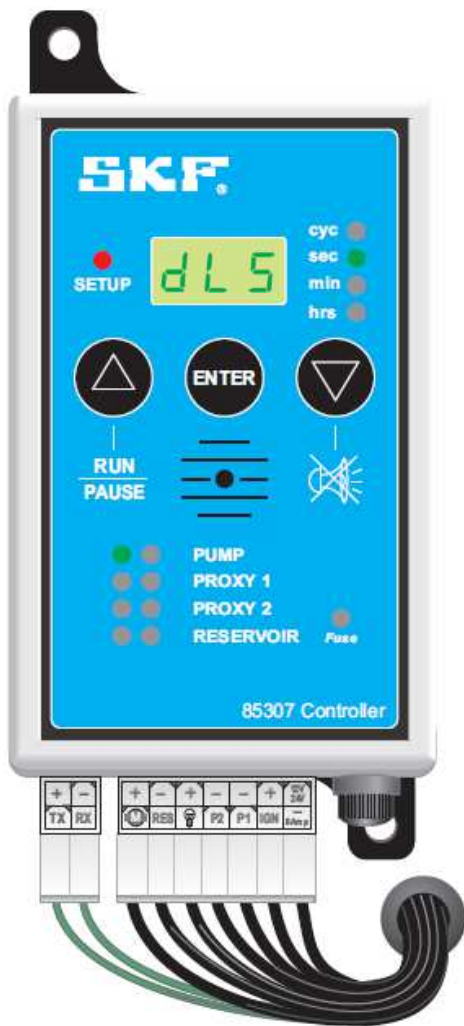


Electronic lubrication control unit

Model 85307; dual-line system



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Description

Lubrication controller 85307 is a universal electronic control unit compatible with dual-line, single-line and progressive lubrication systems. Provides flexibility and control over traditional single-line systems.

Controller digital display quickly identifies system status with easy-to-identify codes. Programming of unit requires simple information allowing operator to focus on specific utilized system.

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 system status.
- Simple setup procedure.
- Test mode allows testing of all circuits connected to controller.
- Practical housing with mounting bracket.

Table 1

Specifications

Voltage	10 V  to 30 V 
Current drain	150 mA maximum (no load), 70 mA nominal
Pump output	7 A rms. maximum
Lamp output	3 A maximum
Switching	Solid state short circuit protected
Fuse	8 A fast blow 0.79 in (20 mm) glass
Connection	14 way MOLEX MINIFIT - JR
Communications	RS232 type
Dimensions	2.8 x 5.7 x 1.5 in (70 x 145 x 38 mm) ¹⁾
Weight	0.66 lbs (300 g)
Protection	IP54
Temperature range	5 °F to 122 °F (-15 °C to +50 °C)

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.

Switch machine off before performing any setup or work on controller. Position machine so no harm can be caused to any person should machine be switched on during setup of controller. Operator or personnel working on machine must be advised in the event machine needs to be on for setup of controller.

Never switch machine on without prior knowledge of operator/owner or someone with 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.

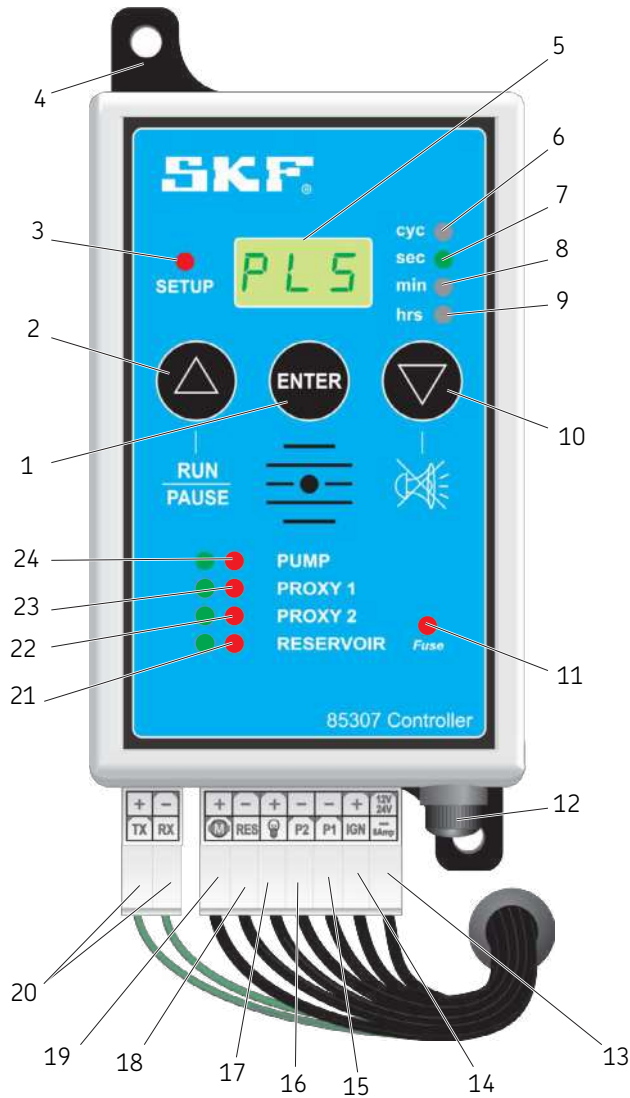
DANGER

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.
- Always mount controller in suitable area.
- Do not mount controller near an area with excessive heat.
- Always use correct 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

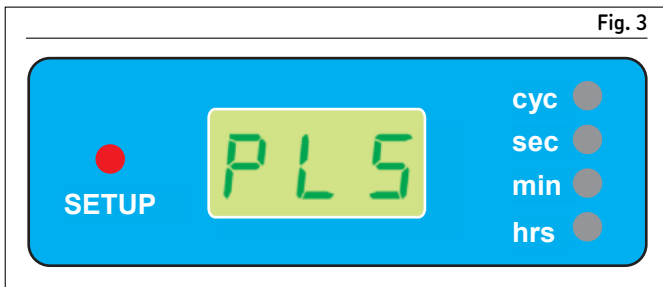


Item	Description
1	Enter button
2	Run/pause button
3	Setup indicator
4	Mounting bracket
5	LED display
6	Cycle indicator
7	Second indicator
8	Minute indicator
9	Hour indicator
10	Select value down or silent buzzer
11	Blown fuse indicator
12	Fuse holder, 8 A
13	Power positive/negative
14	Ignition input/aux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

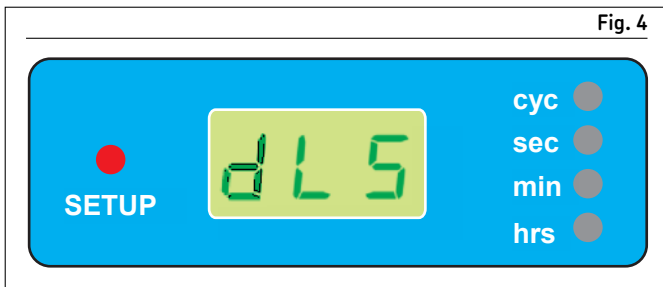
LED code descriptions



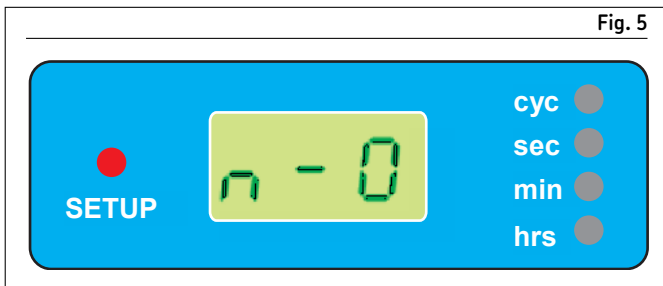
SLS = single-line system



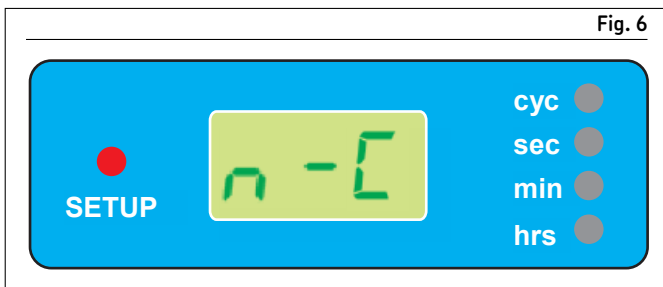
PLS = progressive-line system



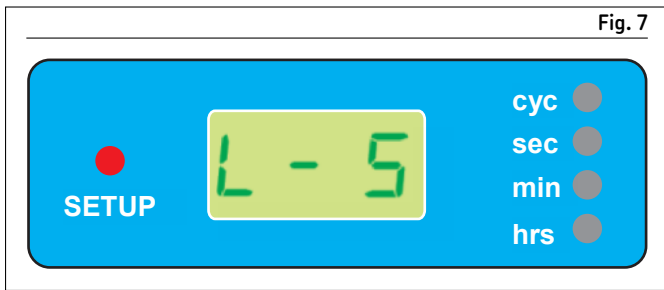
DLS = dual-line system



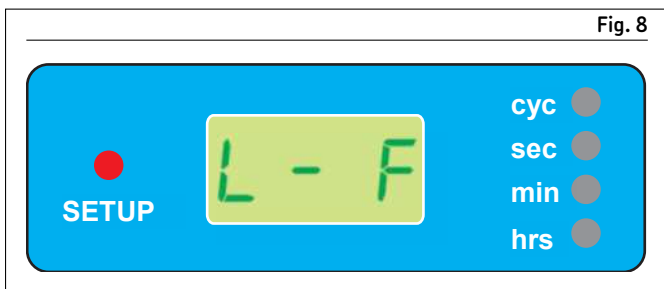
n - 0 = normally open (sensors)



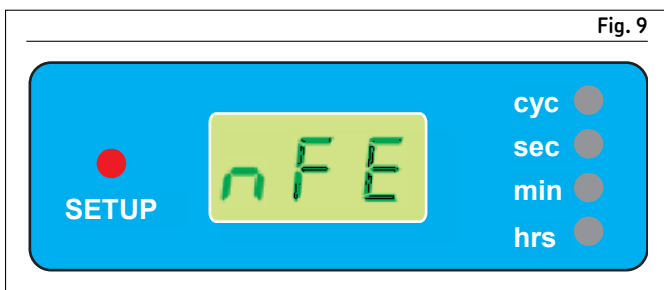
n - C = normally closed (sensors)



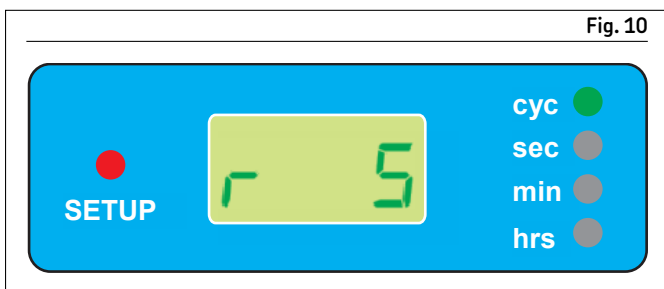
L - S = external lamp steady (continued supply)



L - F = external lamp flashing (pulsed supply)



nFE = non-fatal error (pump continues on low level fault)

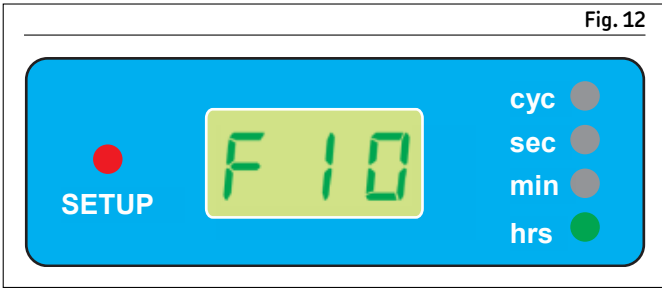


r = run time in cycles



P = pause time in seconds, minutes or hours

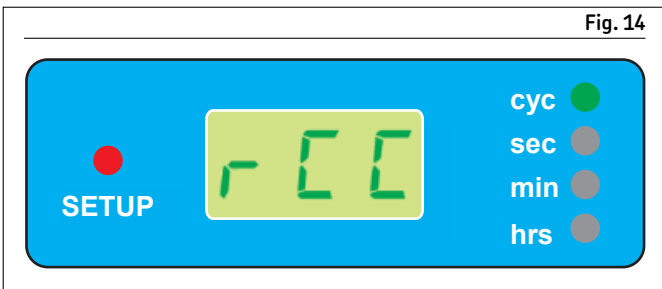
LED code descriptions



F = fault time in seconds, minutes or hours



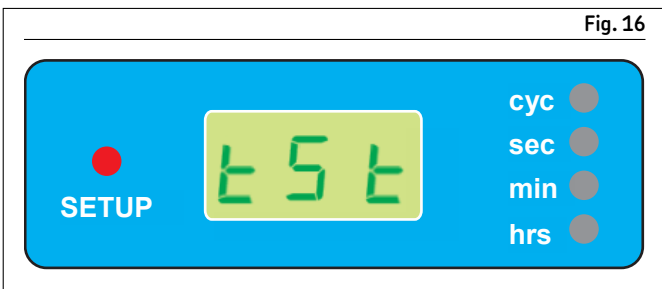
U = vent time in seconds, minutes or hours



rCC = run cycle counter

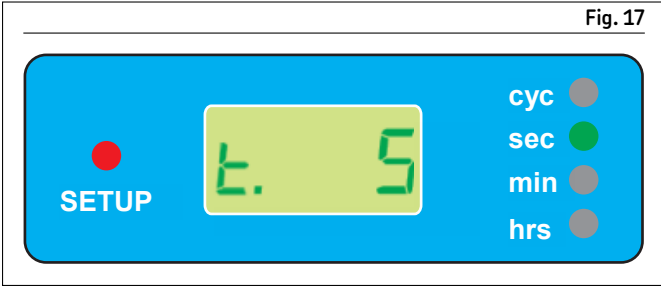


YES = confirms program changes



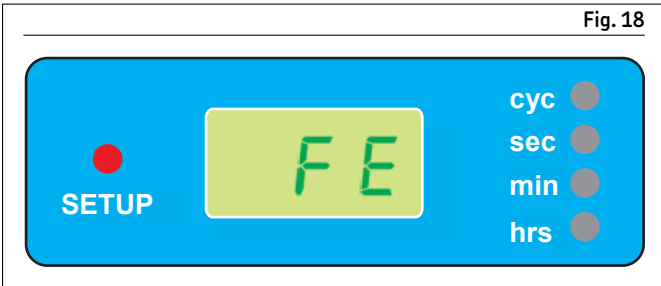
tSt = test mode for checking installed devices

Fig. 17



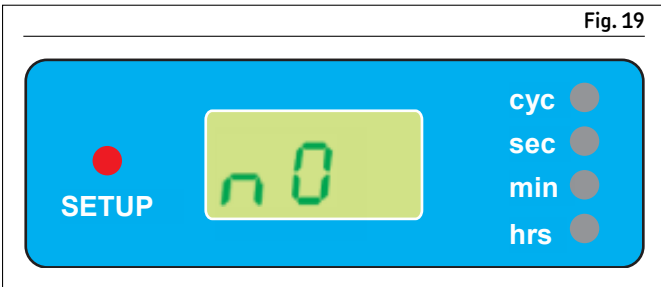
t = time out or dwell time for sensors

Fig. 18



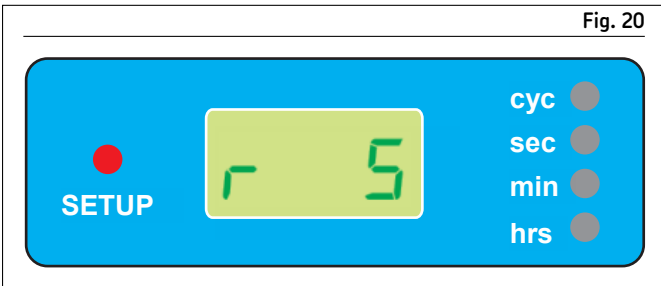
FE = fatal errors (pump stops on Low Level Fault)

Fig. 19



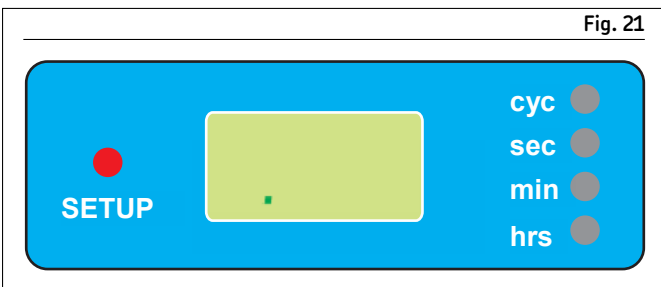
n0 = do not select selection

Fig. 20



r = run time in seconds, minutes or hours

Fig. 21

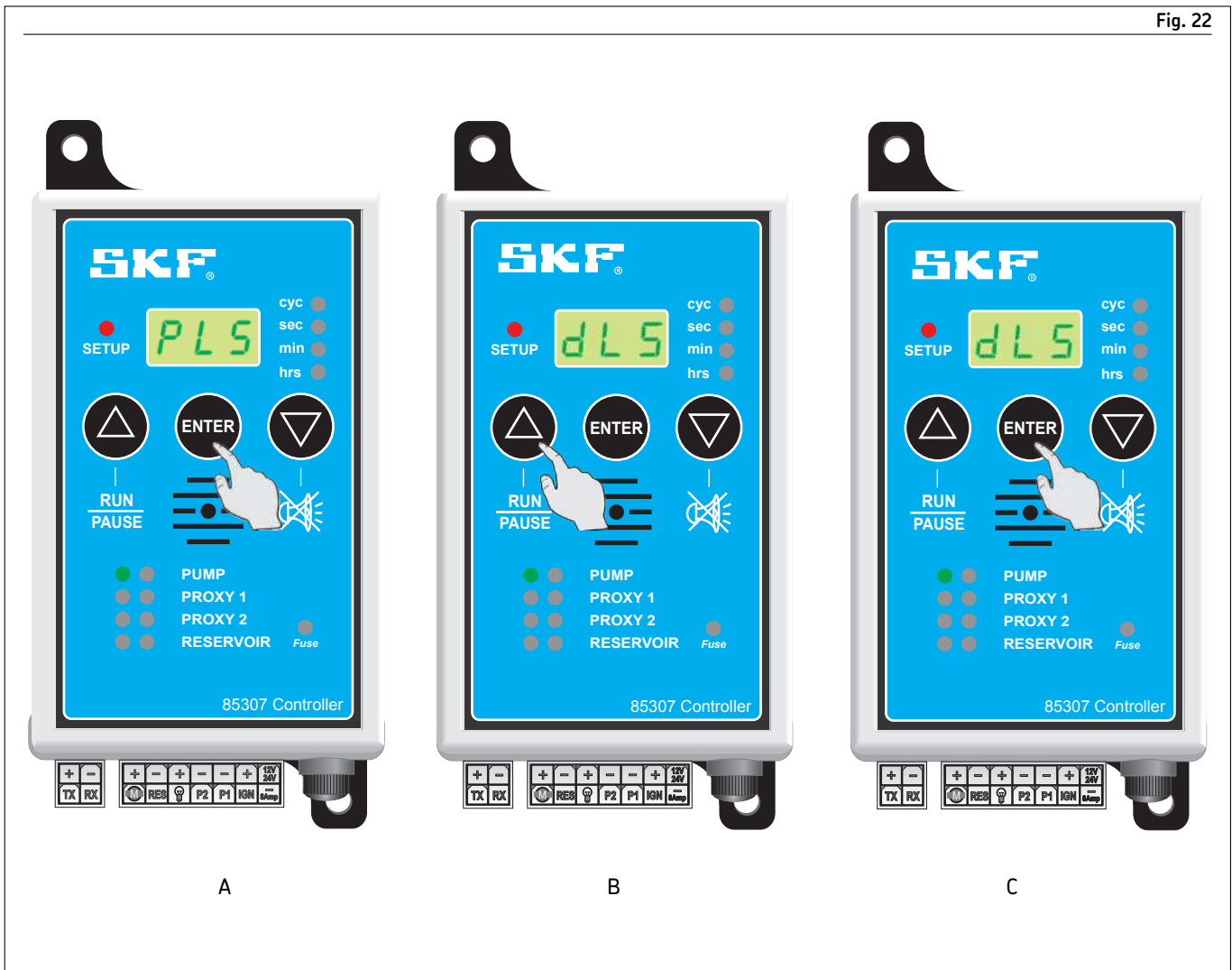


. = standby mode

Setup mode

Dual-line system using two pressure switches and hydraulic change-over valve

Fig. 22



- 1 To enter setup mode:
Press and hold **ENTER** while switching on controller power source.
- 2 Release **ENTER** and red LED next to **SETUP** illuminates.
Green LED next to **PUMP** flashes. **PLS** (progressive-line system) appears in display (Fig. 22 A).
- 3 Press **Δ** to select system type required:
Continue to press until **dLS** displays (Fig. 22 B).
- 4 Press **ENTER** to confirm use of dual-line system (Fig. 22 C).

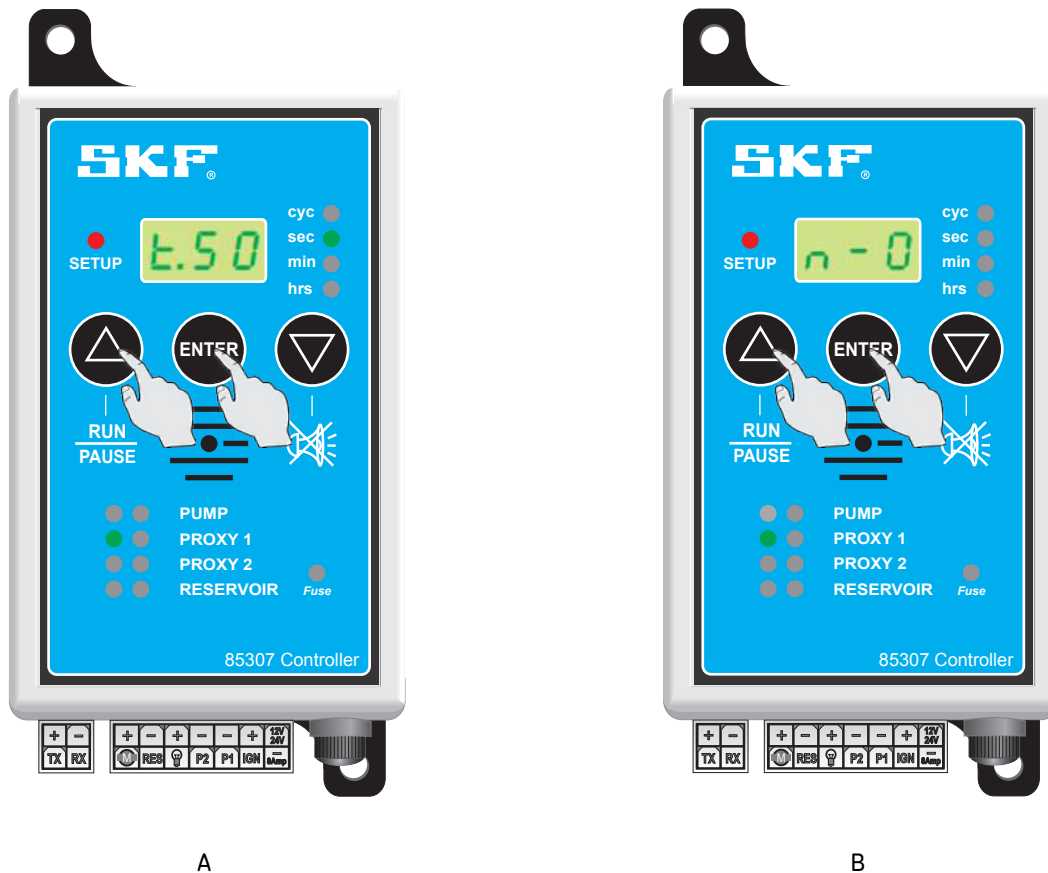


A

B

5 P (pause) appears in display. Press Δ to change time (Fig. 23 A). LED changes from seconds to minutes to hours. Display indicates amount of pause time when function is applied.

6 Press **ENTER** to confirm pause time. In example, pause time of 4 hours is confirmed (Fig. 23 B).



- 7 **t** (time out) for pressure switches displays. Adjust by pressing **Δ** to required time. Large systems time out is substantially greater than smaller systems. Time out, or dwell time, is actual time it takes pressure switch to close contacts. When pressure switch closes, signal is sent to controller that system is pressurized. Should a pipe break, pressure switch remains open. 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 switches system.
- 8 Press **Δ** to increase time out.
- 9 Press **ENTER** to accept (Fig. 24 A).

- 10 **n-0** (normally open) displays indicating whether pressure switch is normally open or normally closed. **n-0** switches are used for dual-line systems.
- 11 Press **Δ** to choose either **n-0** or **n-C**.
- 12 Press **ENTER** to accept choice (Fig. 24 B).



- 13** n0 (do not select) displays. Green LED on **PROXY 2** illuminates. Because two pressure switches 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 before going into pause cycle displays. Controller has unique feature of running multiple cycles because system monitors state of pressure switch, closed or opened, to allow next cycle to commence.
- 16** Press **Δ** to select number of run (**r**) cycles.
- 17** Press **ENTER** to accept settings (Fig. 25 B).



18 **n0** displays. Green LED on reservoir illuminates. Option of low level detection displays. If low level detection is not required, push **Δ** and select **n0**.

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-0** displays indicating whether sensor is normally open or normally closed. Press **Δ** to choose between **n-0** or **n-C**.

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

NOTE

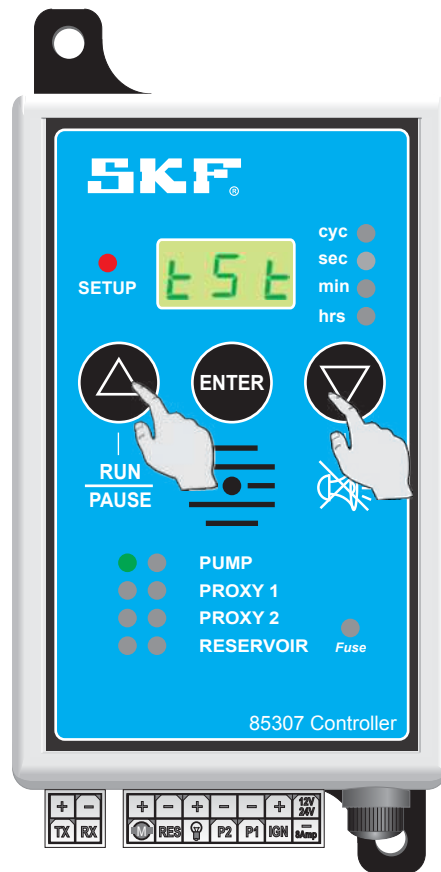
10-second delay occurs on startup when using low level sensor to ensure paddle assembly is in correct position.

Sensor activates on low level after 10 seconds. Low level warning displays when unit reaches pause status.



- 24 FE** (fatal error) or **nFE** (nonfatal error) appears in display.
 Option **FE** (fatal error) is used to stop pump on low level warning. Typically used on pumps with reservoir capacities from 0.26 to 2.6 gal (1 to 10 l). It is preferred to stop pump at low level to maintain layer of grease above pump element area thereby not allowing air pockets to form around pump element when filling up reservoir. Option **nFE** (nonfatal error) is recommended on larger pump reservoirs with substantial distance from pump tube to bottom of reservoir.
- 25** Select choice and press **ENTER** (Fig. 27 A).

- 26 L - F** (lamp flashing) displays. This option is used with external warning lamp. Typically, if monitoring is installed, this function is used. Press **Δ** 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.
- 27** Press **ENTER** with either choice selected to proceed to next part of programming (Fig. 27 B).



28 **tSt** (test mode) appears in display. Press **▲** for pump to start turning (Fig. 28). Correct pump from turning in wrong direction by changing polarity of wiring. Check other sensors by energizing them manually and observing if green LED illuminates. If LED does not illuminate, a problem exists with wiring or setup procedure. With external warning lamp, press **▼** and LED will either flash or show steady, indicating external device is working.

29 If all is correct, switch controller power to off and then to 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 on 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 on display for changes to be confirmed.

Fig. 29



Run mode

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

NOTE

After each cycle received, amount decreases by one until all cycles have been received. Unit then proceeds to pause time.

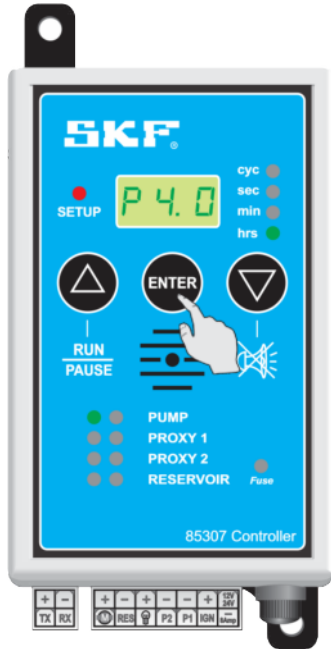
Fig. 30



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.

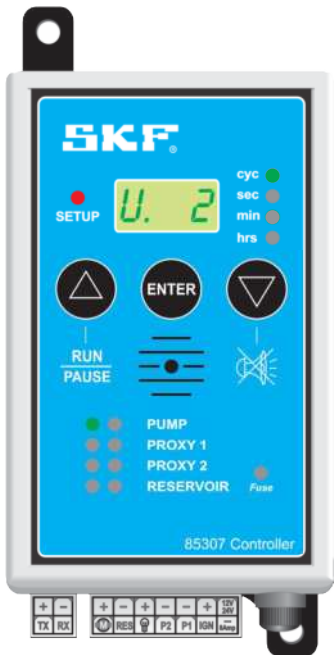
Fig. 31



Running system (pump pause)

Controller enters pause time when required run time is reached. Pause (P) time counts down from original setup time to zero and then resumes run time (Fig. 31). Green LED is steady next to **PUMP** indicating pump is on but not turning while in pause mode.

Fig. 32

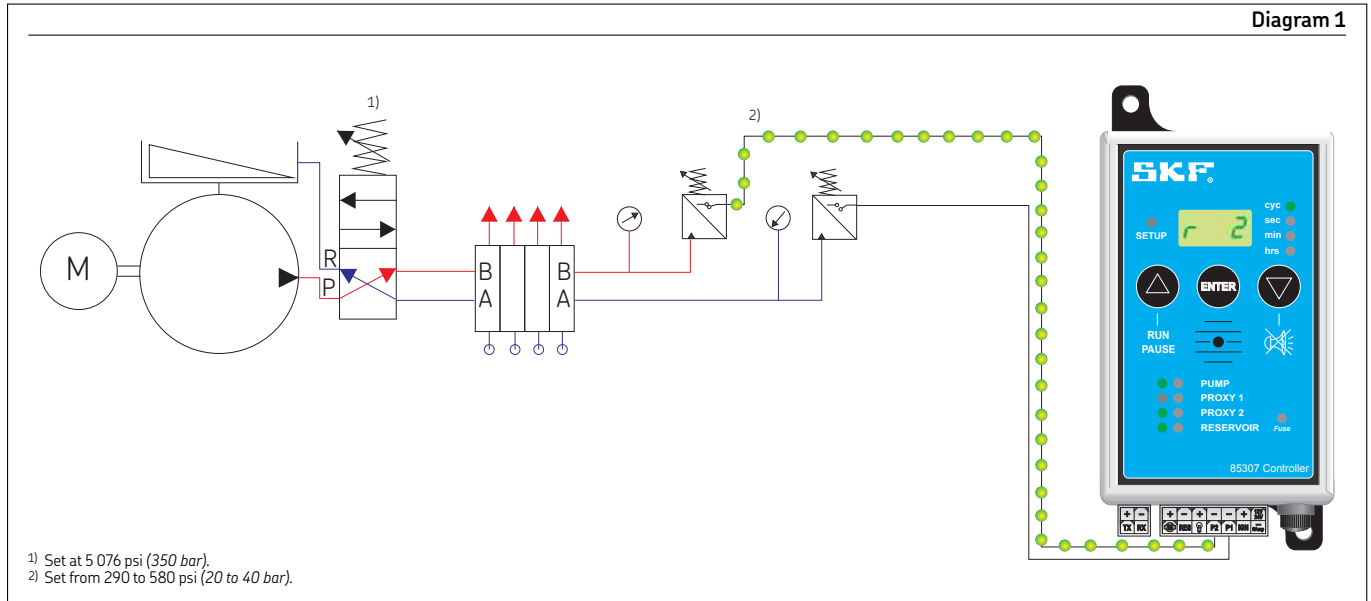


Running system (vent cycles)

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

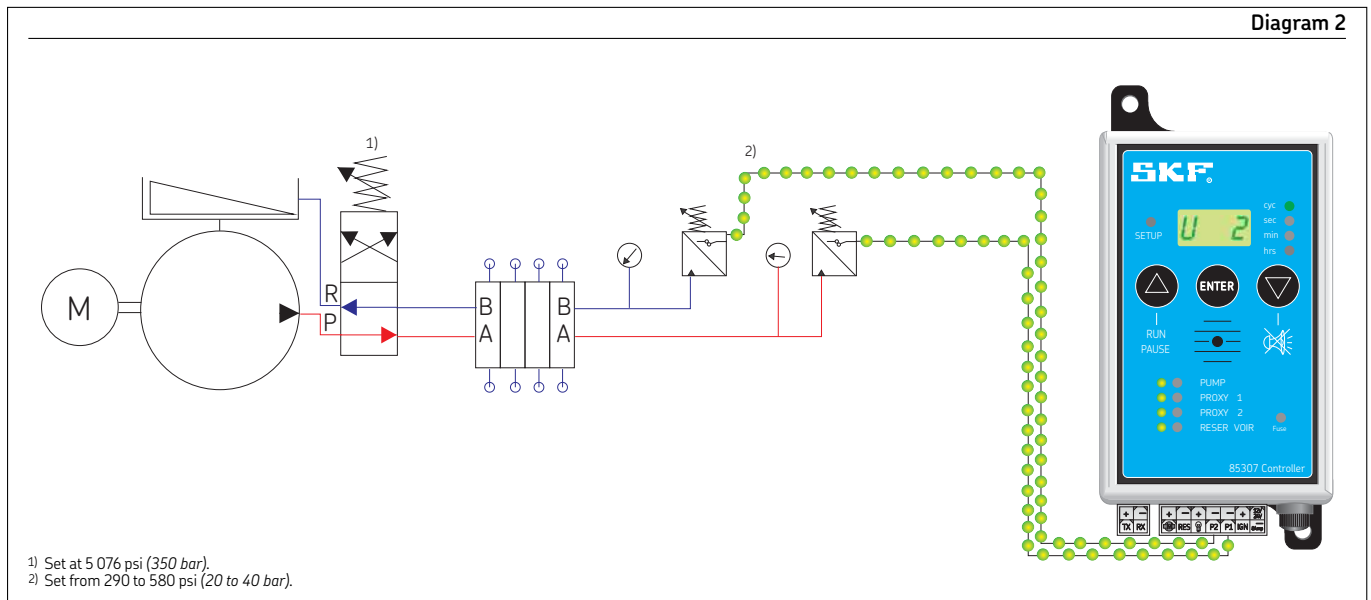
Stage 1

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.



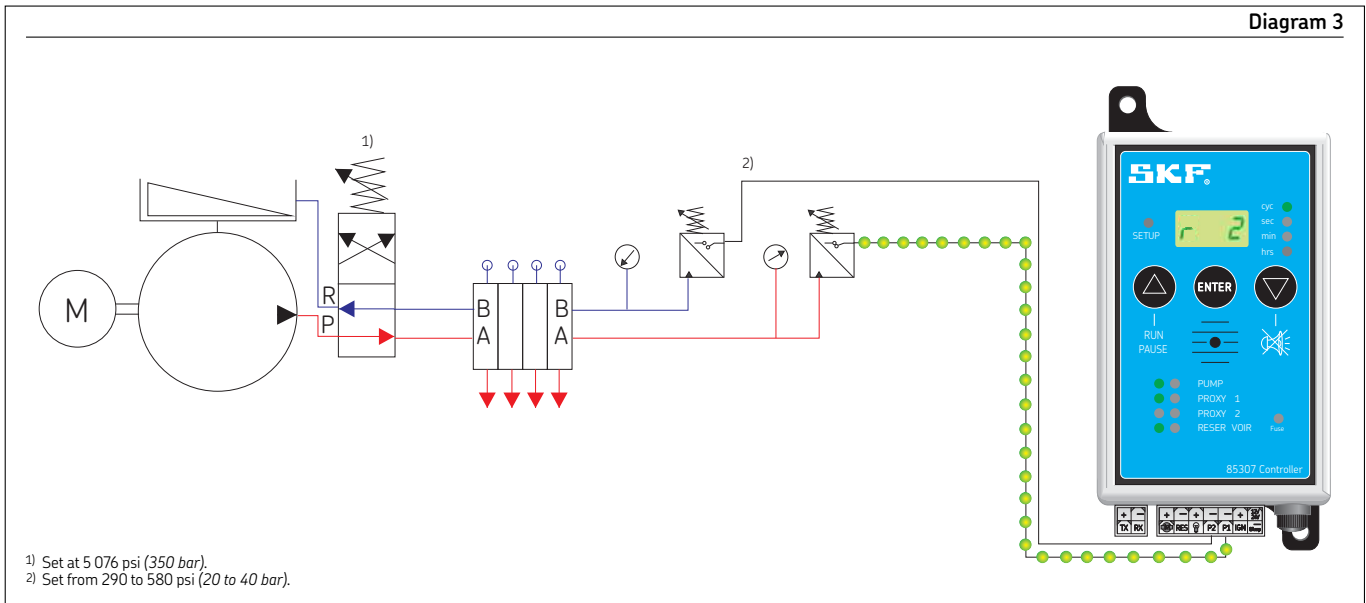
Stage 2

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.



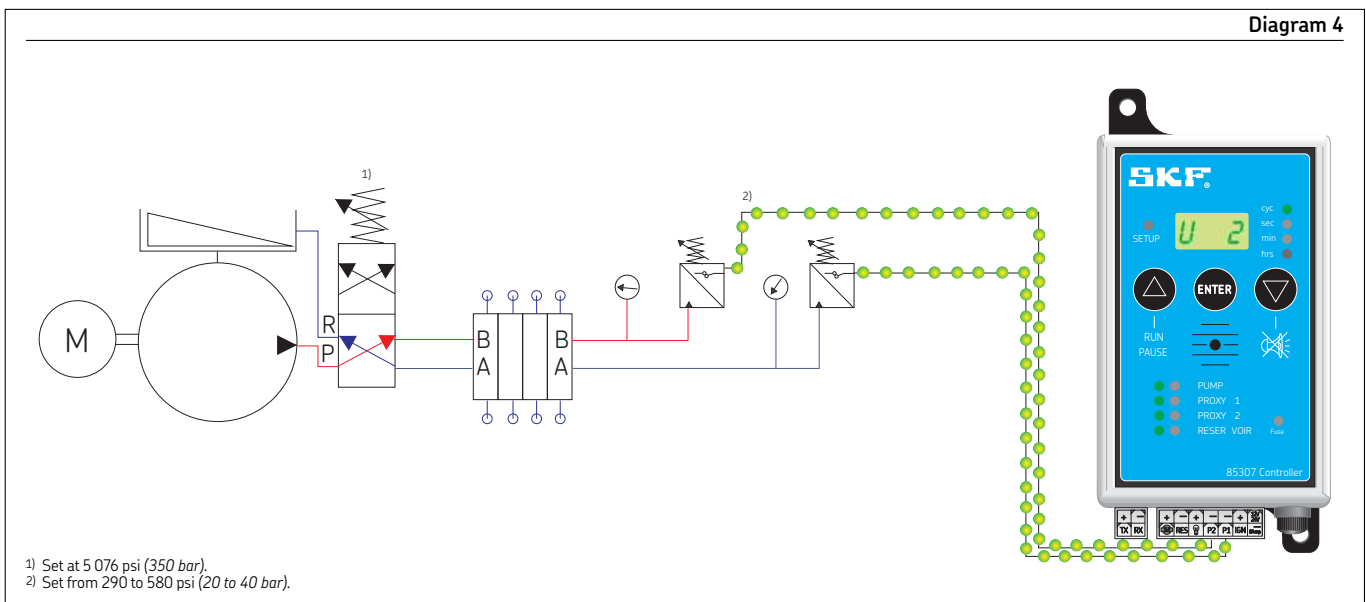
Stage 3

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 and waits for pressure switch on line A to open. Both LEDs illuminate. **U2** (vent) shows in display and indicates two cycles remaining.

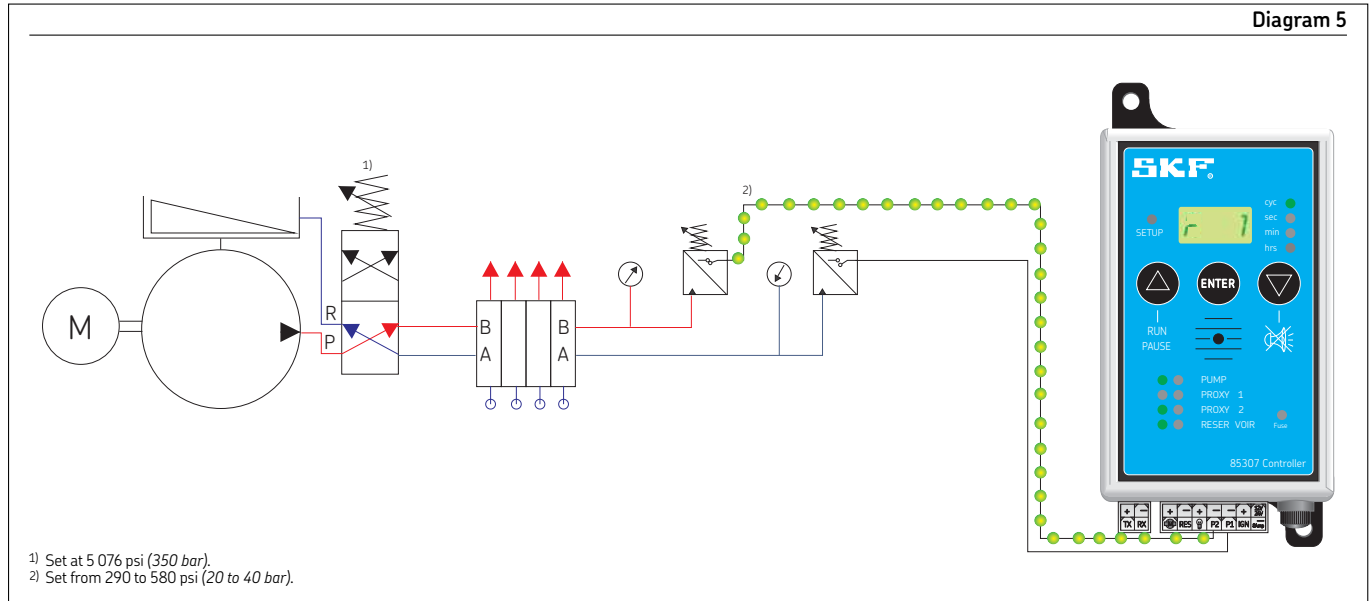


Stage 5

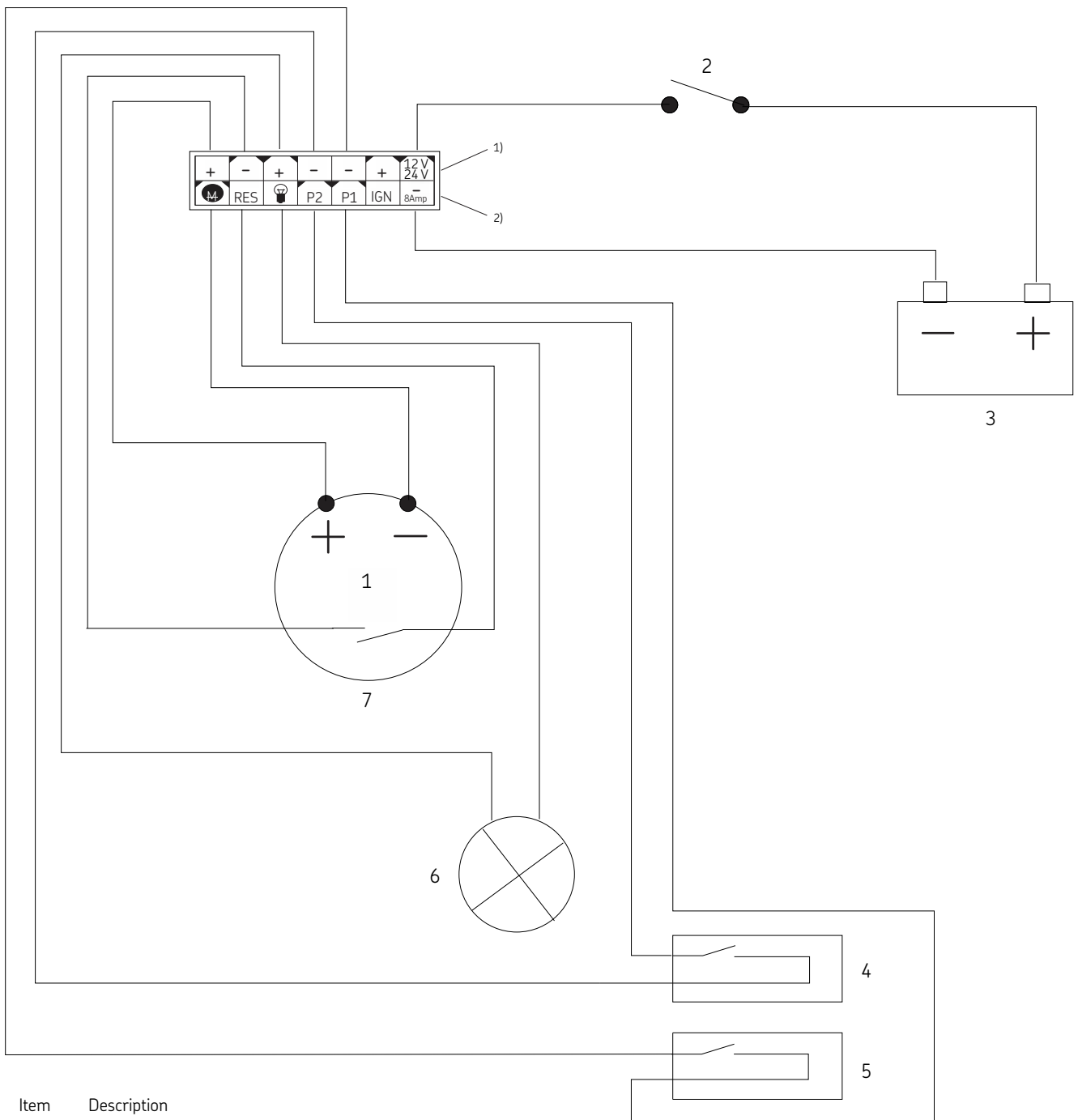
As line A pressure switch opens, pump begins to pump again.
Display shows one complete cycle has ended. A new cycle process begins again. When last cycle is reached, pump resumes pause cycle.

NOTE
It is possible to setup as many run cycles as desired.

Diagram 5



Wiring of pump with two pressure switches and hydraulic change-over valve



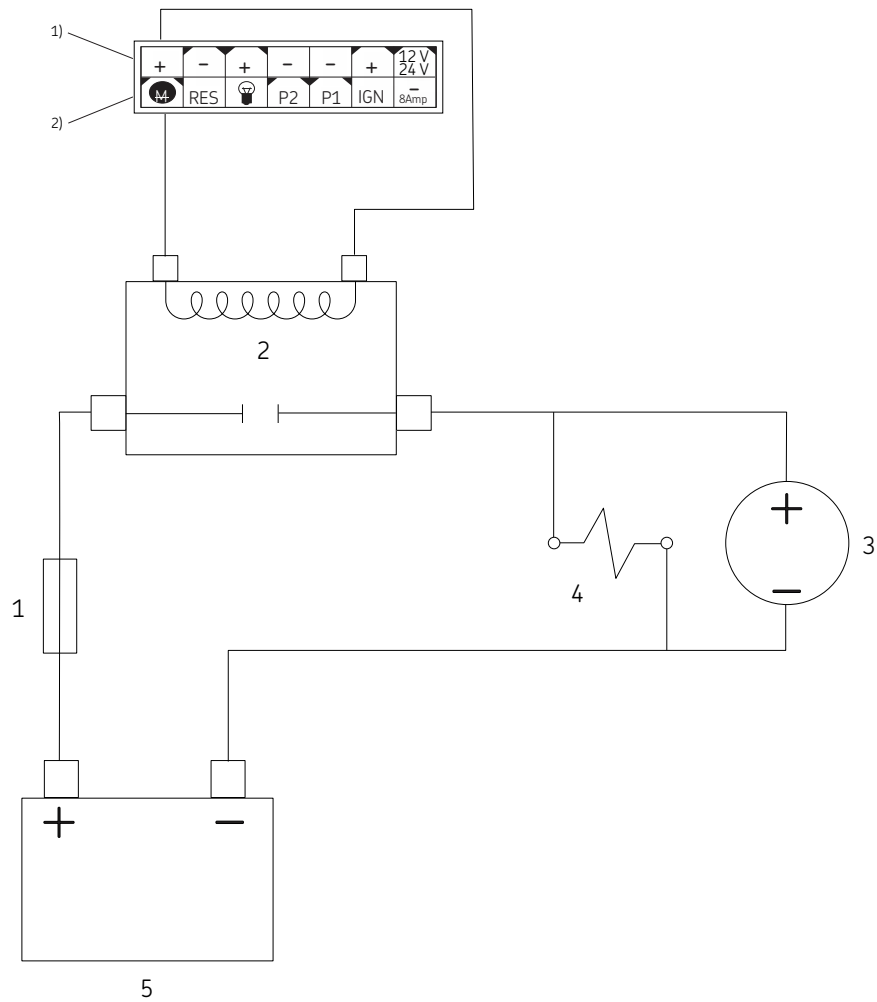
Item	Description
1	Motor
2	Power switch
3	Power supply
4	Pressure switch 2
5	Pressure switch 1
6	External warning lamp
7	Low level sensor


¹⁾ Top row represents front of controller.

²⁾ Bottom row represents back of controller.

NOTE: If motor amp draw exceeds the maximum specification (Table 1, page 3), solenoid relay switch (698975) must be used. Refer to Diagram 7, page 23.

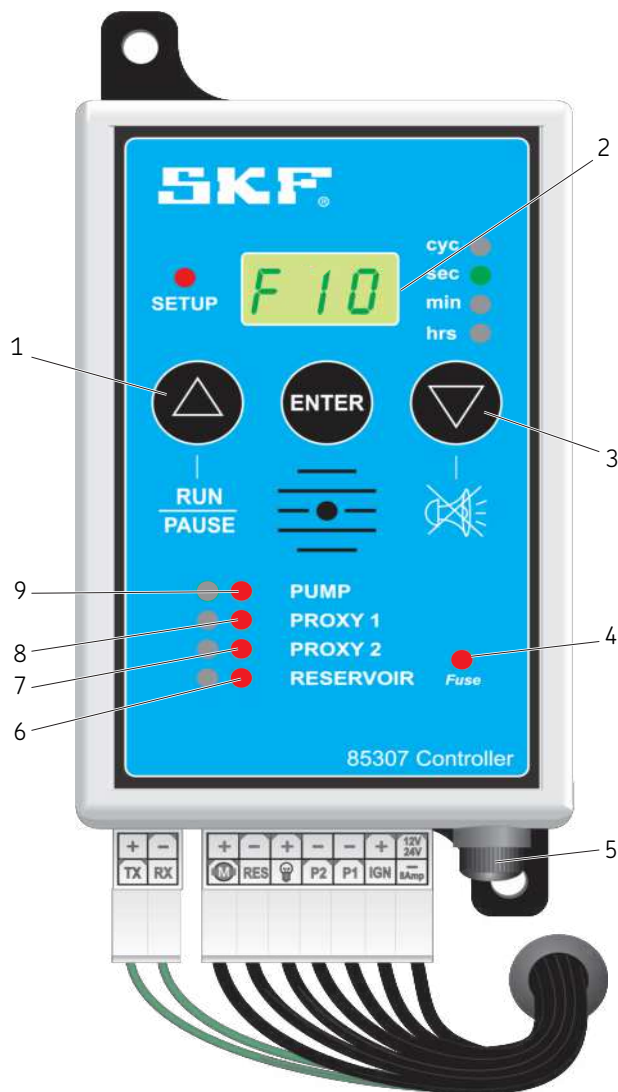
Wiring of pump with solenoid relay switch



Item	Description
1	Fuse, 7.5A
2	Solenoid relay switch
3	Motor
4	Vent valve solenoid (NO)
5	Power supply, 12 or 24V 

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

Fault indications



Item	Description
1	Press RUN/PAUSE to reset faults.
2	Fault indication – counts up from seconds to minutes to hours indicating how long fault has been active.
3	Press V button to silence buzzer.
4	Blown fuse indication – replace with 8A fuse.
5	Fuse holder – use 8A fuse.
6	Low level fault – possible cause, reservoir empty.
7	PROXY 2 fault – either faulty pressure switch, no lubricant in reservoir or broken main line.
8	PROXY 1 fault – either faulty pressure switch, no lubricant in reservoir or broken main line.
9	PUMP fault – either short circuit or wires are disconnected.

NOTE

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

Setup mode

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

Fig. 34



- 1 Refer to **steps 1-9** on **pages 10** through **12**.
- 2 **n0** (do not select) displays. Green LED on **PROXY 2** illuminates. When using microswitch monitoring half cycles select **n0**.
- 3 Press **ENTER** to accept and proceed to next part of setup (**Fig. 34 A**).

- 4 **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**.
- 5 Press **ENTER** to accept. 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-0** (normally open) appears in display. Indicates if sensor is normally open or normally closed. Press **Δ** to choose between **n-0** or **n-C**.
- 8 Press **ENTER** to confirm choice (Fig. 35 A).

- 9 **FE** (fatal error) or **nFE** (nonfatal error) appears in display. Option **FE** (fatal error) is used to stop pump on low level warning. Typically used on pumps with reservoir capacities from 0.26 to 2.6 gal (1 to 10 l). It is preferred to stop pump at low level to maintain layer of grease above pump element area thereby not allowing air pockets to form around pump element when filling up reservoir. Option **nFE** (nonfatal error) is recommended on larger pump reservoirs with substantial distance from pump tube to bottom of reservoir.
- 10 Select choice and press **ENTER** (Fig. 35 B).



11 L - F (lamp flashing) displays. This option is used with external warning lamp. Typically, if monitoring is installed, this function is used. Press **▲** 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.

12 Press **ENTER** with either choice selected to proceed to next part of programming (**Fig. 36 A**).

13 tSt (test mode) appears in display. Press **▲** for pump to start turning (**Fig. 36 B**). Correct pump from turning in wrong direction by changing polarity of wiring. Check other sensors by energizing them manually and observing if green LED illuminates. If LED does not illuminate, a problem exists with wiring or setup procedure. With external warning lamp, press **▼** and LED will either flash or show steady, indicating external device is working.

14 If all is correct, switch controller power to off and then to 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 on 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 on display for changes to be confirmed..

Fig. 37



Run mode

Unit proceeds in run (r) mode after power is terminated on unit and then switched on again. All devices selected display. Device 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 microswitch and in turn sends pulse to control unit. As control unit receives pulse, system stops pumping and resumes in pause cycle programmed during setup.

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.

Fig. 38



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. 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.

Fig. 39



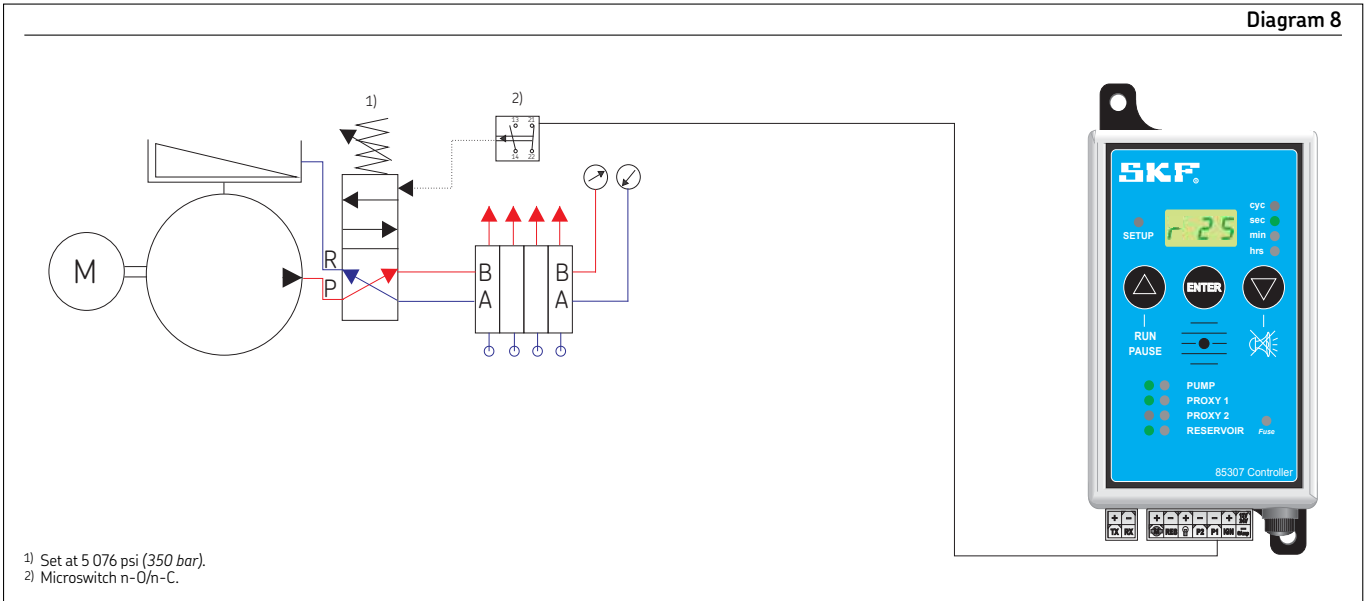
Running system (pump pause)

Controller goes into pause time when required run time is reached. Pause (P) time counts down from original setup time 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 microswitch. Pump LED on control unit flashes while pump works.

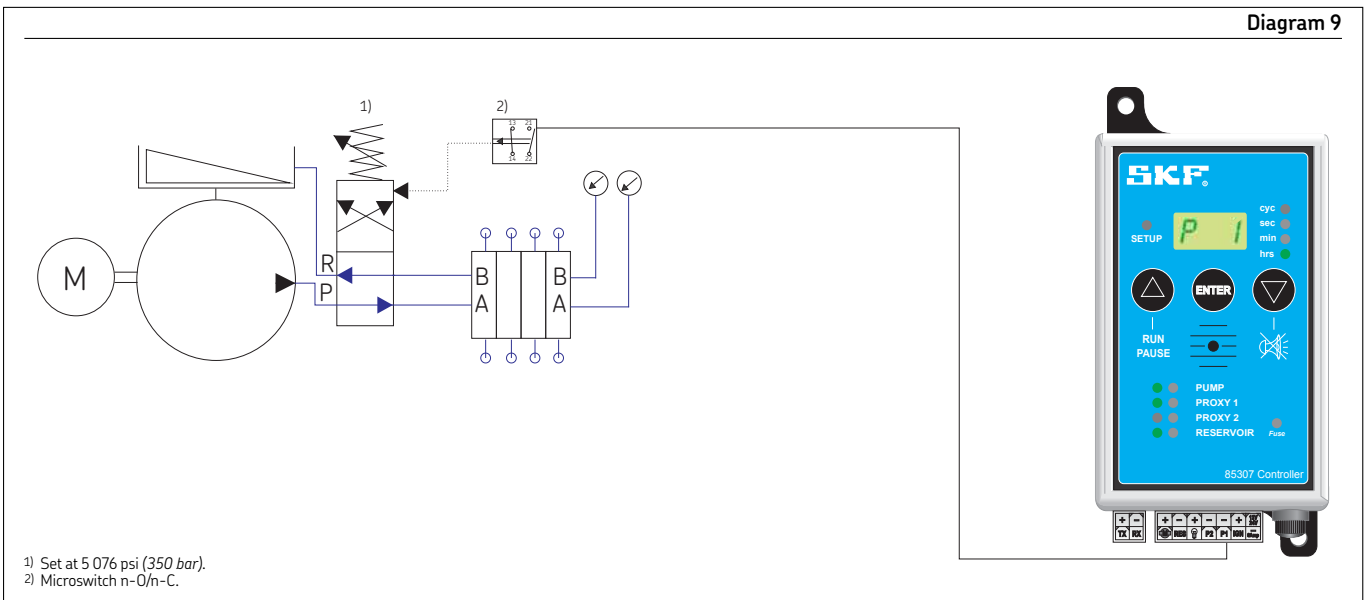
Diagram 8



Stage 2

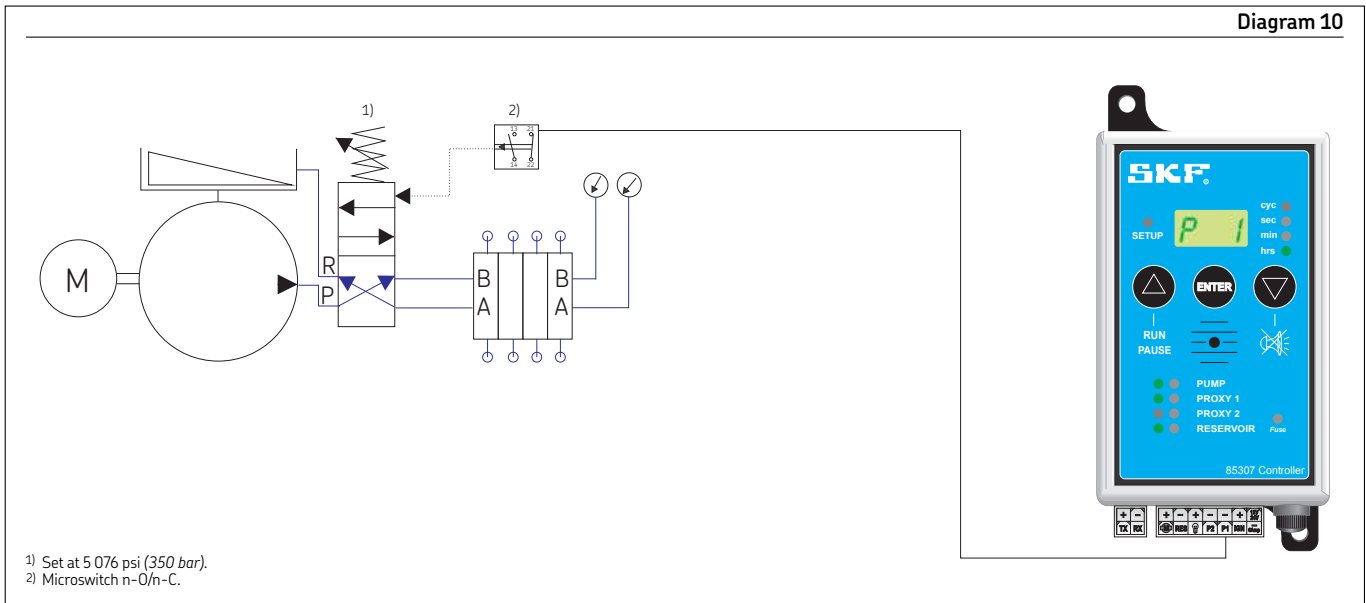
As microswitch activates, pump stops working and resumes pause time. Display indicates remaining time of pause cycle. All other LED's illuminate. Pump LED does not flash.

Diagram 9



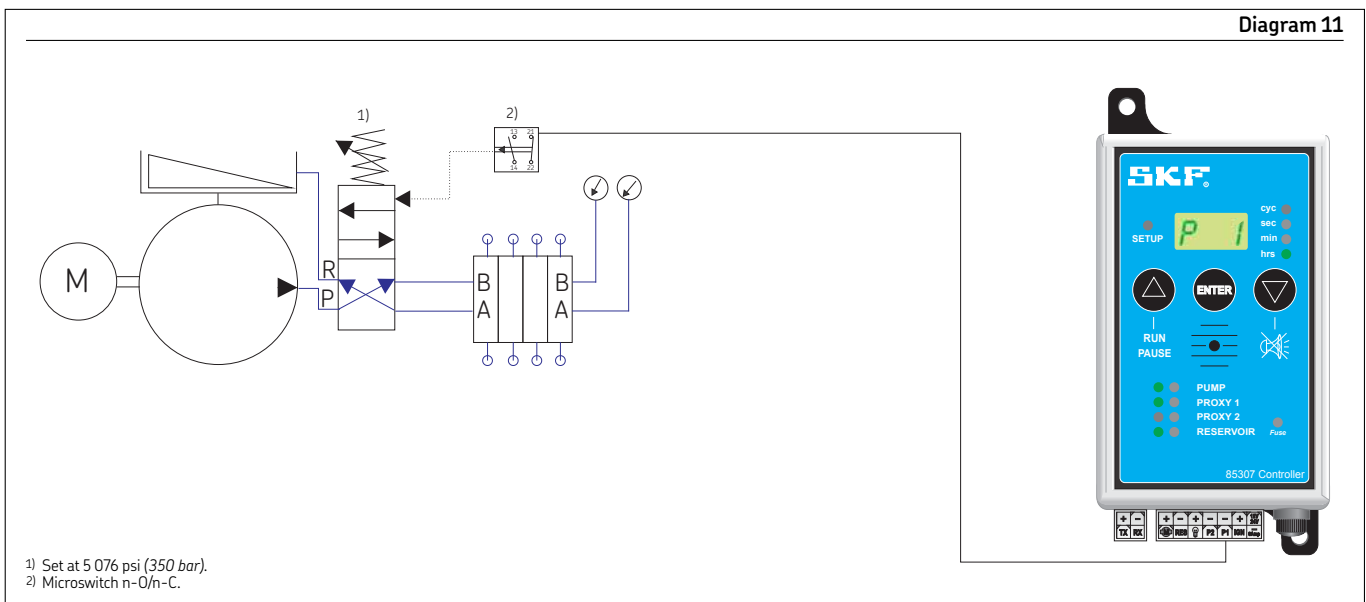
Stage 3

As pause time completes cycle, pump begins to pump and pressurize line A. Time needed to reach pressure setting might vary from line B due to different configurations affecting back pressures. Pump LED on control unit flashes while pump works.

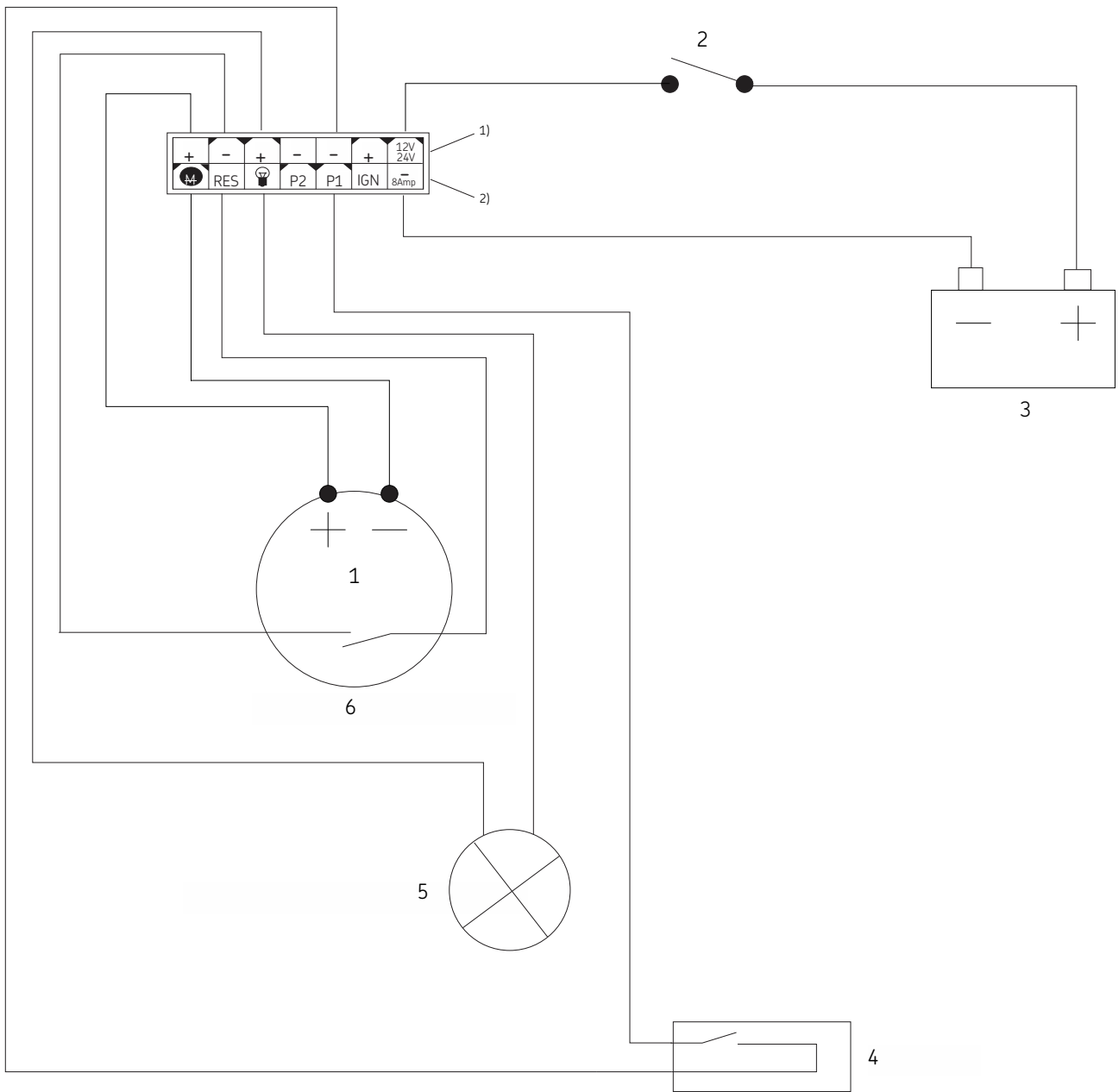


Stage 4

As pressure in stage 3 is reached, change-over valve activates and changes position of microswitch. At this point, pump stops and system resumes pause cycle. Process continues as explained above.



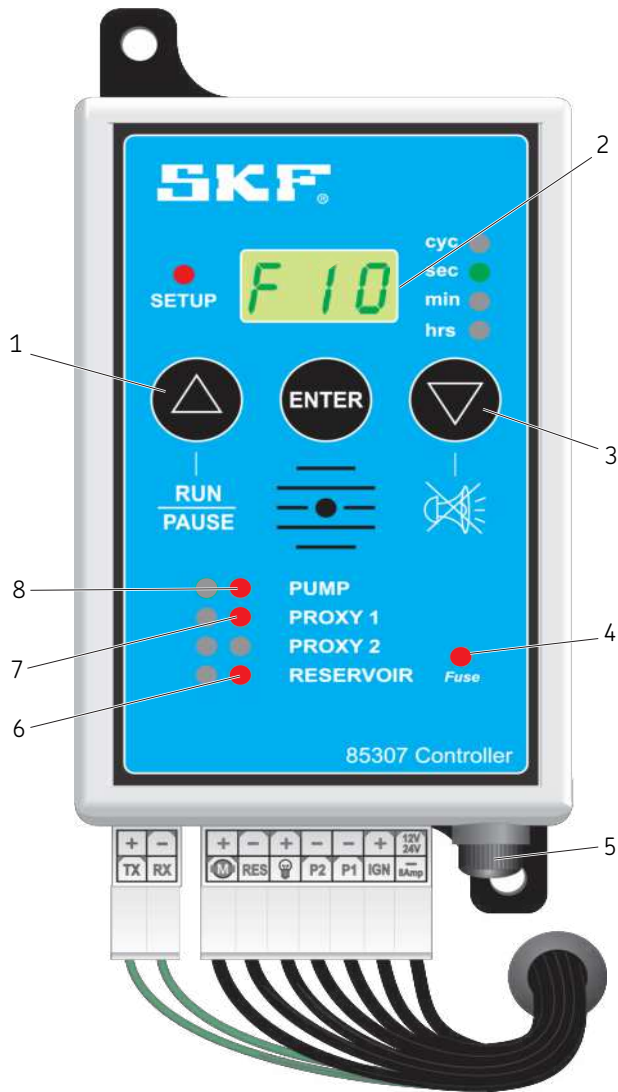
Wiring of pump with dual-line system using 1/2 cycles and hydraulic change-over valve



Item	Description
1	Motor
2	Power switch
3	Power supply
4	Microswitch
5	External warning lamp
6	Low level sensor

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

Fault indications



Item	Description
1	Press RUN/PAUSE to reset faults.
2	Fault indication – counts up from seconds to minutes to hours indicating how long fault has been active.
3	Press V button to silence buzzer.
4	Blown fuse indication – replace with 8A fuse.
5	Fuse holder – use 8A fuse.
6	Low level fault – possible cause, reservoir empty.
7	PROXY 1 fault – either blockage in system or faulty sensor.
8	PUMP fault – either short circuit or wires are disconnected.

NOTE

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

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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.

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