



## *DripDoser*

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## *User Guide*

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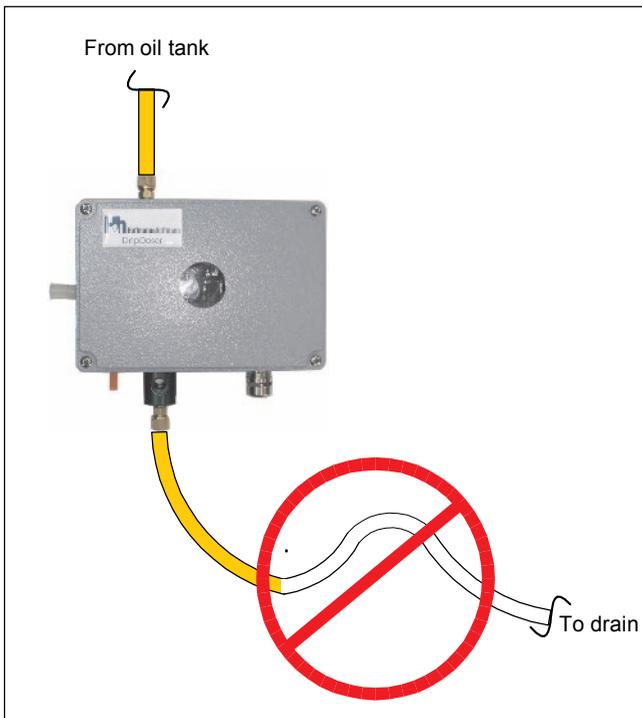
# CAUTION!

Avoiding unnecessary alarms and ensuring the free flow of oil.

## AVOID UNNECESSARY ALARMS

Refer to section 3.3.2 Adjusting the Drip Rate for proper adjustments.

## ENSURE THE FREE FLOW OF OIL



Entire drain tube must face downward to prevent oil backup.

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# 1 Introduction

## 1.1 Overview

The DripDoser is an active vertical lineshaft lubrication-dosing device that:

- Protects your irrigation turbine pump from running dry
  - Detects loss of oil supply
  - Detects clogged or pinched delivery input line/clogged output line
- Controls pump, provides fail-safe oil output and alarm
- Reduces oil consumption and minimizes well contamination by dripping only the required amount of oil
- Alarm can be set for N.O. or N.C. contacts with a slide switch

The DripDoser controls the amount of oil that is supplied to the lineshaft according to the drip rate setting on the PC board (SW3). Refer to the Figure 1. The drip rate setting controls the on time of the duty cycle of power supplied to the ON/OFF solenoid. The solenoid is ON until the specified number of drops pass through the DripDoser, after which the solenoid is turned OFF for the remainder of the one minute duty cycle.

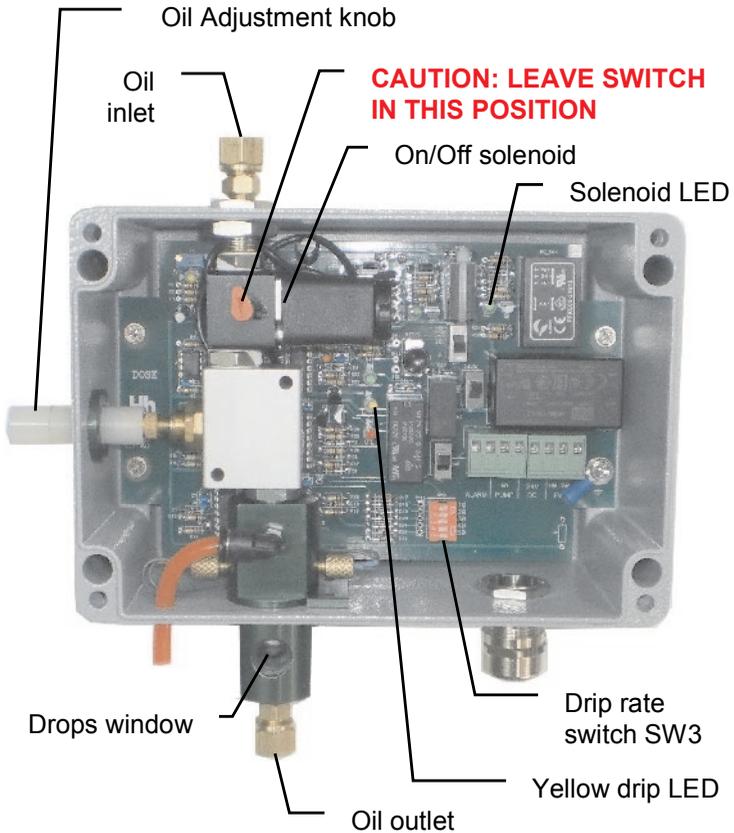
The Oil Adjustment knob controls a restrictor that sets the correct amount of oil to satisfy the demands set by the DIP switch setting on the PC board. Refer to section **3.3.2** Adjusting the Drip Rate for proper adjustment.

### 1.1.1 Setup Procedure Overview

Choose only one toggle switch on Drip rate switch SW3 and turn it on for the required dpm value (10, 20, 30, 40, or 50 dpm).

To ensure that a sufficient amount of oil is provided to meet the demand of the drip rate, it is recommended that the Oil Adjustment

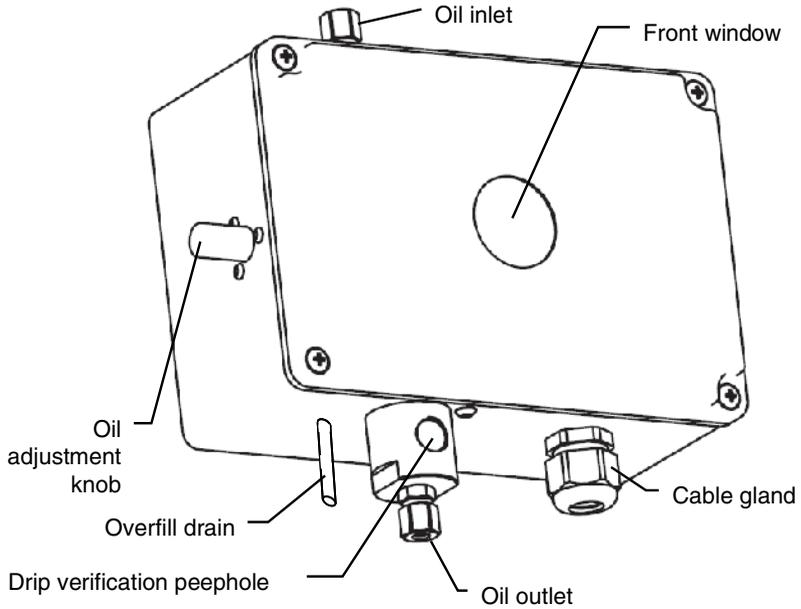
knob be adjusted so that in a period of approximately 10 – 20 seconds, the number of drops passing through the DripDoser equals the drops/minute setting of the drip rate switch. This can be accomplished easily by adjusting the Oil Adjustment knob so that the Solenoid LED stays on for roughly 10 – 20 seconds.



**Figure 1: DripDoser Interior**

## 1.2 External Layout

The external layout of the DripDoser is shown in the figure below.



**Figure 2: DripDoser external layout**

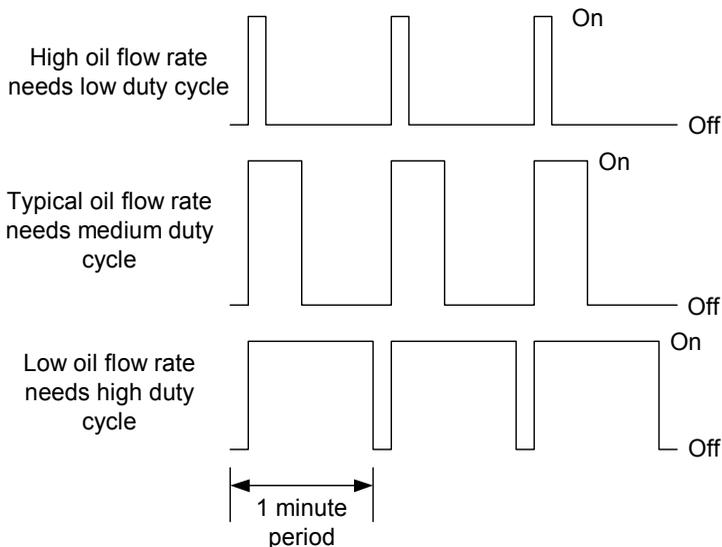
Table 1 explains the function of each component shown in Figure 2.

**Table 1: External connections and interface**

<b>Connection or control</b>	<b>Description</b>
Oil inlet	Oil from the oil tank enters here. A small input filter is mandatory.
Oil outlet	Oil to the pump line shaft exits here.
Cable gland	Power and electrical connections are routed through here.
Oil adjustment knob	Enables the operator to adjust the oil drip rate to allow proper operation and to avoid unnecessary false alarms.
Drip verification peephole	Allows the operator to view oil drops exiting the DripDoser.
Front window	Allows the operator to view the LEDs indicating system status.
Overfill drain	This tube allows oil to drain from the DripDoser in the event the outlet line is clogged.

### 1.3 Principle of Operation

The unit automatically controls the amount of oil flowing to the lineshaft by changing the duty cycle of the solenoid that allows oil flow through the DripDoser (Figure 3).



**Figure 3: Solenoid duty cycle control**

The solenoid duty cycle is set by a dip switch setting according to the dpm (drips/minute) required by the user.

An oil adjustment knob is set to make sure that not too much oil or too little oil flows through the DripDoser, so as to avoid alarms.

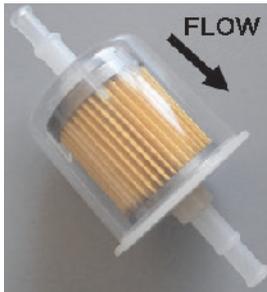
## 2 Installation

### 2.1 General

The DripDoser installation procedure is simple and does not require any special tools, but requires site preparation.

### 2.2 Well Site Requirements

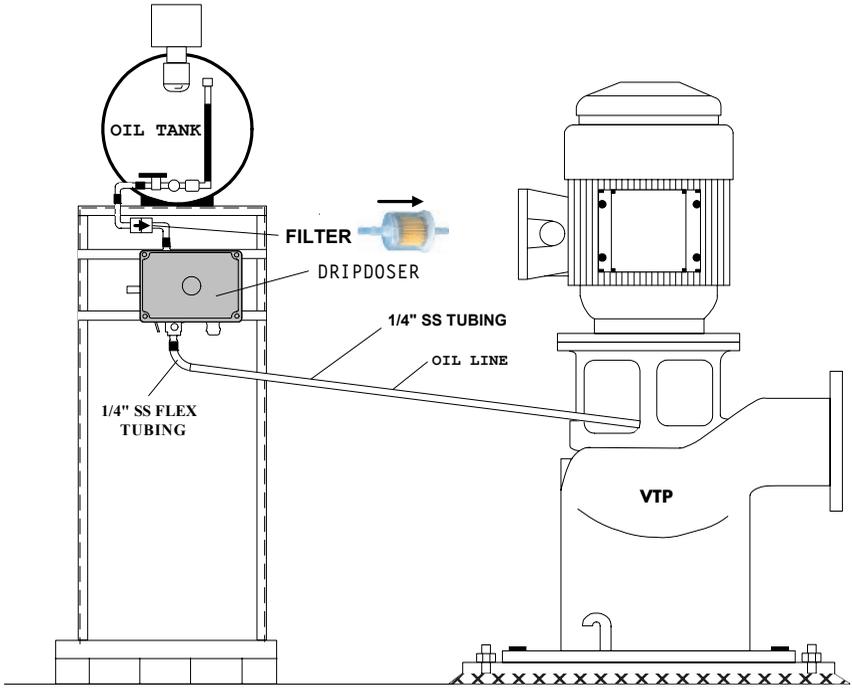
- Line power (110 VAC, 220 VAC, or 24 VDC) must be available at the well pump.
- A sturdy, vertical pole with a welded metal plate should be in close proximity to the well pump.
- Installation of the supplied oil filter at the oil inlet is mandatory for proper functioning of the DripDoser. Replace the filter periodically (every 6-12 months).



**Figure 4: In-line oil filter**

**Note:** For large oil tanks (35 to 50 gallons), mount the DripDoser to the oil tank stand.

**Important:** The relative spacing between the oil tank, the DripDoser, and the line-shaft inlet should be according to Figure 5. Ensure that the angle of the copper tube is sufficient for gravity flow from the DripDoser to the line shaft.



**Figure 5: Installation requirements**

## 2.3 Installation Kit

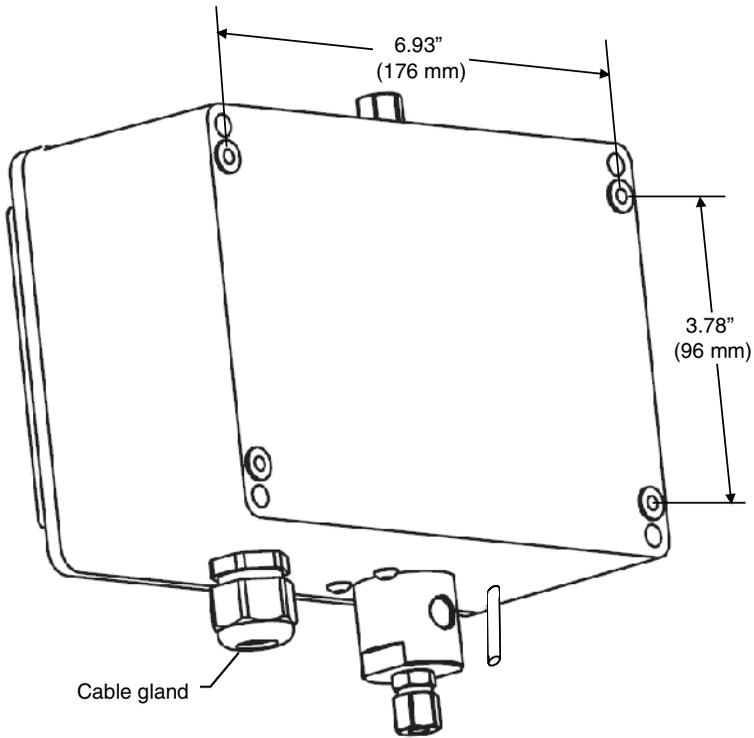
The DripDoser is supplied with the following:

- 4 – mounting bolts
- 8 – nuts
- 8 – lock washers
- 1 – oil filter

Make sure that all of the kit items are present.

Mounting the DripDoser:

1. In order to mount the DripDoser, drill four 1/4-inch holes in the metal plate that mounts the DripDoser according to the drilling template shown in Figure 6: DripDoser – rear view showing mounting centers
2. Remove the DripDoser front cover.
3. Place a bolt into a mounting hole, and keep it in place by using a nut.
4. Repeat step 3 for the other bolts.
5. Secure the device to the metal plate using the remaining nuts and lock washers.
6. Install the inlet oil filter as shown in Figure 5, noting the filter is directional.



**Figure 6: DripDoser – rear view showing mounting centers**

## **2.4 Wiring the Power and Control Cable**

The power and control cable is routed through the bottom of the connection box through the cable gland (see Figure 6).

Wire the DripDoser according to Figure 7. Connections are described in detail in Table 2.

1. Connect the green ground wire to a chassis screw or bolt, preferably using a ring terminal. See Figure 7, adjacent to the wiring terminal blocks.
2. Connect the power/drip/pump/alarm cable to the wiring terminal blocks shown in Figure 7, according to Table 2.

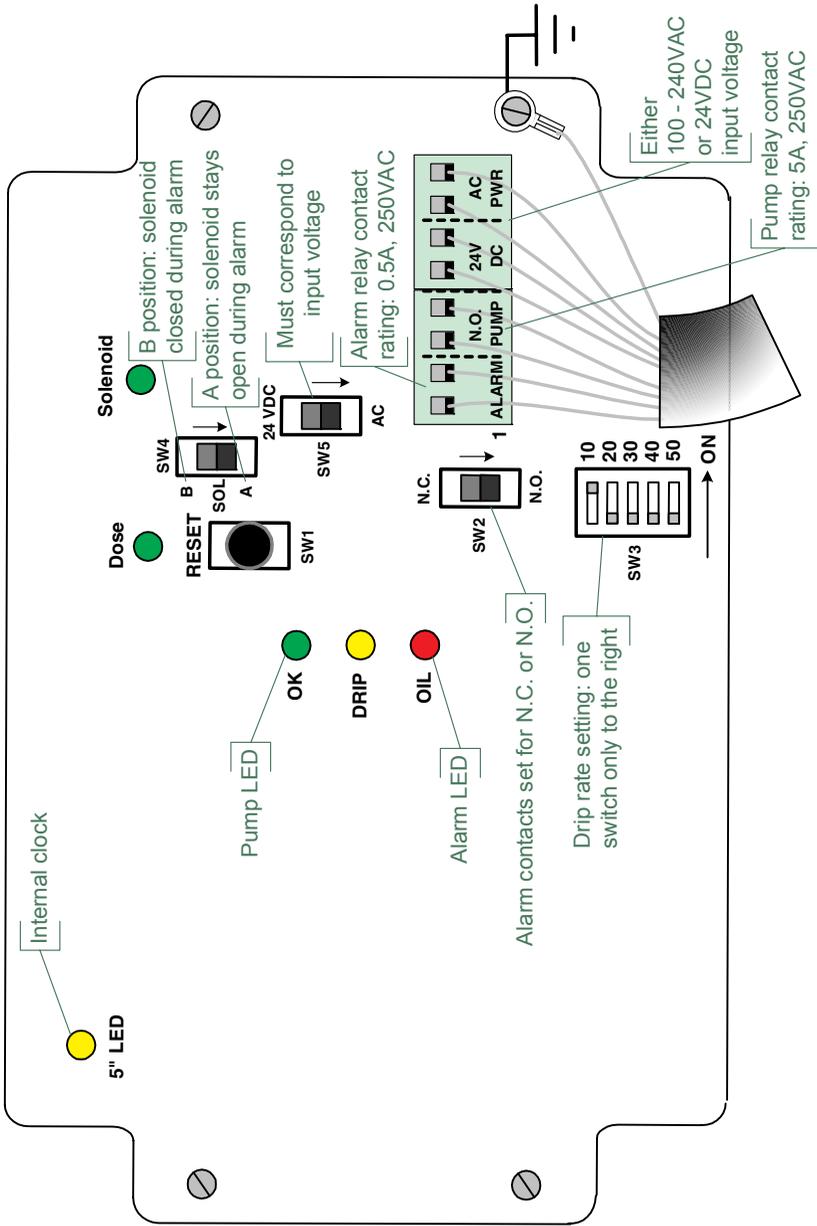


Figure 7: DripDoser – key components

**Table 2: Power/pump/alarm connections**

<b>Connection Name</b>	<b>Terminal block #</b>
ALARM – 1	1
ALARM – 2	2
PUMP – C	3
PUMP – N.O.	4
24VDC – (+)	5
24VDC – (-)	6
AC PWR (100 or 240V) – L1	7
AC PWR (100 or 240V) – L2	8
CHASSIS GROUND	Chassis screw

3. Connect the DripDoser oil outlet (Figure 2 and Figure 5) to the well shaft inlet by means of flexible ¼-inch copper tubing or stainless steel tubing.

**Note:** Use 18 AWG wires in the power/pump/alarm cable.

## 2.5 Setting Oil Drip Rate

1. Open the DripDoser cover by removing the four cover screws.
2. Set the drip rate by following the procedure in section 3.3.2 Adjusting the Drip Rate.
3. Replace the DripDoser cover and tighten the four cover screws.

**Table 3: DripDoser response to oil availability**

Oil Availability	LED/Contact Status
<p>Sufficient oil <i>(Amount of oil supplied equals the drip rate setting over a one minute period.)</i></p>	<ul style="list-style-type: none"> <li>• OK (PUMP) green LED is on</li> <li>• OIL (ALARM) red LED is off</li> <li>• Pump N.O. contact is closed</li> <li>• Alarm N.O. or N.C. according to switch SW2 position</li> </ul>
<p>Lack of oil (3 possibilities):</p> <ol style="list-style-type: none"> <li>1. <i>Clogged oil inlet or outlet.</i></li> <li>2. <i>Empty oil tank.</i></li> <li>3. <i>Continuous oil flow due to excessive oil flow: reduce via oil adjustment knob.</i></li> </ol>	<ul style="list-style-type: none"> <li>• OK (PUMP) green LED is off</li> <li>• OIL (ALARM) red LED is on</li> <li>• Pump N.O. contact is open</li> <li>• Alarm N.O. or N.C. according to switch SW2 position</li> </ul>

# 3 Operation

## 3.1 PCB Controls and Indicators

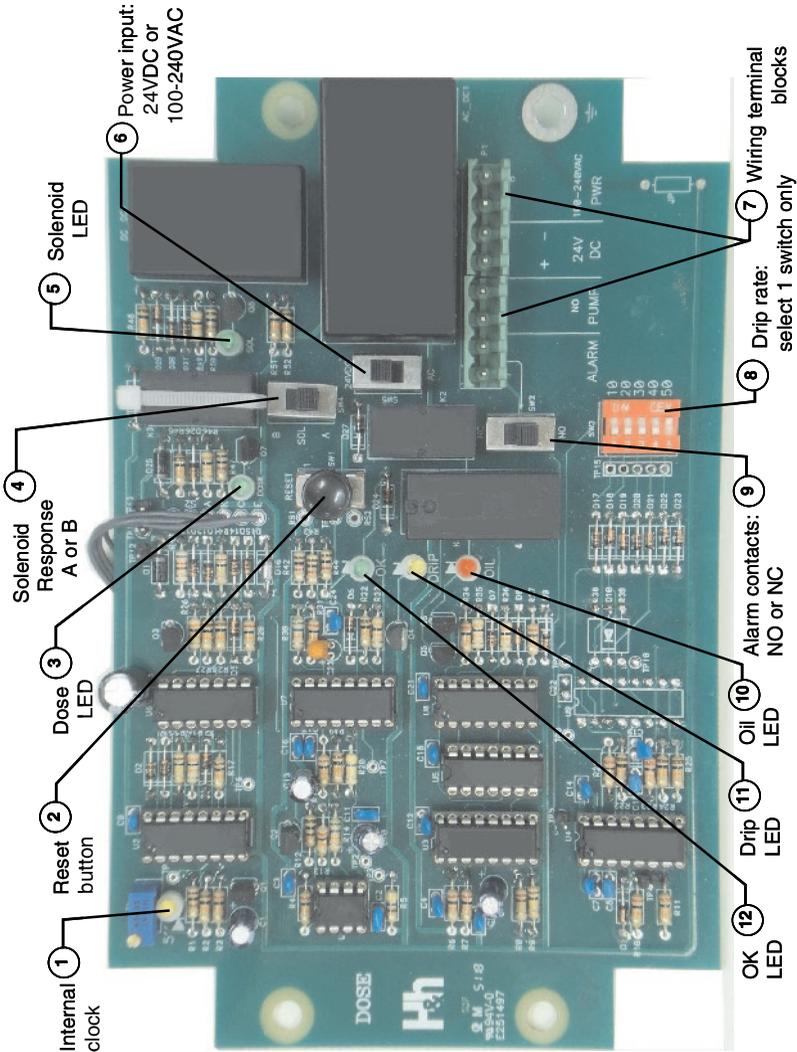


Figure 8: DripDoser – PC board layout

Switch and indicator locations on the DripDoser PC board are shown below. Refer to Figure 8.

**Table 4: DripDoser – controls and indicators**

Item	Name	Control or Indicator	Function
2	<b>Reset button</b>	Push button	Resets the DripDoser; see section 3.5 Resetting the DripDoser .
4	<b>Solenoid A or B</b>	Slide switch SW4	Position A (down position): to protect machinery: keeps solenoid open even during an alarm. Position B (up position): to protect environment: closes the solenoid during an alarm. <b>The switch position is decided by the customer.*</b>
6	<b>24VDC or AC</b>	Slide switch SW5	Selects 24 VDC or AC input voltage (100 to 240VAC).
7	<b>Wiring terminal blocks</b>	Terminal blocks	Input voltage, pump, and alarm connections.
8	<b>Drip rate switch</b>	DIP toggle switches SW3	Sets the drip rate (and oil alarm) setting. Choose <b>only one</b> toggle switch, and push to the ON position for the desired dpm value: (10, 20, 30, 40, 50).
9	<b>Alarm contacts: NO or NC</b>	Slide switch SW2	Provides either N.O. or N.C. contacts for the alarms.
<p><b>*ATTENTION DURING ALARM STATE:</b></p> <p>It is operator's decision to select the A or B position of SW4. An alarm state can be caused by continuous oil flow (oil adjustment not restricted sufficiently) or insufficient oil flow. During an alarm state:</p> <p>If SW4 is in the A position, oil waste and well contamination may occur, but the pump is protected. The Solenoid LED is on.</p> <p>If SW4 is in the B position, there is no waste or well contamination, but the pump is unprotected. The Solenoid LED is off.</p>			

Item	Name	Control or Indicator	Function
1	<b>Internal clock LED</b>	Yellow LED	<i>For factory use only: 5"</i>
3	<b>Dose LED</b>	Green LED	Monitored to set drip rate using the oil adjustment knob: set for a 10-20 second on time after the drip rate switch is set to the required drip rate.
5	<b>Solenoid LED</b>	Green LED	Indicates that the solenoid is on (activated).
10	<b>Oil (Alarm) LED</b>	Red LED	Indicates that the amount of oil delivered is less than the oil drip rate setting on SW3. The PUMP N.O. contacts open and the ALARM N.O./N.C. contacts open/close when the <b>OIL (alarm) LED</b> lights. <i>The <b>OIL (alarm) LED</b> turns off when resetting the DripDoser.</i>
11	<b>DRIP LED</b>	Yellow LED	This LED flashes for each drop of oil that passes through the DripDoser.
12	<b>OK (Pump) LED</b>	Green LED	Indicates that sufficient oil is supplied to the lineshaft, matching the dpm setting on SW3. The PUMP N.O. contacts close and the ALARM N.O. /N.C. contacts close/open when the <b>OK (PUMP) LED</b> is on. The pump relay contacts can be used to turn off the well pump and the alarm relay contacts can be used to activate an external lamp/horn.

## 3.2 Setting the Oil Drip Rate Levels

The oil drip rates are selectable for 10, 20, 30, 40, or 50 drips/minute.

In Figure 9, the oil drip rate setting is set to 10 dpm (drips/minute).

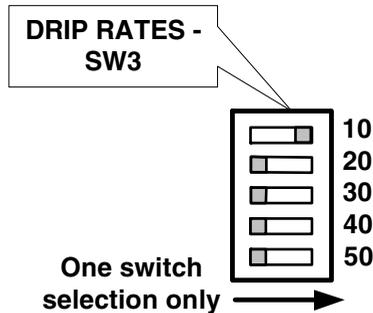


Figure 9: Drip rate setting

## 3.3 Oil Flow Control

Oil flow through the DripDoser (from oil inlet to oil outlet) is controlled by a built-in solenoid and the oil adjustment knob (see Figure 1).

The drip rate is made setting the oil adjustment knob according to 3.3.2 Adjusting the Drip Rate.

### 3.3.1 Oil On/Off Control

The solenoid is powered by the DripDoser power source. When the DripDoser is powered up, and the selected number of drops passes through the DripDoser, then the solenoid turns off until the next one minute on/off duty cycle. The solenoid is turned off when there is no power supply or the DripDoser is in the alarm state with the solenoid A/B switch SW4 in the B (closed) up position.

### 3.3.2 Adjusting the Drip Rate

1. Select the required number of drops/minute (dpm) on the drip rate switch SW3. Refer to Figure 8.
2. Make sure that oil can flow through the DripDoser.
3. Rotate the oil adjustment knob so that the solenoid LED is on for 10 – 20 seconds, which matches the preset DPM setting on SW3. Turning the oil adjustment knob CCW (counter-clockwise) increases the drip flow rate.

**Note:** If the OIL (alarm) LED is on during any time of the oil adjustment, you need to reset the PC board using the reset button.

You can also use the drip verification peephole to check the drip rate, but monitoring the time that the solenoid LED is on (10 – 20 seconds) is much easier.

## 3.4 Alarm States

During an alarm, the red Oil (alarm) LED is lit, indicating that the oil drops flowing during the one minute duty cycle of power to the solenoid is less than the pre-selected number shown on the drip rate switch SW3. The alarm state can occur when:

1. Loss of oil in the oil tank.
2. Clogged input or dirty input filter.
3. Blocked outlet line.
4. The oil adjustment knob setting is too restrictive, causing an insufficient amount of oil to pass to the outlet.
5. The oil adjustment knob setting is allowing too much oil to pass through the DripDoser, resulting in a continuous flow of oil (instead of oil drops).

## 3.5 Resetting the DripDoser

There are two ways to reset the DripDoser:

1. By removing the DripDoser cover and pressing the Reset push button (see Figure 8).
2. By disconnecting the power source to the DripDoser and then reconnecting it.

In both cases, circuit voltage is interrupted and then restored.

## 4 Maintenance and Troubleshooting

**Table 5: Routine Maintenance**

Task	Frequency
Check for oil leaks	Monthly
Fully open the oil adjustment knob (turn fully CCW) for 5 seconds to clear obstructions that might have accumulated.	Annually
Change the oil inlet filter periodically	6 – 12 months

**Table 6: Troubleshooting**

Problem	Possible Cause	Solution
No LEDs are lit.	<ul style="list-style-type: none"> <li>The unit is not powered.</li> </ul>	<ul style="list-style-type: none"> <li>Check power source.</li> <li>Confirm that SW5 setting is correct. See Figure 7.</li> </ul>
No oil dripping – oil does not appear in oil peephole, nor does the Drip LED flash periodically.	<ul style="list-style-type: none"> <li>Partial or complete blockage in the input or output.</li> <li>Oil adjustment knob opened too much.</li> <li>Empty oil tank.</li> </ul>	<ul style="list-style-type: none"> <li>Make sure lines are clear and filter is clean.</li> <li>Make sure the oil adjustment knob is set correctly.</li> <li>Fill empty oil tank.</li> </ul>
You want to quickly stabilize the DripDoser for a new drip rate (see section 3.3.2 Adjusting the Drip Rate).	<ul style="list-style-type: none"> <li>You just refilled the oil tank.</li> </ul>	<ul style="list-style-type: none"> <li>Rotate the oil adjustment knob so that the solenoid LED is on for a 10 - 20 second interval.</li> </ul>

Problem	Possible Cause	Solution
<p>The OIL (alarm) LED is on.</p>	<ul style="list-style-type: none"> <li>• Oil tank is empty</li> <li>• A shut-off valve at the outlet of the oil tank might be closed</li> <li>• Oil flow from the oil tank may be obstructed.</li> <li>• Oil blockage between the DripDoser outlet pipe and the line-shaft.</li> <li>• The oil adjustment knob needs to be re-adjusted.</li> </ul>	<ul style="list-style-type: none"> <li>• Refill the oil tank</li> <li>• Open the shut-off valve</li> <li>• Clean out any obstructions in the pipe between the oil tank and the DripDoser inlet</li> <li>• Clean out any obstructions in the delivery line between the DripDoser outlet and the line-shaft, or replace the delivery line.</li> </ul> <p><b>Note:</b> Reset the DripDoser after fixing the problem. See section 3.5.</p> <ul style="list-style-type: none"> <li>• Rotate the oil adjustment knob so that the solenoid LED is on for 10 – 20 seconds.</li> </ul>

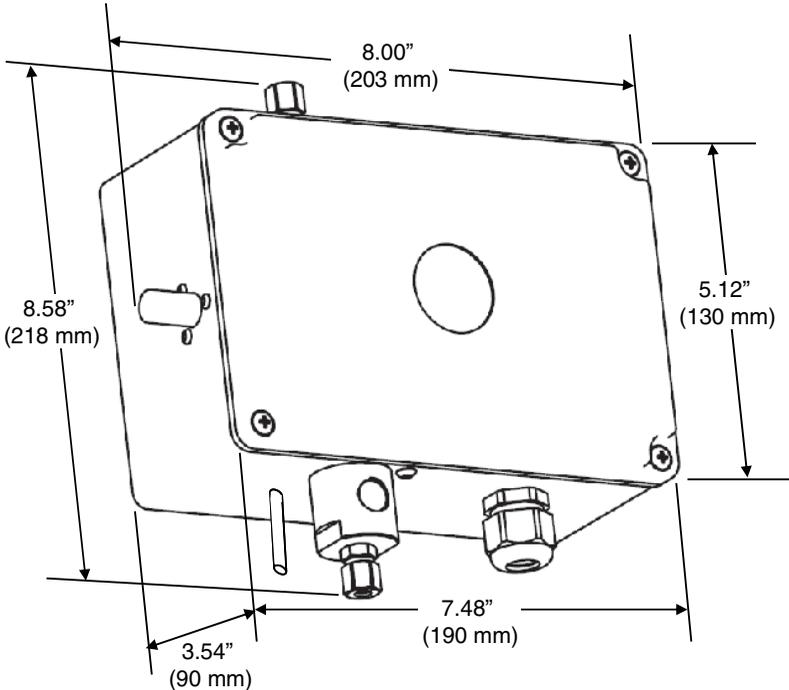
## 5 Specifications

**Table 7: DripDoser specifications**

Supply voltage	100 to 240 VAC, 50/60 Hz, or 24 VDC
Power consumption (max.)	10 W
Drip rate drip rate settings	10, 20, 30, 40, 50 dpm
Pump Shutdown relay contact	AC: 5A DC: 5A
Alarm relay contact	AC: 0.5A DC: 0.5A
Oil on/off solenoid	12 VDC (internal voltage)
Drip volume	32 drops per 1 cc
Oil inlet/outlet	Male thread ¼" BSP
Dimensions (W x H x D)	8.58 x 8.00 x 3.54 inches (218 x 203 x 90 mm)
Weight	3.7 lbs. (1.7 kg)

All specifications shown are subject to change.

# 5.1 Overall Dimensions



**Figure 10: DripDoser dimensions**

The DripDoser enclosure is made of painted, cast aluminum.

## 6 DripDoser Service Policy

This policy has been established to cover the servicing of Hoffmann & Hoffmann products.

### 6.1 Installation

1. Hoffmann & Hoffmann's representative or its authorized dealers will perform the installation work required and charge the customer directly.
2. In cases where there is a prior approval by Hoffmann & Hoffmann, the customer may do the installation.
3. The dealer will assume full responsibility for the installation work he performs.

### 6.2 Product within the Warranty Period

1. All Hoffmann & Hoffmann products have a two year limited warranty.
2. Hoffmann & Hoffmann Warranty will apply only to units installed by authorized Dealers or by the customer (if Hoffmann & Hoffmann authorized installation by the customer).
3. Hoffmann & Hoffmann is not responsible for damages caused by external factors, i.e. temperature extremes, power surges.
4. If the failure occurred during the Warranty Period, Hoffmann & Hoffmann will cover the repair cost. The customer will only pay for the shipment to the nearest Hoffmann & Hoffmann dealer.

NOTES:



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