

## SUREFIRE PDI

Centralized Lubricating System

- + SureFire PDI Automatic Lubricator
- + ZEM Injectors
- + Fittings
- + Accessories

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CAPABLE OF  
PUMPING  
PRECISE  
AMOUNTS OF  
OIL OR FLUID  
GREASE TO  
AS MANY  
AS 100  
LUBRICATION  
POINTS

# Protect Expensive Machinery

## System Description

Whether you work with machine tools, printing equipment or any kind of machinery, you need to maintain a constant level of lubrication to keep things running smoothly, reduce wear and tear and extend equipment life. With multiple lubrication points, it can be a difficult task.

A positive displacement injector (PDI) system from Bijur Delimon is the perfect solution that gives you the ability to apply a precise amount of lubricant exactly where it is needed—to lubrication points and bearings. A major benefit of a PDI system is that points can easily be added to or removed from an existing system, depending on your lubrication requirements. And since Bijur Delimon develops systems, as well as individual parts, you will know everything works together smoothly, improving your productivity and reducing lubrication costs.

The SureFire PDI centralized lubrication system is a reliable PDI system that consists of four basic elements:

- + **SureFire PDI lubricator pump** – stores and pumps lubricant
- + **ZEM Series injector** – discharges a fixed volume of lubricant
- + **Standard compression fittings** – let you connect tubing, injectors and the lubricator
- + **Optional push-to-connect fittings** – allow you to easily install or change tubing without using tools

Each part of the SureFire PDI centralized lubrication system is an important piece of the lubrication puzzle.

## SureFire PDI Lubricator

The SureFire PDI lubricator provides the central source of oil or fluid grease for the centralized lubrication system. It includes a reservoir to store the lubricant and a pump that pressurizes the lubricant through the system.

## Fittings

The SureFire PDI system is compatible with traditional compression fittings or new push-to-connect fittings that let you easily install and change tubing without using tools.

There is also an extensive accessory catalog available to support the SureFire PDI centralized lubrication system. Everything from tubing and junctions to adapters and connection hardware can be ordered with the SureFire PDI system, or ordered from a Bijur Delimon representative when the need arises.

**SureFire PDI helps lubricate many industrial applications:**

- + Machine Tools
- + Mobile
- + Automotive
- + Printing
- + Packaging
- + Injection Molding

### Note!

SureFire Lubricator is also available for use with Single Line Resistance (SLR) applications. Refer to *Brochure #262: SureFire SLR* for more information.

# SureFire PDI Lubricator

The heart of the SureFire PDI centralized lubrication system is the robust and durable SureFire PDI Lubricator, capable of handling oil and fluid greases. Available in four reservoir capacities to fit your space requirements and lubrication demands, the SureFire PDI lubricator is a self-contained electric motor-driven gear pump that can adapt to a broad range of production machinery. It can handle single injectors or injector groups serving up to 100 lubrication points. Its versatility also allows it to perform with other lubrication systems and applications.

## Benefits

The SureFire PDI Lubricator is designed with the user in mind. It has a unique and flexible modular construction that makes it user-friendly.

- + Multiple voltage options:
  - + **Single phase:** 100 VAC, 115 VAC, 200 VAC, 230 VAC, 24 VDC
  - + **Three phase:** 230/480 VAC
- + Outlet connections on both sides facilitate quick installations
- + Quick-snap reservoir release clips let you quickly remove the unit for service and provide easy access for servicing and replacement of key components
- + Large fill cap and built-in strainer allows for faster filling and fewer spills
- + Liquid level, pressure switch (single phase only), pressure relief valve and pressure gauge included
- + Cast base and sealed electric motor enclosure protect working components from contamination
- + Programmable controller/monitor (optional on single phase models)
- + Two controller versions available

SUREFIRE PDI SINGLE PHASE



SUREFIRE PDI THREE PHASE



Figure 1: Hydraulic Schematic  
Standard Single Phase SureFire PDI

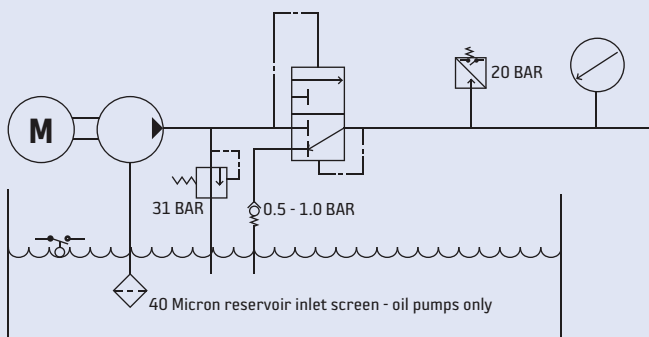
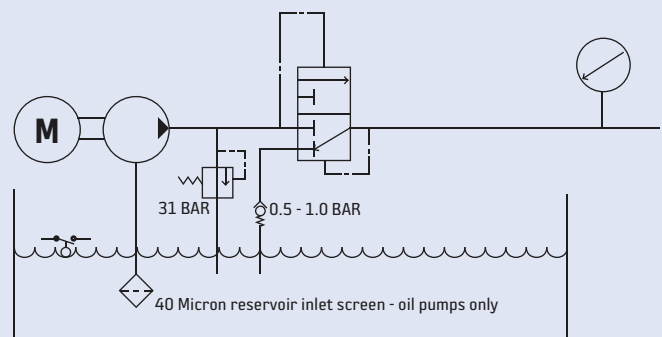


Figure 2: Hydraulic Schematic  
Standard Three Phase SureFire PDI



## How it Works

As the motorized gear pump pulls lubricant in from the reservoir and delivers lubricant to the distribution system, the PDIs in the system discharge a fixed amount of lubricant to the lubrication points. After the injectors are fired, the pressure in the network continues to rise until the limit in the pressure switch is reached. Once the limit is reached, the pressure switch signals the motor to stop. When the momentary pressure in the distribution network becomes greater than the gear pump pressure, the pressure differential actuates a quick release valve which relieves the distribution line pressure back into the reservoir. This causes each PDI in the distribution network to reset and refill for the next cycle.

## Technical Data

<b>Max Output Volume – 100 VAC, 115 VAC, 200 VAC, 230 VAC</b>		200cc/min @ 60 Hz (167cc/min @ 50 Hz)
<b>Max Output Volume – 24 VDC</b>		250cc/min
<b>Max Output Volume – Three phase</b>		200 or 500cc/min @ 60 Hz; 167 or 415cc/min @ 50 Hz
<b>Max Output Pressure</b>		450 psi (31 bar)
<b>Pressure Switch Setting<sup>1,2</sup></b>		Normally open, closes at 290 psi (20 bar)
<b>Lubricant Viscosity</b>		Oil: 20 to 1500 cSt at operating temperature
<b>Soft Greases<sup>3</sup></b>		NLGI 000, NLGI 00 (40,000 cSt max)
<b>Reservoir Fill Screen (oil only)</b>		40 mesh, removable
<b>Reservoir Volume</b>		1.8 liter, 2.7 liter, 6.0 liter, 12.0 liter
<b>Reservoir Material</b>		Clear Terluc Plastic for 1.8, 2.7 and 6.0 liter; Steel for 12.0 liter
<b>Motor Voltage Options</b>	Single Phase	100 VAC, 115 VAC, 200 VAC, 230 VAC 50/60 Hz, 24 VDC
	Three Phase	230/415 VAC 50 Hz, 260/480 VAC 60 Hz
<b>Motor Power Requirements<sup>4,5</sup></b>		Approximately 140 watts
<b>Operating Temperature Range</b>		5°C through 40°C (40°F through 105°F)
<b>IP Enclosure Rating</b>		IP-54
<b>Electrical Fitting</b>		Liquid tight
<b>Output Connection</b>		G 1/4 BSPP
<b>Single (main) Feed Line</b>		6mm O.D. minimum recommended

<sup>1</sup> Pressure switch is standard on single phase models. Not available on three phase models.

<sup>2</sup> External end-of-line pressure switch also available (part #26772-2; 225 psi).

<sup>3</sup> Please contact a Bijur Delimon representative for applications using soft grease.

<sup>4</sup> Only applies to SureFire PDI single phase models.

<sup>5</sup> Motor Overload Protection needs to be provided by the host machine and/or its control system.



### IMPORTANT!

The electrical circuit for the level switch for oil must not exceed 10 watts.

## How to Order

The SureFire PDI Lubricator features a smart part number ordering system, where you can tailor the pump to meet your needs. First, choose the reservoir capacity, distribution system, options, controller type, voltage and wiring you need. Then, put the numbers into the corresponding squares in the easy-to-use grid. You now have the customized part number.

Example: To order a 1.8 liter reservoir with a volumetric/PDI distribution system, standard options, terminal block controller and a 115 VAC motor, you would use Part #SF2BNAC.

**Reservoir capacity**

2– 1.8 liter (Terluc plastic)  
3– 2.7 liter (Terluc plastic)  
6– 6.0 liter (Terluc plastic)  
12– 12.0 liter (Painted steel)

**Distribution system**

B– Volumetric/PDI

**Options**

N– Standard oil version  
B– Standard grease version (grease level switch, no fill screen)  
A– Quick connect grease version (grease level switch and quick connect style reservoir fill fitting for grease/no fill screen)  
C– Quick connect oil version (quick connect style reservoir fill fitting for oil/no fill screen)  
D– Standard oil version (2 position oil level switch)

SF

**Required wiring**  
(if controller type C is selected)  
A– M12

**Voltage**

B– 24 VDC, 2.4 amps  
C– 115 VAC, 50/60 Hz, 2.2 amps  
D– 230 VAC, 50/60 Hz, .95 amps  
E– 230/480 VAC, three phase, 50/60 Hz, 0.5 amps (416/500cc/min, 50/60 Hz)  
F– 230/480 VAC, three phase, 50/60 Hz, 0.5 amps (167/200cc/min, 50/60 Hz)  
G– 100 VAC, 50/60Hz, 1.9 amps  
H– 200 VAC, 50/60Hz, 1.0 amps

**Controller type**

A– Terminal block\*  
B– ON/OFF timer (not available on 1.8 liter Or 3-Phase models)\*  
C– Programmable Controller/monitor (not available on 3-Phase)  
D– Direct connect to three phase motor (for motor voltages E and F only; This code is required for voltages E and F)  
E– Lite Programmable Controller (for motor voltages C, D, G and H only, not available on 1.8 liter models; use w/option N)  
\*CE approved

**Standard versions include:** Float type reservoir; low level switch, standard reservoir fill-cap screen, quick dump valve for PDIs and 450 psi pressure relief valve.

# On-board Controller/Monitor

## SureFire with Standard Controller/Monitor

### Features

The on-board controller/monitor is available on single phase models of SureFire and is designed to precisely control the lubrication to a piece of equipment. It does this by controlling the pump's cycle time, monitoring both internal and external inputs or switches, detecting and reporting faults and offering visual feedback that can be continuously updated and improved to enhance the user's experience with the product. Four languages are available on the screen for global use (English, German, French, Spanish).

The microprocessor-based controller allows users to:

- + Manage the on-times and the off-times of the pump.
- + Provide prelube functionality on start up.
- + Detect and respond to various input signals.
- + Display in real time the status of the pump at any time.
- + Monitor for faults in the system.
- + Provide output signals for feedback to the controlling machine.

The controller also features the protection of settings, through password-based security, protection of motors with limited duty cycles and restoration of default settings if required.

### Operation

The SureFire PDI lubricator with on-board controller/monitor may be operated in two modes – TIMER mode and CONTROLLER mode. In TIMER mode, the user sets the pump on-time and the pump off-time. In CONTROLLER mode, the pump on-time is dependent on the pressure hold time, while the pump off-time may either be time-based or event-based. Both modes are subject to the non-disabling WARNING LEVEL fault and the disabling LOW LEVEL and AIR PRESSURE faults. In addition, CONTROLLER mode monitors the function of the OIL PRESSURE switch and will fault if necessary.

Parameters are set using the five key switches mounted on the front of the pump. By following the on-screen prompts, the user may navigate through menus, set various parameters, enable/disable various switches and select fault monitoring output schemes. Left and right arrow keys are typically used to navigate through screens, forwards and backwards, while up and down arrow keys are used to increase and decrease particular values or to enable/disable functions. The asterisk key is used mainly to save settings and to move on to the next screen.

The controller software has been written specifically to enable the user to navigate through screens without the help of a manual as it provides on-screen prompts on all screens. The controller is equipped with a backup battery and may be configured in various ways to deal with a power outage and subsequent power restoration.

SUREFIRE PDI SINGLE PHASE WITH  
STANDARD CONTROLLER



Refer to *Operators Manual*  
#35462: *Controller* for more  
detailed operating instructions.



## SureFire Lite Controller/Monitor

### Features

The SureFire Lite Controller is a multi-purpose programmable controller only available on single phase units. Controller settings are saved whenever power is interrupted. Up to four operating modes can be selected which allows the controller to be used with various lubrication system designs.

- + Digital status display on front cover for easy programming
- + System monitoring capabilities
- + Data memory function initiated at power down
- + Compact design

### Operation

#### Keys Description



With the controller energized:

- + Press keys **S** and **R** simultaneously and release to enter control mode.
- + The display panel will now show a fixed letter for the selected mode and a flashing number (1-4).
- + To select the required mode press the **▲** key.
- + Press the **S** key to advance to the next parameter of the selected mode.
- + Repeat steps 3 and 4 above using the **◀▶** key to move across the digits and the **▲** key to change the value of the selected flashing digit.
- + On completion, press the **R** key to save the data and initiate a lubrication cycle.

#### Manual Override

- + With the controller energized press the **R** key to initiate a lubrication cycle.

#### Program Review

- + To review the preset data, press the **S** key repeatedly with the controller energized.
- + To return to operating condition display, release **S** key or depress **S** key for 5 seconds.

#### Fault Alarm

- + In any alarm condition, e.g. low level, low pressure etc., the pump will not be able to operate and the alarm lamp will illuminate. The fault condition must be rectified to cancel the alarm and reactivate the system.

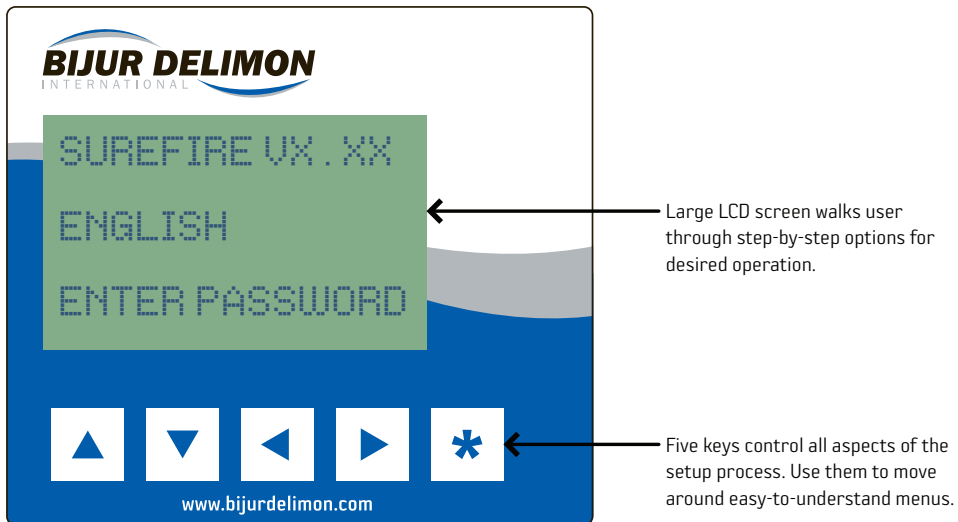
SUREFIRE PDI SINGLE PHASE WITH  
LITE CONTROLLER



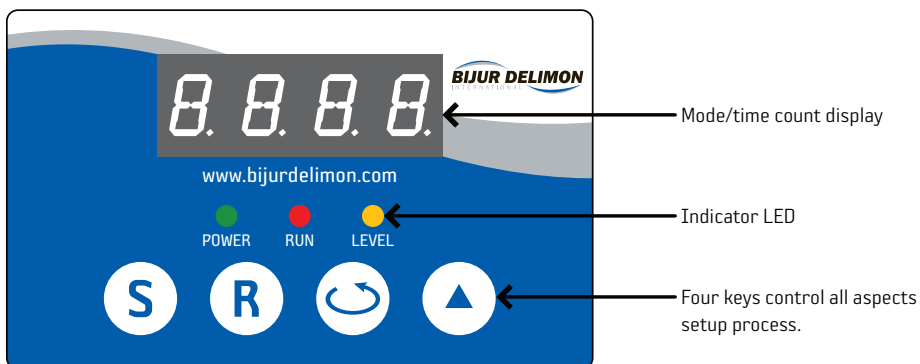
Refer to *Supplement #35989: SureFire Lite Controller* for more detailed operating instructions.

## SureFire Controller/Monitor Screen

### Standard Version



### Lite Version





## Accessories

### Field-wireable M12 Connectors

Configuration	Pins (qty)	Part #
Straight	5	<a href="#">23694</a>
Angled (90°)	5	<a href="#">23694-1</a>
Straight	8	<a href="#">23837</a>
Angled (90°)	8	<a href="#">23842</a>

### Cable + M12 Connectors (Assembled)

Description	Part #
Cable power, 5-pin, 2 meters long, 90° plug	<a href="#">M125A02U75</a>
Cable power, 5-pin, 2 meters long, straight plug	<a href="#">M125S02U75</a>
Cable signal, 8-pin, 2 meters long, 90° plug	<a href="#">M128A02U25</a>
Cable signal, 8-pin, 2 meters long, straight plug	<a href="#">M128S02U25</a>

*Note: 3, 5 and 10 meter cable lengths are also available.*

#### ATTENTION

Accessories for Standard Controller version only.



## Timer

### SureFire with Timer

The SureFire PDI lubricator is also available with an ON/OFF timer to provide basic timing functions, as detailed below:

- + ON time range = 0.1 seconds to 100 hours
- + OFF time range = 0.1 seconds to 100 hours
- + ON and OFF time settings are adjusted with dials, using a screwdriver
- + Upon power up, timer begins with ON time settings
- + Timer is wired at the factory in series with each motor and will handle the maximum amp draw of each motor used (no fusing is required)
- + Customer simply connects (+) and (-) power to the lubricator terminal block

Refer to *Supplement #35144: SureFire On/Off Timer* for more detailed operating instructions.

# ZEM Series Injectors

The ZEM Series injectors are positive displacement injectors (PDIs) that deliver precise and controlled lubrication outputs, meeting exact requirements for diverse applications. They are pre-fixed volumetric injectors that ensure each lubrication point receives the proper amount of lubricant. Which means you won't have to worry about over- or under- lubrication.

## Benefits

ZEM Series injectors are built to effectively function with the SureFire PDI lubricator, as well as other pumps that can support a PDI system.

- + Handles oil and fluid greases
- + Injector endcaps that can be quickly replaced within a manifold to change discharge settings
- + Ten output volumes available for diverse application types and points (0.01cc/cycle to 1.5cc/cycle)
- + Flexible design allows you to choose from output volumes for each outlet
- + Can be used in the same system with other ZEM Series injectors
- + Optional push-to-connect fittings help lower installation labor costs

## At a Glance

Name	Description	Discharge Volumes (cc)
Series 32	Screw-in injector (requires manifold bar)	0.01, 0.03, 0.06, 0.1, 0.16
Series 33	Screw-in injector (requires manifold bar)	0.01, 0.03, 0.06, 0.1, 0.16
Series 34	Built-in cast manifold construction	0.01, 0.03, 0.06, 0.1, 0.16, 0.0 (plug)
Series 35	Built-in cast manifold construction	0.06, 0.1, 0.2, 0.4, 0.6, 0.0 (plug)
Series 39	Built-in cast manifold construction	0.2, 0.4, 0.6, 1.0, 1.5, 0.0 (plug)

## How it Works

ZEM Series injectors are classic PDIs. Reliable. Accurate. As pressure builds in the manifold, the piston in the injector fires forward, discharging a set amount of lubricant to the application point.

As the pressure is relieved, a compression spring returns the piston to its original position. This movement recharges the injector with more lubricant. The injector is now ready to be fired again.

ZEM COMPRESSION OUTLETS



ZEM PUSH-TO-CONNECT OUTLETS



## System Requirements

It is important to note that the lubricating pump used in the ZEM Series injectors system must build pressure to 220 psi (15 bar) at the injector in order to actuate injector discharge. The recommended operating pressure is 300 psi (21 bar). Also, a pressure relief valve is required to quickly drop the line pressure to the 5 to 11 psi (0.3 to 0.7 bar) range between lubrication cycles. This allows the injectors to be fully recharged.

ZEM 32 and 33 Series injectors are used in conjunction with manifolds or tee fittings (see page 22). Other ZEM Series injectors are manufactured with multiple outlet manifolds. All ZEM injectors are available with either a compression style or push-to-connect outlet fitting.

## Technical Data

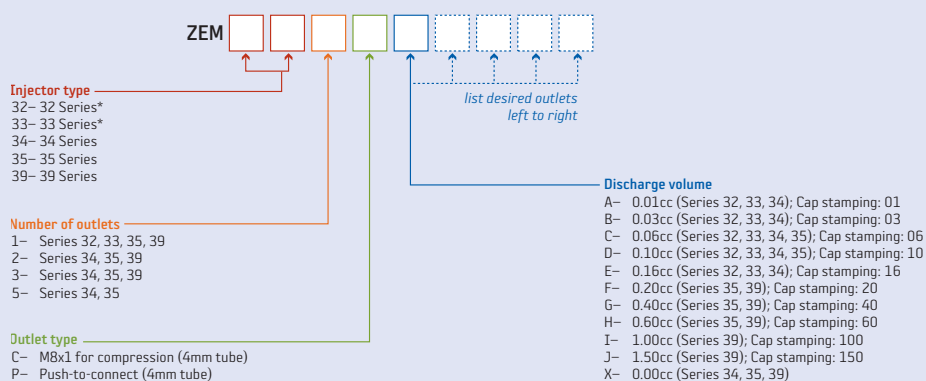
Lubricants	Oil viscosity range	20 to 1500 cSt at operating temperature
	Soft greases <sup>1</sup>	NLGI 000
Pressure	Operating maximum	650 psi (45 bar)
	Operating minimum	220 psi (15 bar)
	Relieving	11 psi (0.7 bar)
	Seals	Viton
Threads	Inlet	M8x1 (ZEM 32), M10x1 (ZEm 33, 34, 35), M12x1 (ZEM 39)
	Outlet	M8x1, push-to-connect

<sup>1</sup> Please contact a Bijur Delimon representative for applications using soft grease.

## How to Order

The ZEM injectors use a smart part numbering system that allows you to tailor the injector to meet your needs. First, choose the injector type, number of outlets, outlet type and the discharge volume for each outlet. Then, put the numbers into the corresponding squares in the easy-to-use grid.


Example: To order a three outlet, 35 Series injector, with push-to-connect fittings, where the discharge volumes are 0.1cc, 0.2cc and 0.6cc, you would use Part #ZEM353PDFH.



\* Requires a manifold or tee fitting (sold separately).

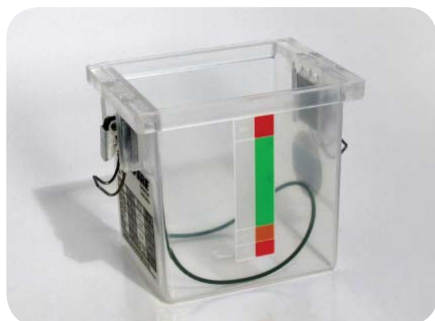
# Replacements & Spare Parts

## SureFire Parts

SureFire PDI model number 	SF2Bxxx	SF3Bxxx	SF6Bxxx	SF12Bxxx
Part Description	Part #	Part #	Part #	Part #
Reservoir assembly	<a href="#">34794</a> <sup>1</sup>	<a href="#">34795</a> <sup>1</sup>	<a href="#">34796</a> <sup>1</sup>	<a href="#">35153</a> <sup>2</sup>
Reservoir inlet strainer assembly (w/ screws)	<a href="#">35150</a>	<a href="#">35150</a>	<a href="#">35150</a>	<a href="#">35150</a>
Automotive quick connector assembly, for grease applications (w/ O-ring)	<a href="#">35151</a>	<a href="#">35151</a>	<a href="#">35151</a>	<a href="#">35151</a>
Automotive quick connector assembly, for oil applications (w/ O-ring)	<a href="#">35152</a>	<a href="#">35152</a>	<a href="#">35152</a>	<a href="#">35152</a>
Motor cover, O-ring, screw <sup>3</sup>	<a href="#">34791</a>	<a href="#">34792</a>	<a href="#">34793</a>	<a href="#">34793</a>
Level switch (standard for oil versions), Level switch stem (single-phase)	<a href="#">34797</a>	<a href="#">34797</a>	<a href="#">34798</a>	<a href="#">34798</a>
Level switch for oil (three-phase)	N/A	<a href="#">AC368-4</a>	<a href="#">AC368-3</a>	<a href="#">AC368</a>
2 position level switch for oil	<a href="#">39161-4793-1</a>	<a href="#">39161-4793-1</a>	<a href="#">39161-4793-2</a>	<a href="#">39161-4793-2</a>
Level switch for grease	<a href="#">23470</a>	<a href="#">23470</a>	<a href="#">23470</a>	<a href="#">23470</a>
Pressure gauge (single-phase)	<a href="#">23411</a>	<a href="#">23411</a>	<a href="#">23411</a>	<a href="#">23411</a>
Pressure gauge (three-phase)	<a href="#">24541</a>	<a href="#">24541</a>	<a href="#">24541</a>	<a href="#">24541</a>
Pressure switch [normally open, closes at 290 psi (20 bar)]	<a href="#">23472</a>	<a href="#">23472</a>	<a href="#">23472</a>	<a href="#">23472</a>
On-off timer (optional)	<a href="#">35074</a>	<a href="#">35074</a>	<a href="#">35074</a>	<a href="#">35074</a>
Motor (24 VDC)	<a href="#">27632</a>	<a href="#">27632</a>	<a href="#">27632</a>	<a href="#">27632</a>
Motor (115/230 VAC), motor fan	<a href="#">34876</a>	<a href="#">34876</a>	<a href="#">34876</a>	<a href="#">34876</a>
Motor (230/480 VAC three phase)	<a href="#">23233</a>	<a href="#">23233</a>	<a href="#">23233</a>	<a href="#">23233</a>
Electrical connector fitting	<a href="#">34681</a>	<a href="#">34681</a>	<a href="#">34681</a>	<a href="#">34681</a>
Dump valve kit (w/ rubber disc, stem, check valve & copper seal)	<a href="#">60007</a>	<a href="#">60007</a>	<a href="#">60007</a>	<a href="#">60007</a>
Relief valve	<a href="#">19139</a>	<a href="#">19139</a>	<a href="#">19139</a>	<a href="#">19139</a>

<sup>1</sup> O-ring, clasp, clasp plate and clasp plate screws <sup>2</sup> Assembly, gasket bolts and washers <sup>3</sup> For SureFire Single Phase, terminal block model (w/o controller)

RESERVOIR ASSEMBLY (PART #34794)



PRESSURE SWITCH (PART #23472)



24 VDC MOTOR (PART #27632)



# ZEM Parts

	Kit Description	Push-to-connect		Compression	
		Discharge	Part #	Discharge	Part #
32, 33, 34 Series	ZEM 32, 33, 34 replacement kit	0.01cc	<a href="#">23332</a>	0.01cc	<a href="#">23353</a>
		0.03cc	<a href="#">23333</a>	0.03cc	<a href="#">23354</a>
		0.06cc	<a href="#">23334</a>	0.06cc	<a href="#">23355</a>
		0.10cc	<a href="#">23335</a>	0.10cc	<a href="#">23356</a>
		0.16cc	<a href="#">23336</a>	0.16cc	<a href="#">23357</a>
		0.00cc (plug)	<a href="#">23388</a>	0.00cc (plug)	<a href="#">23388</a>
35 Series	ZEM 35 replacement kit	0.10cc	<a href="#">23342</a>	0.10cc	<a href="#">23363</a>
		0.20cc	<a href="#">23343</a>	0.20cc	<a href="#">23364</a>
		0.40cc	<a href="#">23344</a>	0.40cc	<a href="#">23365</a>
		0.60cc	<a href="#">23345</a>	0.60cc	<a href="#">23366</a>
		0.00cc (plug)	<a href="#">23389</a>	0.00cc (plug)	<a href="#">23389</a>
39 Series	ZEM 39 replacement kit	0.40cc	<a href="#">23347</a>	0.20cc	<a href="#">23367</a>
		0.60cc	<a href="#">23348</a>	0.40cc	<a href="#">23368</a>
		1.00cc	<a href="#">23349</a>	0.60cc	<a href="#">23369</a>
		1.50cc	<a href="#">23350</a>	0.00cc (plug)	<a href="#">23390</a>
		0.00cc (plug)	<a href="#">23390</a>	1.00cc	<a href="#">23370</a>
		--	--	1.50cc	<a href="#">23371</a>

*Note: Each kit comes with (1) end cap, (1) o-ring and (1) spring.*

REPLACEMENT KIT (PART #23334)



REPLACEMENT KIT (PART #23355)



# Lubricator Fittings

The third part of the SureFire PDI system is the fittings. Whether you choose the flexibility of push-to-connect fittings or the traditional route with compression fittings, you can be sure everything works together. Bijur Delimon stands behind the quality of its fittings and accessories.

## Compression Fittings

The SureFire PDI centralized lubrication system also features many compression fittings and accessories that let you maximize the effectiveness of the system. From straight connectors to bushings, these options also meet the highest manufacturing standards. If compression is your fitting of choice, just choose the appropriate part number from the chart on this page.

### Technical Data

<b>Maximum Operating Pressure</b>	3000 psi (207 bar) at 20°C (68°F)
<b>Seals</b>	Metal
<b>Recommended Tubing</b>	Metal or Nylon

*Note: Each fitting requires 1 copper sealing washer to complete connection.*

### COMPRESSION FITTINGS



### Part Numbers

	Fitting Size & Type	Part #	ZEM 32	ZEM 33	ZEM 34	ZEM 35	ZEM 39	SureFire
Injector outlet M8x1 Male	4mm compression bushing	15326	X	X	X	X	X	
	4mm sleeve	35001	X	X	X	X	X	
M10x1 Male	6mm tubing, straight	AR426	X	X	X			
	6mm tubing, elbow	AR904	X	X	X			
	6mm tubing, banjo	AR1021	X	X	X			
	8mm tubing, straight	AR1028	X	X	X			
	8mm tubing, swivel elbow	AR617	X	X	X			
	8mm tubing, banjo	AR1029	X	X	X			
M12x1 Male	6mm tubing, straight	FB1098				X	X	
	8mm tubing, straight	AR5004				X	X	
	8mm tubing, banjo	AR1023				X	X	
M14x1.5 Male	8mm tubing, straight	AR1280	X					
	8mm tubing, banjo	AR1033	X					
	10mm tubing, straight	AR1417	X					
	10mm tubing, banjo	AR553	X					
	12mm tubing, straight	AR1281	X					
Pump outlet fittings (G1/4 BSPP)	6mm tubing, straight (G1/4)	AR397						X
	6mm tubing, elbow (R1/4)	AR961						X
	6mm tubing, banjo	AR1032						X
	8mm tubing, straight (G1/4)	AR384						X
	8mm tubing, elbow (R1/4)	AR794						X
	8mm tubing, banjo	AR982						X
	10mm tubing, straight (G1/4)	AR385						X
	10mm tubing, elbow (R1/4)	AR157						X
	10mm tubing, banjo	AR983						X
	12mm tubing, straight (G1/4)	AR790						X
	1/4" O.D. tubing, straight	B10176-4						X
	5/16" O.D. tubing, straight	B10176-5						X
	3/8" O.D. tubing, straight	B10176-6						X
Copper washer	M8	20913-9	X					
	M10	20913-1	X	X	X			
	M12	20913-3				X	X	
	M14	35010	X					
	1/4 BSPP	35010						X
Tee fittings	6x6x6 for main line	35004	X	X	X	X	X	
	8x8x8 for main line	35005	X	X	X	X	X	
	10x10x10 for main line	AR181	X	X	X	X	X	
	12x12x12 for main line	AR182	X	X	X	X	X	

## Push-to-connect Fittings

When you need to install or change a piece of tubing, push-to-connect fittings let you do it quickly and easily. Push-to-connect fittings let you remove tubing with a simple click. Then, just push the new tubing into the fitting. The new tubing stays securely in the fitting. If push-to-connect is your fitting of choice, just choose the appropriate part number from the chart on this page.

### Technical Data

<b>Maximum Operating Pressure</b>	350 psi (24 bar) at 20°C (68°F) <sup>1</sup>
<b>Seals</b>	Viton
<b>Recommended Tubing</b>	Nylon

<sup>1</sup> Push-to-connect fittings are supplied with tubing support inserts. They must be used to achieve the rated maximum pressure.

*Note: Each fitting requires 1 copper sealing washer to complete connection (see chart on page 12 for appropriate part #).*

## Part Numbers

	Fitting Size & Type	Part #	ZEM 32	ZEM 33	ZEM 34	ZEM 35	ZEM 39	SureFire
Injector Inlet M10x1 Male	6mm tubing, straight	<a href="#">AR1995</a>	X	X	X			
	6mm tubing, swivel elbow	<a href="#">AR2113</a>	X	X	X			
	6mm tubing, banjo	<a href="#">AR2141</a>	X	X	X			
	8mm tubing, straight	<a href="#">AR2158</a>	X	X	X			
	8mm tubing, swivel elbow	<a href="#">AR2114</a>	X	X	X			
	8mm tubing, banjo	<a href="#">AR2145</a>	X	X	X			
Injector inlet M12x1 Male	6mm tubing, straight	<a href="#">AR2052</a>				X	X	
	6mm tubing, elbow	<a href="#">AR1988</a>				X	X	
	6mm tubing, banjo	<a href="#">AR2142</a>				X	X	
	8mm tubing, straight	<a href="#">AR2019</a>				X	X	
	8mm tubing, elbow	<a href="#">AR2115</a>				X	X	
	8mm tubing, banjo	<a href="#">AR2146</a>				X	X	
	10mm tubing, elbow	<a href="#">AR2117</a>				X	X	
	12mm tubing, straight	<a href="#">AR2058</a>				X	X	
	12mm tubing, elbow	<a href="#">AR2118</a>				X	X	
	12mm tubing, banjo	<a href="#">AR2152</a>				X	X	
Lubricator outlet G1/4 BSPP Male	6mm tubing, straight	<a href="#">AR1983</a>						X
	6mm tubing, swivel elbow	<a href="#">AR2089</a>						X
	8mm tubing, straight	<a href="#">AR2013</a>						X
	8mm tubing, swivel elbow	<a href="#">AR2091</a>						X
	10mm tubing, straight	<a href="#">AR1725</a>						X
	10mm tubing, swivel elbow	<a href="#">AR2093</a>						X
	12mm tubing, straight	<a href="#">AR2043</a>						X
	12mm tubing, swivel elbow	<a href="#">AR2095</a>						X
Tee fittings	6x6x6 for main line	<a href="#">AR2134</a>	X	X	X	X	X	
	8x8x8 for main line	<a href="#">AR2135</a>	X	X	X	X	X	
	10x10x10 for main line	<a href="#">AR2136</a>	X	X	X	X	X	
	12x12x12 for main line	<a href="#">AR2137</a>	X	X	X	X	X	
Union	6x6	<a href="#">AR2061</a>						
	8x8	<a href="#">AR2062</a>						
	10x10	<a href="#">AR2063</a>						
	12x12	<a href="#">AR2064</a>						

### PUSH-TO-CONNECT FITTINGS





# Tubing & Accessories

	Fitting Size and Type	Part #	ZEM 32	ZEM 33	ZEM 34	ZEM 35	ZEM 39	SureFire
Nylon tubing	4mm O.D. (2.7mm I.D.), 300 psi (21 bar) maximum operating pressure at 20°C	<a href="#">5N25</a>	X	X	X	X	X	X
	6mm O.D. (4mm I.D.), 500 psi (35 bar) maximum operating pressure at 20°C	<a href="#">35006</a>	X	X	X	X	X	X
	8mm O.D. (5mm I.D.), 500 psi (35 bar) maximum operating pressure at 20°C	<a href="#">35007</a>	X	X	X	X	X	X
	10mm O.D. (7.5mm I.D.), 400 psi (28 bar) maximum operating pressure at 20°C	<a href="#">34825</a>	X	X	X	X	X	X
	12mm O.D. (9mm I.D.), 360 psi (25 bar) maximum operating pressure at 20°C	<a href="#">34826</a>				X	X	X
Copper tubing	4mm O.D. (2mm I.D.)	<a href="#">5C25</a>	X					
	6mm O.D. (4mm I.D.)	<a href="#">21431-6</a>	X	X	X	X	X	X
	8mm O.D. (6mm I.D.)	<a href="#">10C8</a>	X	X	X	X	X	X
	10mm O.D. (8mm I.D.)	<a href="#">21431-10</a>	X	X	X	X	X	X
Closure plug	M8x1	<a href="#">15322</a>	X					
	M10x1 <sup>1</sup>	<a href="#">27450</a>	X	X	X			
	M12x1 <sup>1</sup>	<a href="#">35008</a>				X	X	
	M14x1.5 <sup>1</sup>	<a href="#">34773</a>	X					
	1/4 BSPP <sup>1</sup>	<a href="#">35009</a>						X
Tubing clip	4mm O.D., 1 tube	<a href="#">A2435</a>	X	X	X	X	X	X
	4mm O.D., 2 tubes	<a href="#">B3539</a>	X	X	X	X	X	X
	4mm O.D., 3-5 tubes	<a href="#">B7535</a>	X	X	X	X	X	X
	6mm O.D., 1 tube	<a href="#">B6537</a>	X	X	X	X	X	X
	8mm O.D., 1 tube	<a href="#">35011</a>	X	X	X	X	X	X
	10mm O.D., 1 tube	<a href="#">B6508</a>	X	X	X	X	X	X
	12mm O.D., 1 tube	<a href="#">U301E1</a>	X	X	X	X	X	X
Adapters	M8x1 male to 1/8 NPT female	<a href="#">AR215</a>	X	X	X	X	X	
	M10x1 male to 1/8 NPT female <sup>1</sup>	<a href="#">B10279-1</a>	X	X	X			
	M12x1 male to 1/8 NPT female <sup>1</sup>	<a href="#">B10279-2</a>				X	X	
	G1/4 BSPP male to 1/8 NPT female <sup>1</sup>	<a href="#">B10279-7</a>						X
Tubing inserts	Insert for nylon tubing with 4mm O.D. (2.7mm I.D.)	<a href="#">19268</a>	X	X	X	X	X	
	Insert for nylon tubing with 6mm O.D. (4mm I.D.)	<a href="#">34836</a>	X	X	X	X	X	
	Insert for nylon tubing with 8mm O.D. (5mm I.D.)	<a href="#">34837</a>	X	X	X	X	X	
	Insert for nylon tubing with 10mm O.D. (7.5mm I.D.)	<a href="#">34838</a>	X	X	X	X	X	
	Insert for nylon tubing with 12mm O.D. (9mm I.D.)	<a href="#">34839</a>	X	X	X	X	X	
Straight nipple	M8x1 <sup>1</sup> (close [no hex])	<a href="#">34957</a>	X	X	X	X	X	
	M8x1 <sup>1</sup> (with hex)	<a href="#">15822</a>	X	X	X	X	X	
	M10x1 <sup>1</sup> (close [no hex])	<a href="#">34958</a>	X	X	X	X	X	
	M12x1 <sup>1</sup> (close [no hex])	<a href="#">34959</a>	X	X	X	X	X	
	<sup>1</sup> Requires copper washer to complete tube connection							

# Flexible Hose Assemblies

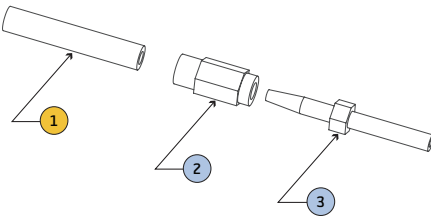
Used in high pressure PDI systems, these flexible hose assemblies are made of braided polyester hose with zinc plated tube ends. Available in 6mm O.D. and 8mm O.D. tube ends.

To assemble the hose coupling to the flexible hose refer to the illustration below and use the following procedure:

1. Thread **item 2** onto the outside diameter of **item 1** (flex hose) by holding the hose with pliers and turning **item 2** counterclockwise. Assembly may be easier by initially applying some lubricant to the outside of the hose. Turn **item 2** until it bottoms out on the tube end. Be careful not to damage the hose with the pliers.
2. Holding **item 2** with a wrench on the hex flats, thread **item 3** into the hole of **item 2** by turning **item 3** clockwise. Turn **item 3** until it bottoms out tight on **item 2**.

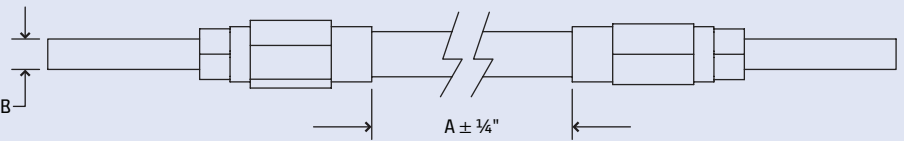
## IMPORTANT!

In PDI systems going to 25-35 bar, tubing inserts should be used at every nylon tube connection.



## Technical Data

Material	Braided polyester hose with zinc plated steel tube ends
Burst Pressure	6mm Tubing: 12180 psi (840 bar) 8mm Tubing: 8412 psi (580 bar)
Max Operating Pressure	2900 psi (200 bar)
Allowable Temperatures	-40°F to 212°F (-40°C to 100°C)
Minimum Bend Radius	50mm (2")
* Tube ends to be used with compression fittings, not recommended for use with push-to-connect fittings.	
* Special hose assemblies available upon request. Hose and tube ends can be ordered separately.	



## How to Order

	6mm O.D. (Tube End - B)	8mm O.D. (Tube End - B)
Hose Length (A)	Part #	Part #
203mm (8")	34971-8	34972-8
254mm (10")	34971-10	34972-10
304mm (12")	34971-12	34972-12
355mm (14")	34971-14	34972-14
406mm (16")	34971-16	34972-16
457mm (18")	34971-18	34972-18
508mm (20")	34971-20	34972-20
558mm (22")	34971-22	34972-22
609mm (24")	34971-24	34972-24
660mm (26")	34971-26	34972-26
711mm (28")	34971-28	34972-28

## Spare Parts

Item #	Description	Part #
1	Hose - 4.1mm I.D. X 8.75mm O.D. <sup>1</sup>	34962
1	Hose - 6.4mm I.D. X 14.4mm O.D. <sup>1</sup> (for 8mm tube ends)	34964
2 & 3	6mm tube end <sup>2</sup>	34963
2 & 3	6mm tube end, 90° <sup>2</sup>	AR1736
2 & 3	8mm tube end <sup>2</sup>	34965 <sup>3</sup>
2 & 3	1/4" tube end <sup>2</sup>	29117
2 & 3	1/4" tube end, 90° <sup>2</sup>	29220
2 & 3	3/16" tube end	29116
2 & 3	4mm tube end	29587
2 & 3	4mm tube end, 90°	29585

<sup>1</sup> Order by the foot, minimum hose length is 10 feet.

<sup>2</sup> Items 2 & 3 come together as a set when ordered as Part #34963 (6mm dia end) or #34965 (8mm dia end).

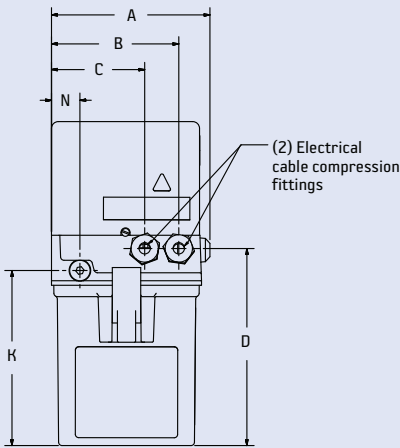
<sup>3</sup> Used with part #34963 only.

# Dimensional Schematics

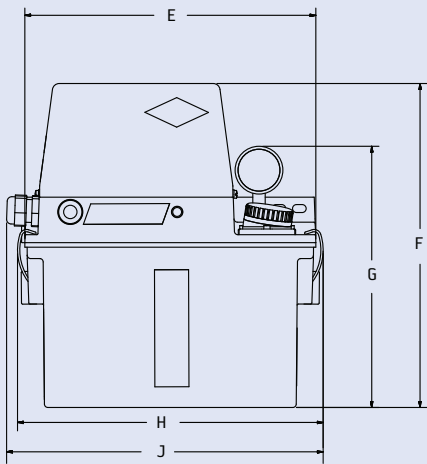
Note: All dimensions shown in millimeters.

SureFire PDI 1.8, 2.7 & 6.0 Liter  
100 VAC, 115 VAC, 200 VAC, 230 VAC and 24 VDC Single Phase

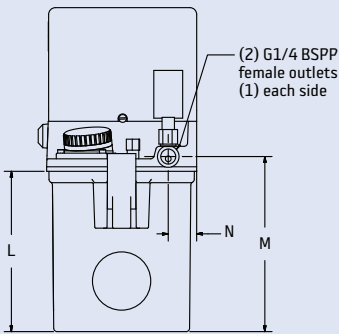
Left View



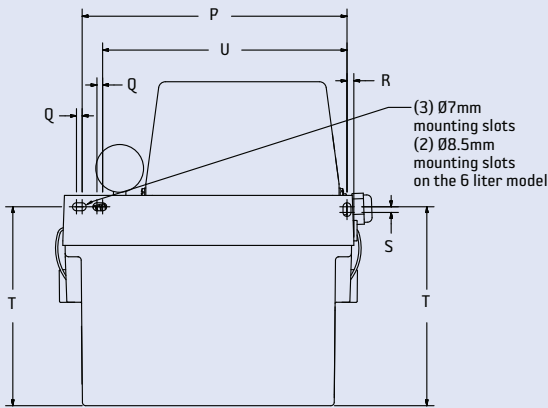
Front View



Right View



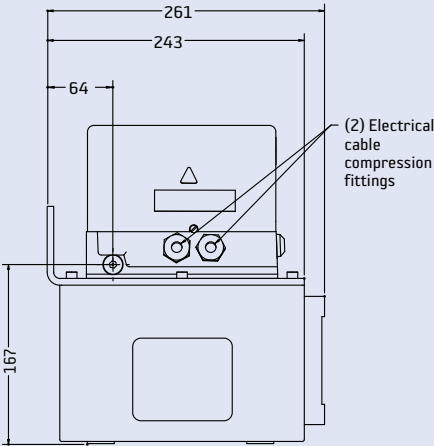
Back View



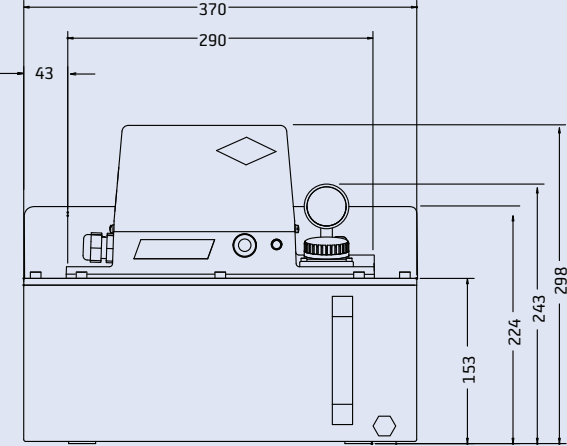
Reference	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U
1.8 liter	136	114	82	174	170	285	230	183	204	154	141	154	25	153	5	6	5	175	N/A
2.7 liter	139	114	82	174	256	285	230	269	279	154	141	154	25	233	5	6	5	175	215
6.0 liter	186	117	85	204	290	318	264	303	N/A	187	174	187	25	220	5	35	5	209	N/A

**SureFire PDI 12.0 Liter**  
100 VAC, 115 VAC, 200 VAC, 230 VAC and 24 VDC Single Phase

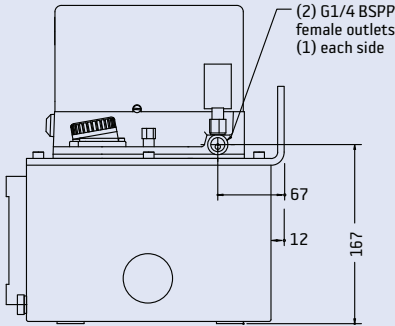
**Left View**



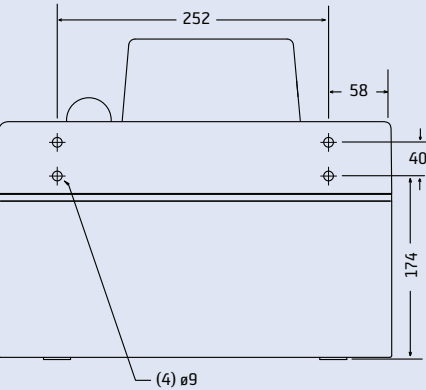
**Front View**



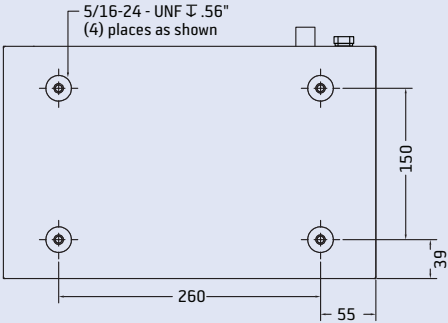
**Right View**



**Back View**



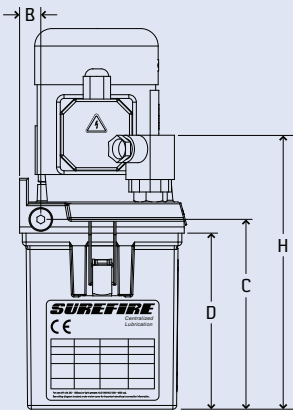
**Bottom View**



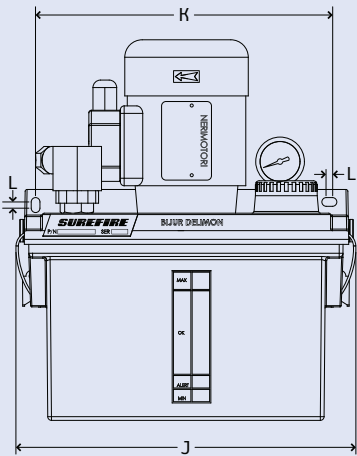
Note: All dimensions shown in millimeters.

SureFire PDI 2.7 & 6.0 Liter  
230/480 VAC Three Phase

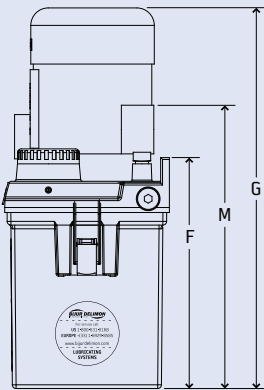
Left View



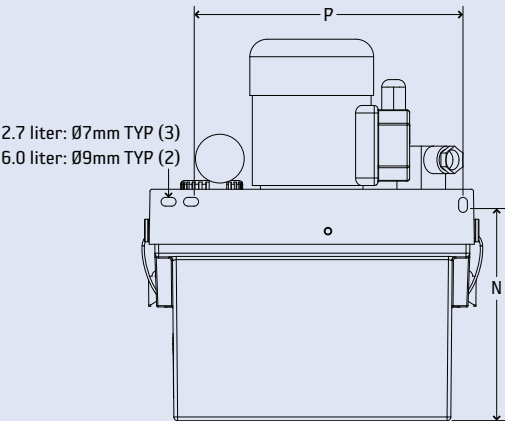
Front View



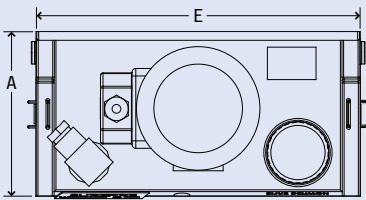
Right View



Back View



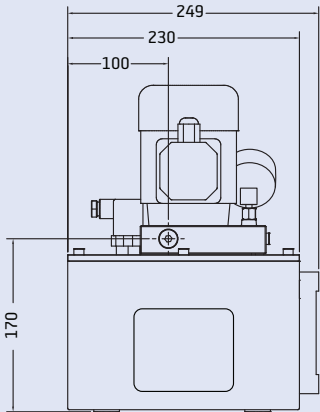
Top View



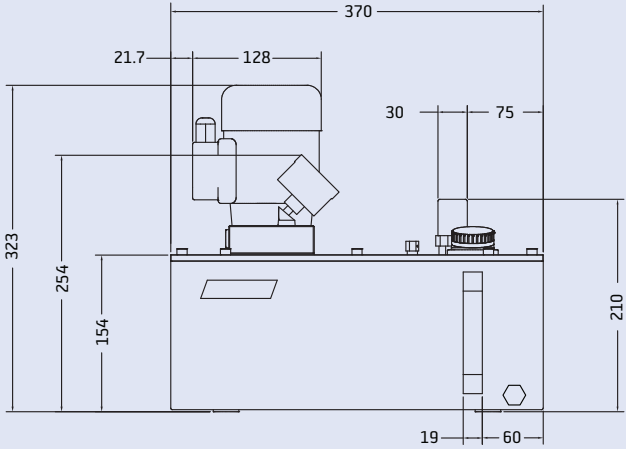
Reference	A	B	C	D	E	F	G	H	J	K	L	M	N	P
2.7 liter	132	17	152	141	260	184	305	220	272	238	5	227	170	215
6.0 liter	180	22	185	174	290	218	338	253	306	N/A	N/A	262	209	225

**SureFire PDI 12.0 Liter**  
**230/480 VAC Three Phase**

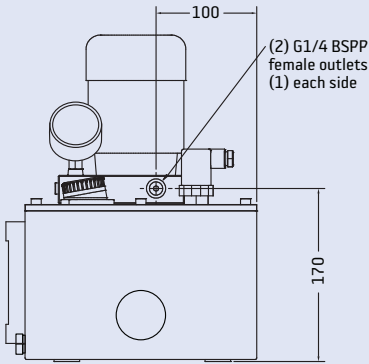
**Left View**



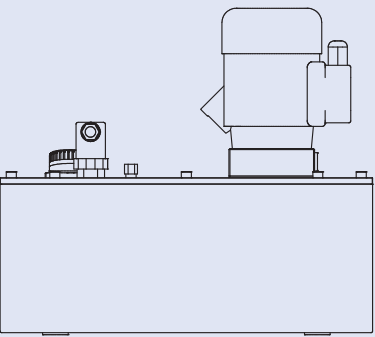
**Front View**



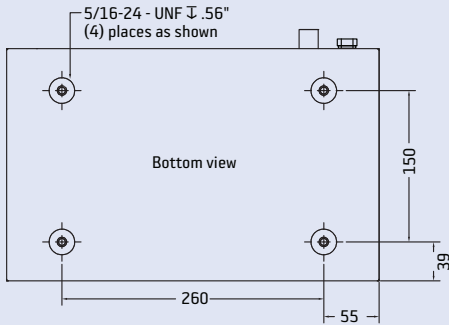
**Right View**



**Back View**

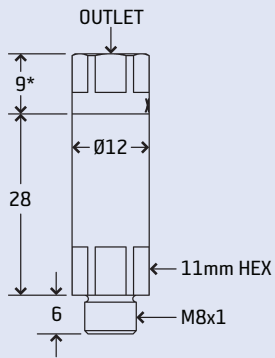


**Bottom View**



## ZEM 32 Series Injectors

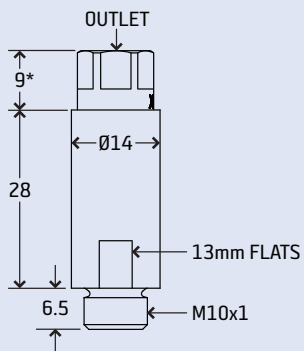
Note: ZEM 32 Series injectors can be used with manifolds (see page 22) or tee fittings (part # 22564).



\* 13 for push-to-connect outlets

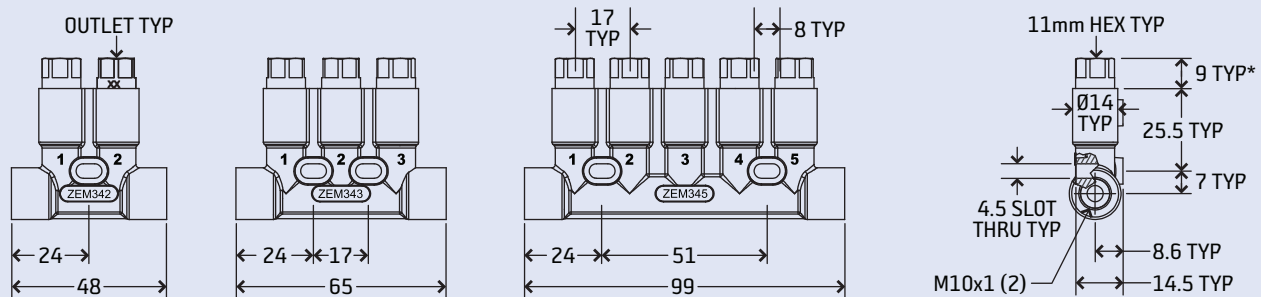
## ZEM 33 Series Injectors

Note: ZEM 33 Series injectors can be used with manifolds (see page 23) or tee fittings (part # 73462-3443).



\* 13 for push-to-connect outlets

## ZEM 34 Series Injectors

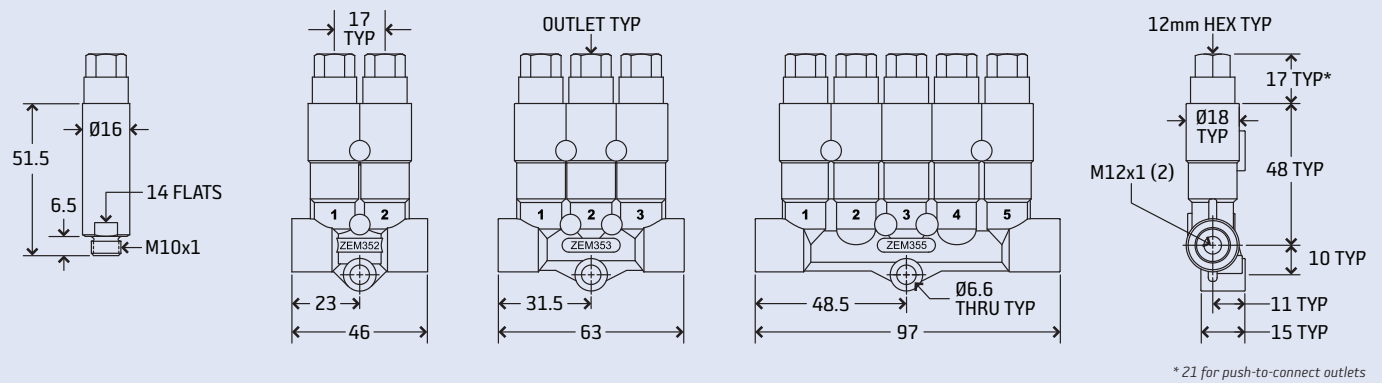


\* 13 for push-to-connect outlets



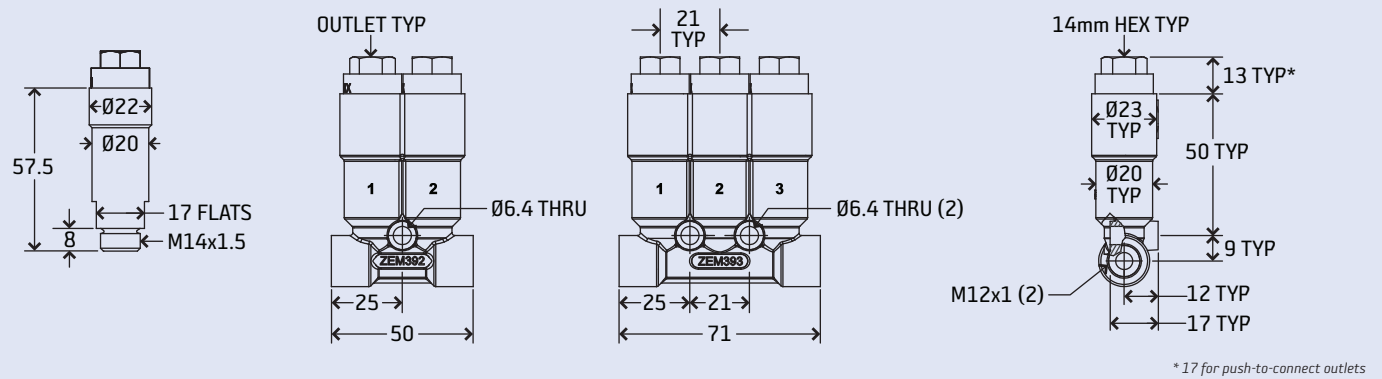
## ZEM 35 Series Injectors

NOTE: ZEM 35 Series injectors with one outlet can be used with tee fittings (part #73462-3443).



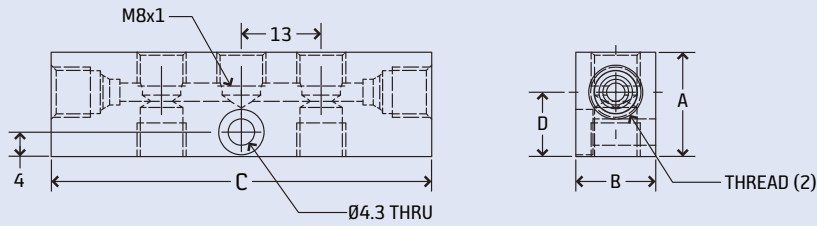
## ZEM 39 Series Injectors

NOTE: ZEM 39 Series injectors with one outlet can be used with tee fittings (part #34547).

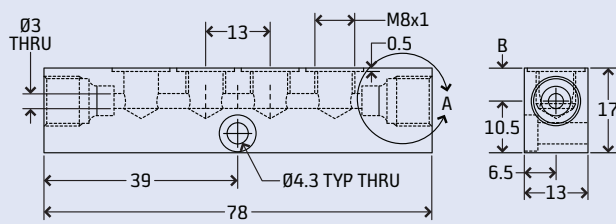


## ZEM 32 Series Manifolds

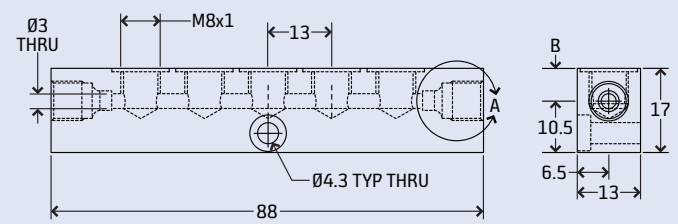
### 5-Way Double Manifold



### 4-Way Inline Manifold

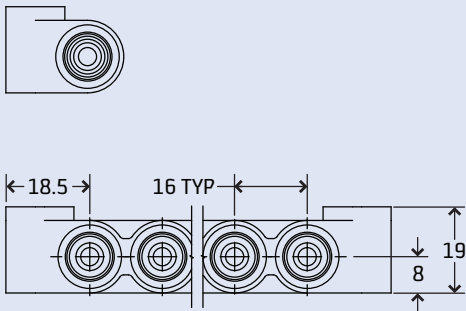
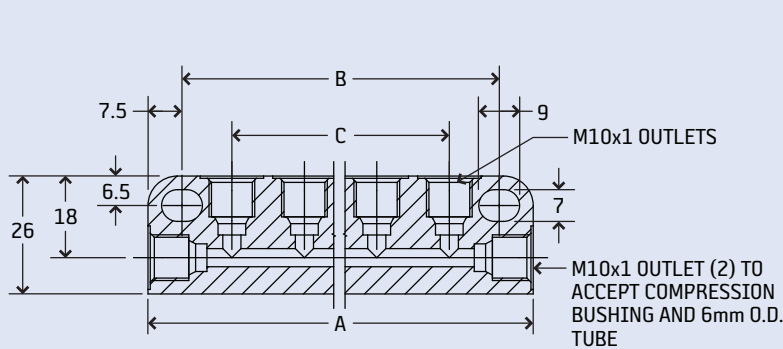


### 5-Way Inline Manifold



# of Lube Points	Main Line Tube Diameter	Inlet Thread	Outlet Thread	A (mm)	B (mm)	C (mm)	D (mm)	Part #
<b>Double Manifold</b>								
1	4mm	M8x1	M8x1	N/A	N/A	N/A	N/A	<a href="#">22564</a>
2	4mm	M8x1	M8x1	17.0	13.0	49.0	10.5	<a href="#">34539-1</a>
2	6mm	M10x1	M8x1	17.0	13.0	52.0	10.5	<a href="#">34539-2</a>
2	8mm	M14x1.5	M8x1	20.0	18.0	61.0	11.0	<a href="#">34539-3</a>
3	4mm	M8x1	M8x1	17.0	13.0	62.0	10.5	<a href="#">34540-1</a>
3	6mm	M10x1	M8x1	17.0	13.0	65.0	10.5	<a href="#">34540-2</a>
3	8mm	M14x1.5	M8x1	20.0	18.0	74.0	11.0	<a href="#">34540-3</a>
5	4mm	M8x1	M8x1	17.0	13.0	62.0	10.5	<a href="#">34541-1</a>
5	6mm	M10x1	M8x1	17.0	13.0	65.0	10.5	<a href="#">34541-2</a>
5	8mm	M14x1.5	M8x1	20.0	18.0	74.0	11.0	<a href="#">34541-3</a>
<b>Inline Manifold</b>								
4	6mm	M10x1	M8x1	17.0	13.0	78.0	10.5	<a href="#">ZEM32M46</a>
5	4mm	M8x1	M8x1	17.0	13.0	88.0	10.5	<a href="#">ZEM32M54</a>
5	6mm	M10x1	M8x1	17.0	13.0	91.0	10.5	<a href="#">ZEM32M56</a>
5	8mm	M14x1.5	M8x1	20.0	18.0	100.0	11.0	<a href="#">ZEM32M58</a>

# ZEM 33 Series Manifolds



Note: Manifolds rated at 500 psi (34.5 bar) max.

# of Lube Points	Main Line Tube Diameter	Inlet Thread	Outlet Thread	A (mm)	B ± 0.3 (mm)	C ± 0.3 (mm)	Part #
2	6mm	M10x1	M10x1	53	38	16	<a href="#">31000-4</a>
3	6mm	M10x1	M10x1	69	54	32	<a href="#">31000-5</a>
4	6mm	M10x1	M10x1	85	70	48	<a href="#">31000-6</a>
5	6mm	M10x1	M10x1	101	86	64	<a href="#">31000-7</a>
6	6mm	M10x1	M10x1	117	102	80	<a href="#">31000-8</a>
7	6mm	M10x1	M10x1	133	118	96	<a href="#">31000-9</a>
8	6mm	M10x1	M10x1	149	134	112	<a href="#">31000-10</a>

## Notes

This image shows a full page of blank, lined paper. It features approximately 20 evenly spaced horizontal grey lines across its entire width, providing a guide for handwriting or typing. The background is a clean, solid white color.

[illegible]

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