

### 3. Power Source Section

The 'Power Source' section is primarily the:

1. Hydraulic Pump
2. Diesel Engine or Electric Motor \*
3. Electronic Controller
4. Self-bunded Steel Base

\* The following description is applicable to "Power Source" sections fitted with diesel engines (representing the majority of Sharpe PPU rentals); a description of a "Power Source" section fitted with an electric motor can be provided upon request.

#### Hydraulic Pump

- The hydraulic pump provides the oil flow for the reciprocation of the hydraulic cylinder (fig. 15).
- Sharpe PPUs are fitted with fixed displacement pumps which provide maximum reliability and service life.
- The UP-stroke speed is directly proportional to the pump displacement which is varied by drive speed and cartridge exchange.



figure 15

#### Diesel Engine

- Sharpe PPUs are powered by air cooled, diesel engines which provide maximum reliability in Australia's hottest conditions (fig. 16).
- We have a range of engine sizes so that they can be exchanged for smaller ones as well production declines hence ensuring maximum efficiency and therefore economy.
- Diesel fuelled engines are supplied with shorter term fuel storage (fig. 17) for initial operations as well as longer term, self-bunded, fuel storage (fig. 18).



figure 16

#### Electronic Controller

- An electronic controller enables convenient and reliable control and monitoring of the power source section (fig. 19).
- A 12V power supply connection (35mm dia. x 7 way) is provided for external equipment e.g. RTU (fig. 20).
- A RJ-45 communications port is provided for remote monitoring of engine parameters (fig. 21).

#### Electric Motor

- A description of a "Power Source" section fitted with an electric motor can be provided upon request.



figure 17



figure 18



figure 19



figure 20



figure 21

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## Sharpe PPU Series C100 & D100

### How Does It Work?

The Sharpe PPU is a portable pumping unit which provides the reciprocating, vertical motion needed to operate a sucker rod, artificial lift system. The Series C100 and D100 are our benchmark designs which have been proven by more than one million hours of operation, with less than 1% downtime, in Australia's Cooper and Surat Basins.

Visit [www.sharpe.com.au](http://www.sharpe.com.au) for more information on the benefits of using the Sharpe PPU. Customers can also access detailed operating information on the website from the customer login portal.

#### An Introduction to the Sharpe PPU

The Sharpe PPU (fig. 1) consists of three sections, the Well Head, Power Control and Power Source.

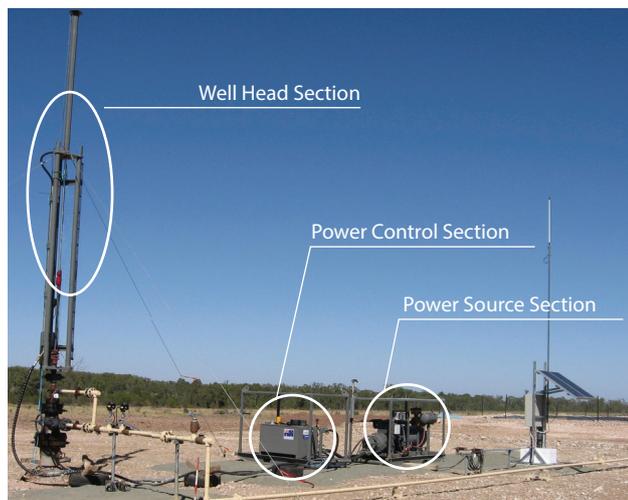


figure 1

#### 1. Well Head Section

The 'Well Head' section (fig. 2) is primarily the:

- 'Lower Base Plate' which is fitted to the well head (A)
- 'Well Head Frame' which supports the hydraulic cylinder (B)
- 'Hydraulic Cylinder' (single acting), which provides the reciprocating vertical motion to the sucker rods (C)

A structural certificate for the 'Well Head Frame' is available for customers to download from [www.sharpe.com.au](http://www.sharpe.com.au)

#### Lower Base Plate

The plate is fitted with a 2-7/8" EUE tubing coupling.

It is most economical to fit the plate to the well head during well completion or well servicing (fig. 3). Maximum stroke length is achieved when the polished rod stick-up is the specified distance above the plate.

Drawing numbers 100-WHD-040, "Side Elevation, Well Head Installation, Sharpe PPU Series 100" and 100-WHD-041, "Plan View, Well Head Installation, Sharpe PPU Series 100" are available for customers to download from [www.sharpe.com.au](http://www.sharpe.com.au)

#### Well Head Frame

The frame is supported by, and bolted to the lower base plate (fig. 4).

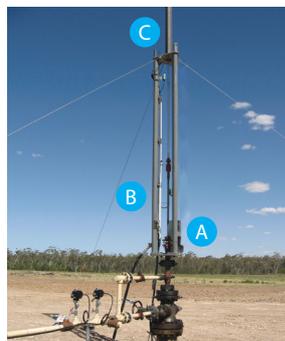


figure 2



figure 3



figure 4

## Hydraulic Cylinder

- The hydraulic cylinder rod is connected to the polished rod by a 7/8" nominal, polished rod coupling (fig. 5, A).
- Electronic, intrinsically safe, proximity sensors are used to control the reciprocating motion and the stroke length (fig. 5, B).
- The stroke length is changed simply by adjusting the vertical position of the top sensor; this can be done safely from ground level (NB: no need for 'work at heights') (fig. 6).

A compliance certificate for the sensors is available for customers to download from [www.sharpe.com.au](http://www.sharpe.com.au).

- Hydraulic oil supply to the well head section (fig. 7, A) is conveniently and safely connected or disconnected by a 'connect under pressure' / 'quick release' coupling which prevents any oil spill.
- Well survey data, including electronic dynagraphs, can be readily obtained by connecting well survey equipment to the Sharpe PPU hydraulic system and the polished rod (fig. 8).
- The well head section includes a hydraulic test point to enable convenient connection of the well survey equipment for the acquisition of polished rod load data (fig. 7, B).
- UP-stroke speed is controlled independently of DOWN-stroke speed by hydraulic pump displacement (see Power Source section).
- DOWN-stroke speed is controlled independently of UP-stroke speed by a hydraulic valve (see Power Control section).



Figure 5



Figure 6

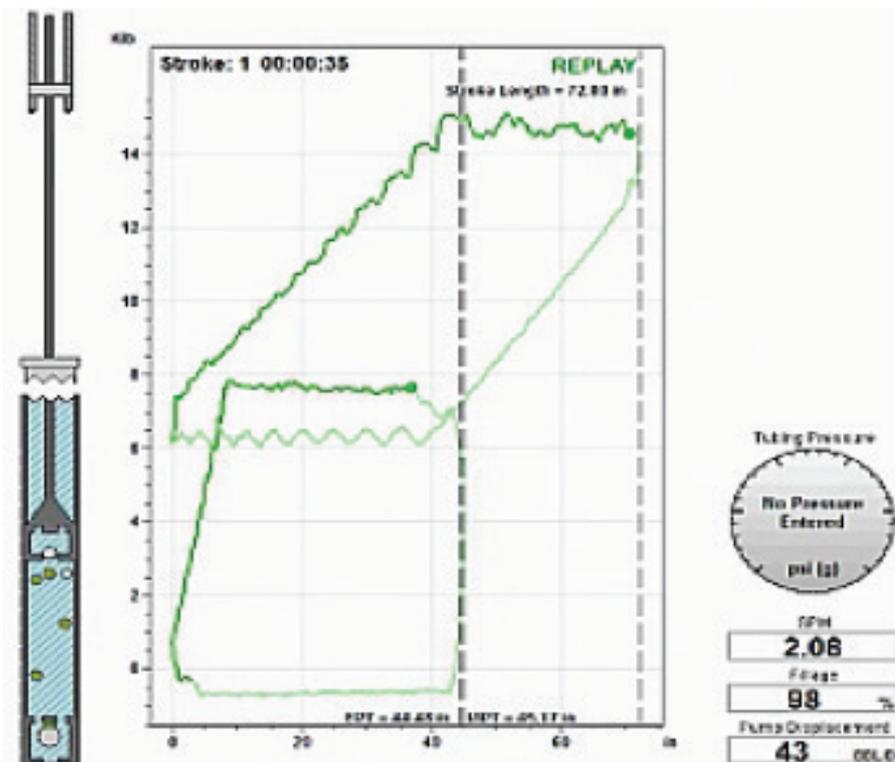


Figure 8



Figure 7

## 2. Power Control Section

The 'Power Control' section is primarily the:

1. Control Valves
2. Oil Reservoir and Cooler
3. Electrical Controller
4. Self-bunded Steel Base

### Control Valves

- Operational valves on the power control section are clearly labelled for easy and safe operation (fig. 9).
- A decal is affixed to each unit for easy reference and operation of valves by field personnel (fig. 10).

### Oil Reservoir and Cooler

- The design and size of the hydraulic oil reservoir and cooler ensures the oil temperature remains within operating range in the hottest of Australian conditions (fig. 11).
- The Sharpe PPU has successfully operated in the Cooper Basin in ambient temperatures of 49°C.
- Fitted with an oil level safety switch which is set to shut down the system if the oil drops below a pre-set level (fig. 12).

### Electrical Controller

- The electrical controller is fitted with an intrinsically safe (IS) barrier (Fig. 13-14).
- The power control section (and therefore IS barrier ) is installed beyond the hazardous zone.

A compliance certificate for the barrier is available for customers to download from [www.sharpe.com.au](http://www.sharpe.com.au)



Figure 9

Designation	Description	Operations
V1	Ball valve which controls the oil supply to Power Source Section	Must be latched in open position during operations
V2	Ball valve which controls the oil supply to Well Head Section	Open - operating position Closed - shut down position When in closed during stop-strings, it do not allow sensor actuator (only) to come to rest adjacent to a sensor (green).
V3	Ball valve which controls the hydraulic "dump"	Open - Power Control Section "disengage" Closed - Power Control Section "engage"
V7	Needle valve which controls the down-stroke speed	Clockwise rotation - reduce down-stroke speed Anti-clockwise rotation - increase down-stroke speed Adjust during down-stroke only
F1 & F2	Hydraulic oil filters	Maximum interval between filter change - 500 hours - total operating hours are recorded on the meter inside the electrical control box
F3	"Spin-on" air filter	Maximum interval between filter change - 500 hours - total operating hours are recorded on the meter inside the electrical control box
V8	Directional valve which controls the change in direction of polished rod stroke	Refer to O&M Manual @ <a href="http://www.sharpe.com.au">www.sharpe.com.au</a>
V4, V6 & V10	Pressure controls	Refer to O&M Manual @ <a href="http://www.sharpe.com.au">www.sharpe.com.au</a>
SW1	Push button switch which activates lower sensor on Well Head Section	Push to commence normal operation when polished rod coupling is detected below the lower sensor. Refer to O&M Manual @ <a href="http://www.sharpe.com.au">www.sharpe.com.au</a>
SW2	Low oil level switch	Refer to O&M Manual @ <a href="http://www.sharpe.com.au">www.sharpe.com.au</a>
SW3	High oil temperature switch	Refer to O&M Manual @ <a href="http://www.sharpe.com.au">www.sharpe.com.au</a>

Refer to Operation & Maintenance (O&M) Manual @ [www.sharpe.com.au](http://www.sharpe.com.au) or call +61 (0) 7 54621433 for more information

Figure 10



Figure 11



Figure 12



Figure 13



Figure 14