

EBSRAY PUMPS



R Series

***Models RX10 & RX10-60
(50Hz & 60Hz)***

***...for Submersible
LPG APPLICATIONS***



Model RX10 (including RX10-60)



The EBSRAY MODEL RX10 REGENERATIVE TURBINE SUBMERSIBLE PUMPSETS are designed and precision built for High flow/High pressure transfer of LPG, AUTOGAS, PROPANE and BUTANE from underground (or above ground) storage tanks.

Features

- Single Stage Regenerative Turbine pumping element.
- Certified design Explosion-Proof Submersible Electric Motor
 - Australian Certification AUS Ex 3129X (Ex s IIA T4 Class 1 Zone 0)
 - European Certification LCIE 03 ATEX 6390 (II 2 G EEx d IIA T4 Class 1 Zone 1)
- CE marked, ATEX compliant.
- BCL™ (Bearing Cooling and Lubrication) system for reliability.
- Quiet Operation, Low maintenance.
- 'Three-Tier' Protection System for Pump, Motor and System Protection.
- High Differential Pressure capability.
- Rugged Heavy Duty construction.
- Pumpset is designed to enable complete servicing.

Typical Services

Submersible installations for:

- Autogas Driveway Dispensing (Up to six hoses site & usage dependant)
- Aerosol Industries
- Marine Dispensing
- Cylinder Filling
- Bulk Filling
- Transfer Agricultural Industries
- Direct Burner/Vaporiser feed
- Forklift Refuelling

Allied Equipment

Manufactured and/or supplied by EBSRAY for the RX10 Pumpsets includes Bypass Valves, PPV™ Valves, Motor and Protection System Controllers, and electrical installation components.

Assured Quality and Performance

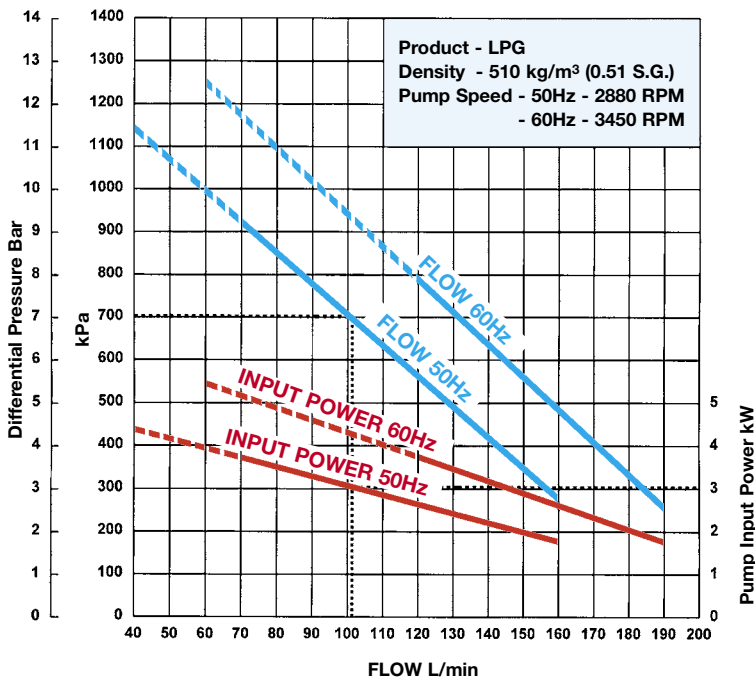
EBSRAY's ISO 9001 : 2000 Quality Management System assures compliance with the high safety and quality standards demanded by the LPG industry.

All Ebsray RX10 pumpsets are manufactured and test run under strict guidelines. Quality checks and electrical compliance tests during production guarantee pump and motor integrity and pumping performance in accordance with the specifications.

All Ebsray LPG Pumps, Pumpsets and Bypass Valves are designed and manufactured in Australia and comply with the requirements of Australian Standard AS1596, ATEX and other recognised International Standards and Codes - refer Ebsray

Specifications

Performance – RX10 for 50Hz Supply RX10-60 for 60Hz Supply



Pumpset

- Pump type..... Single stage Regenerative Turbine Principle
- Porting Inlet 55mm NB
Discharge 2" (F) NPT
(coaxial or parallel with conduit)
Conduit entry 3/4" (F) NPT
- Bearings Sleeve type/Kingsbury type, product lubricated
- Materials Body/Cover/Discharge Head: Ductile Iron (ASTM A395)
Casing: Steel (ASTM A53 Type E)
Bearings: Carbon Composite
Elastomers: Viton
Impeller: Gunmetal
- Motor Certified explosion proof design
3.7 kW 2 pole
50Hz Model - 380V - 415V
60Hz Model - 460V
- Certification Australian AUS Ex 3129X
(Ex s IIA T4 Class 1 Zone 0)
European LCIE 03 ATEX 6390
(II 2 G EEx d IIA T4 Class 1 Zone 1)

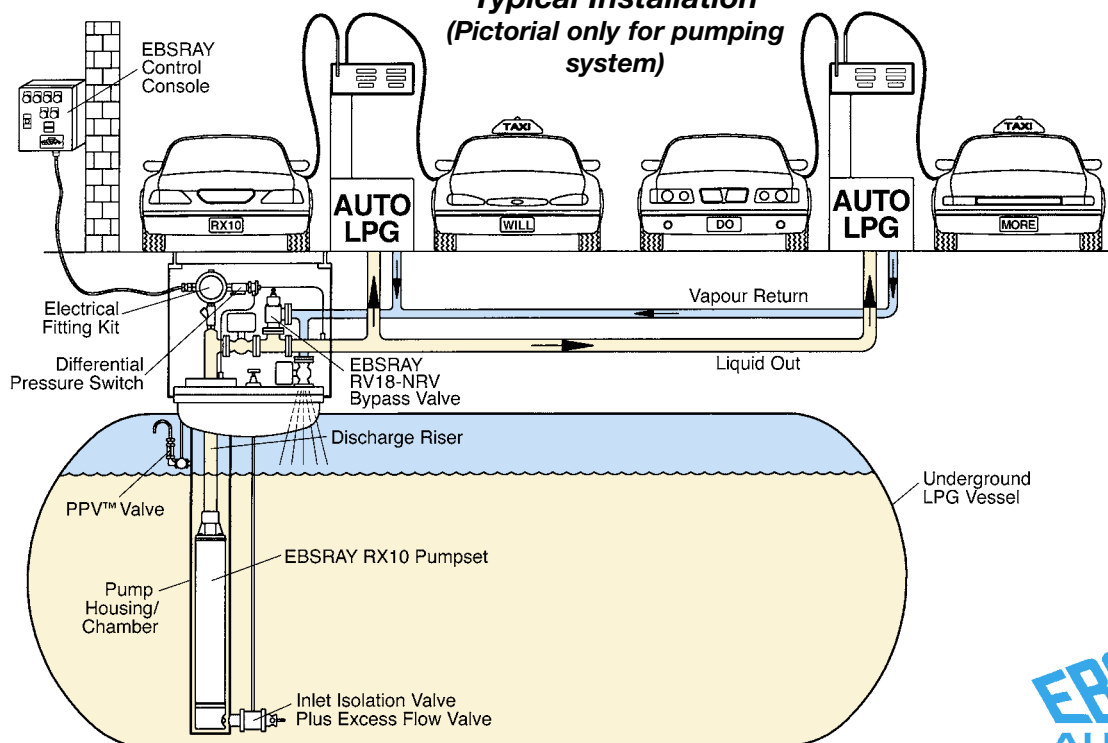
Example RX10 (50Hz Supply)

- Differential Pressure..... 700 kPa (7 Bar)
- Flow 103 L/min
- Input Power 3.1 kW

Warranty

All Ebsray manufactured pumps and equipment are warranted for a full 12 months against faulty workmanship and/or materials. Refer to Ebsray or Factory Appointed Representative for detailed RX10 Pumpset Extended Warranty conditions.

Typical Installation (Pictorial only for pumping system)



Model RX10 (including RX10-60)

Pump

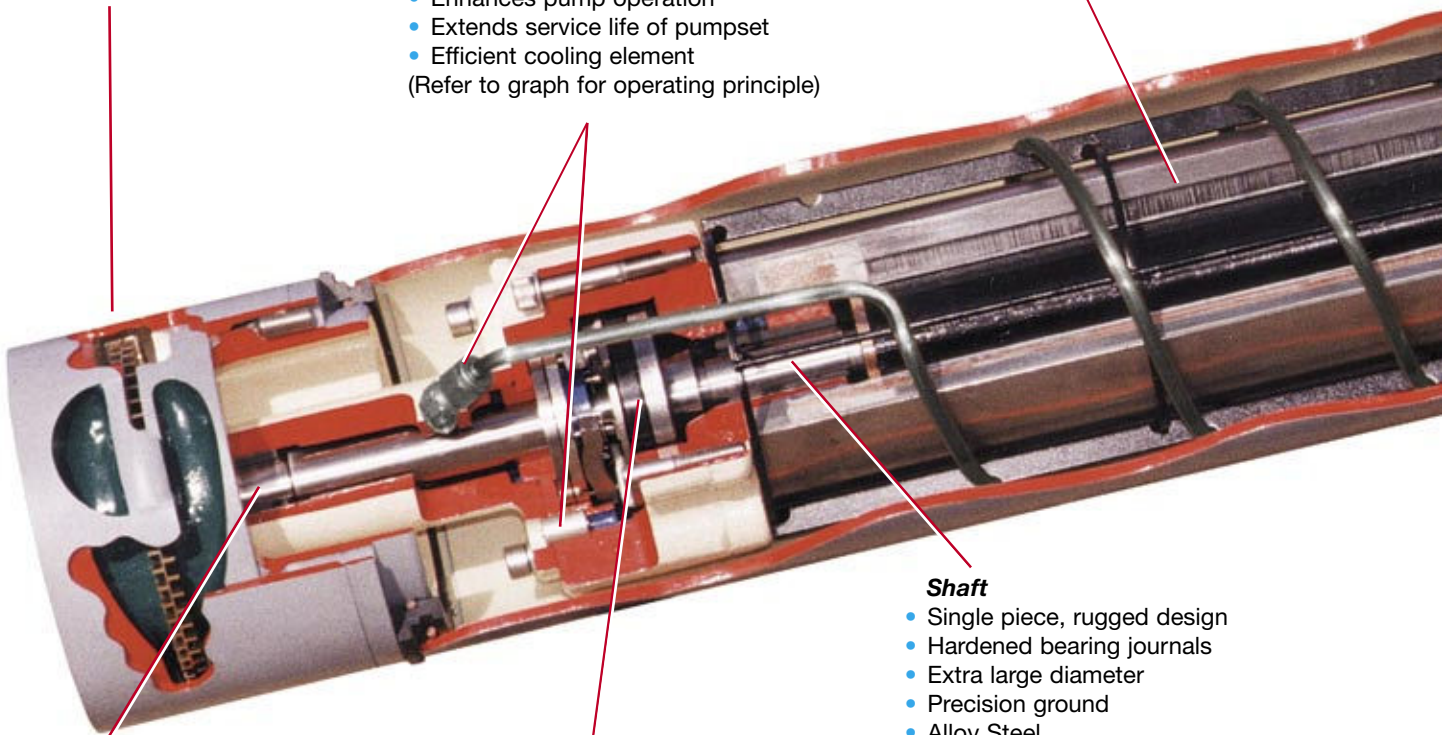
- Regenerative Turbine Principle
- Single Stage Gunmetal Impeller, axially located. 50Hz model & 60Hz model.
- Computer Optimised hydraulics for maximum performance
- Quiet, smooth, pulse-free operation
- Unique anti-cavitation shrouded inlet (suction) port. Low NPSH design.
- Excellent vapour handling capability ensures maximum withdrawal from supply tank
- High differential pressure capability
- Ductile Iron casing to ASTM A395
- 'Complete disassembly' design for future maintenance / service (by certified persons only)
- Pump operates efficiently to liquid levels as low as pump housing inlet

Motor

- 3.7 kW 2-Pole
- Certified Explosion-Proof design
- Australian Certification AUS Ex 3129X (Ex s IIA T4 Class 1 Zone 0)
- European Certification LCIE 03 ATEX 6390 (II 2 G EEx d IIA T4 Class 1 Zone 1)
- CE marked, ATEX compliant
- Encapsulated, sealed stator windings
- 50 Hz 380 - 415 V
- 60 Hz 460 V
- Temperature Rating T4

BCL™ System

- "Bearing Cooling and Lubrication" System
 - Cools and lubricates all bearings with LPG
 - Ensures LPG remains in liquid state inside motor
 - Returns cooled 'liquid state' LPG to pump suction
 - Explosion-Proof breathers filter cooling liquid
 - Enhances pump operation
 - Extends service life of pumpset
 - Efficient cooling element
- (Refer to graph for operating principle)



Shaft

- Single piece, rugged design
- Hardened bearing journals
- Extra large diameter
- Precision ground
- Alloy Steel

Thrust Bearing

- Kingsbury/Michelle type
- For axial location of Rotor, Shaft and Impeller
- Heavy duty design
- Proven Performance

Pump Bearing

- Robust - extra large diameter
- Hardened shaft journal
- Spiral grooved - flow induced
- Forced 'liquid state' LPG Lubrication and Cooling
- Engineered carbon composite for LPG duty
- Long service life - Replaceable

“QUALITY ENGINEERED FOR PERFORMANCE”

Pumpset Features

Casing

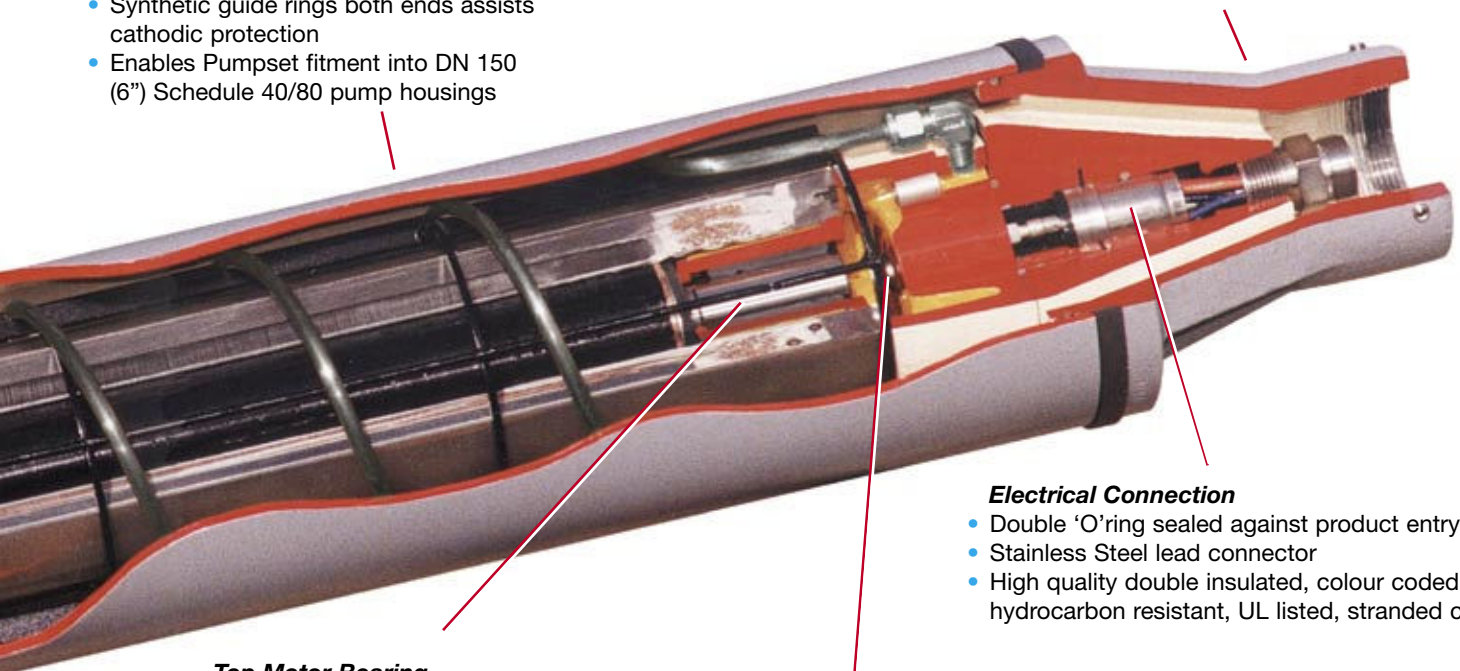
- Rugged 4.5mm wall Steel to ASTM A53 type E
- 'O'ring sealed for positive LPG retention
- Synthetic guide rings both ends assists cathodic protection
- Enables Pumpset fitment into DN 150 (6") Schedule 40/80 pump housings

Explosion-Proof Integrity

- Australian Certification AUS Ex 3129X (SAQAS)
- European Certification LCIE 03 ATEX 6390
- Tamper-evident seal in Discharge Head maintains Certification status
- Explosion-Proof certified breathers
- Positive alignment ensures flamepath integrity
- Pumpset can be serviced by Certified persons

Discharge Head

- Ductile Iron to ASTM A395
- NPT thread connections for coaxial LPG discharge and electrical conduit
- Optional non-coaxial Discharge Head design for separate electrical conduit
- Locking screws for maintaining angular orientation
- Motor Certification Tag and Pump Serial Number Identification Plate location



Top Motor Bearing

- Robust - extra large diameter
- Hardened shaft journal
- Spiral grooved - flow induced
- Forced 'liquid state' LPG Lubrication and Cooling
- Engineered carbon composite for LPG duty
- Long service life - Replaceable

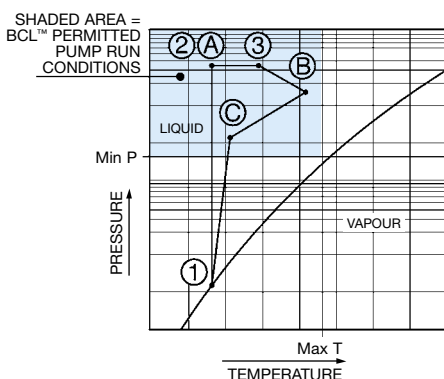
Electrical Connection

- Double 'O'ring sealed against product entry
- Stainless Steel lead connector
- High quality double insulated, colour coded, hydrocarbon resistant, UL listed, stranded cable

HBT Thermal Cutout (Switch)

- Senses high bearing or motor temperature
- Part of 'Three-Tier' protection system
- Explosion-Proof, high pressure design
- Hermetically sealed
- Automatic reset (at pumpset)
- Normally closed setting
- Critical to BCL™ System operation (refer to graph for operating principle)

VAPOUR PRESSURE VS. TEMPERATURE TYPICAL LPG AUTOGAS MIX



BCL™ SYSTEM OPERATING PRINCIPLE

Model RX10 (including RX10-60) BCL™ System

EBSRAY BCL™ SYSTEM (Bearing Cooling and Lubrication system)

The EBSRAY BCL™ System relies upon the unique physical characteristics of LPG, Propane and Butane for its operation.

Differential pressure control within the pumpset, combined with the corresponding product temperature maintenance, guarantees BCL™ operation.

Specific design features built into the RX10 take advantage from, and enable optimum use of, the LPG, as the medium for attaining the desired service life and efficient operation of the pumpset and its internal components, sleeve bearings etc.

In order to cool and lubricate effectively, the LPG must remain in 'liquid' state at all times. As heat is absorbed by the LPG during its internal circulating/lubricating cycle, any excessive drop in pressure or increase in temperature will cause it to 'flash off' into vapour. In turn, this would cause either a loss of lubrication (ie. dry running) or inject vapour back into the pump. Both these situations would be detrimental to pump life and performance.

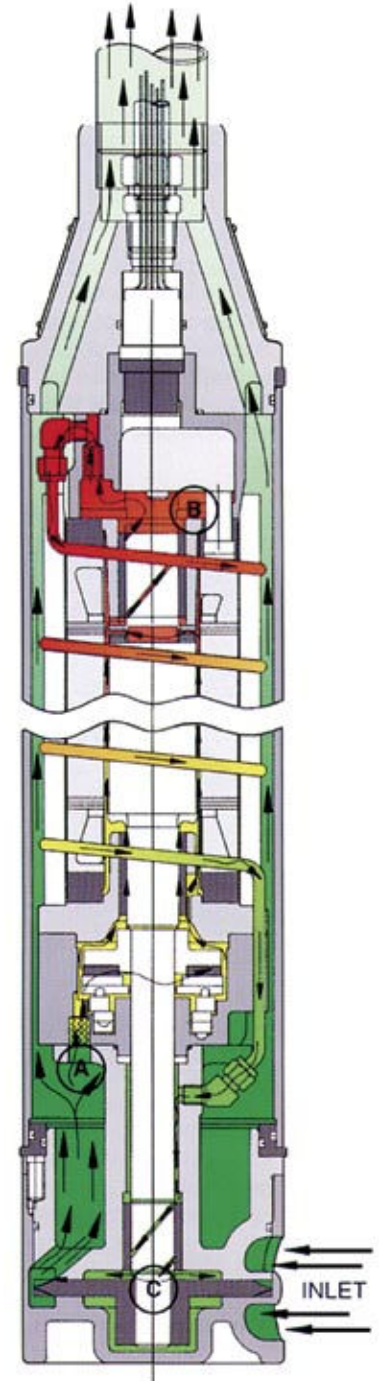
The principle of the BCL™ System maintains and guarantees 'liquid-state' internal circulation and lubrication of the RX10 Pumpset.

A - B (see diagram and graph)

At all times during operation, a percentage of cool LPG at pump discharge pressure is circulated internally through the thrust bearing, the lower motor bearing, the gap between the stator and rotor and, most critically, through the upper motor bearing.

B - C (see diagram and graph)

Above the upper motor bearing is a temperature monitoring switch. From this area, LPG which has been kept in 'liquid state' is returned and re-cooled via a spiral tube, (which is immersed in the cooler pump discharge liquid). Finally, this cool liquid is directed through the pump bearing and into the intermediate (lower) pressure area of the pump impeller. The predetermined minimum differential pressure is critical to maintain adequate flow and to keep the 'liquid state' of the LPG.



Bypass Valve EBSRAY Model RV18 NRV

Function/Operation

The Bypass Valve plays a pivotal role in the overall LPG system, controlling the following functions:

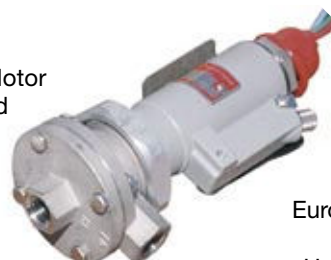
- ✓ Maintains pump system differential pressure as required for optimum flow rate.
- ✓ Enables the RX10 pumpset BCL™ system pressure requirements to be met and maintained.
- ✓ Forms an integral part of the overall 'Three-Tier' protection system function.
- ✓ Softseat 'backcheck' (NRV) function helps to eliminate LPG drain back when pump is idle.
- ✓ ATEX compliant.

Differential Pressure Switch

Function/Operation

To ensure adequate (lubrication/cooling) flow through the Pump/Motor internals, overall pumping system differential pressure must be monitored and kept above a predetermined minimum level. The Differential Pressure Switch signals the Control Console if the minimum system differential pressure:

- a) Is not attained on startup after the preset time delay.
- b) Falls below the predetermined pressure during pumping/operation of the Pumpset.



UL, AUS, ATEX
European Certification
for Class I Zone I
Hazardous Locations

Pumpset, System Control Ancillary Items

Control Console with “Three-Tier” Protection System

The EBSRAY “Three-Tier” Protection System forms an integral and fundamental part of the complete pumping ‘system’, ensuring proper pumpset performance and protecting against operation outside specified duty point. The basic functions of this system are as follows:

1. Operation of the system will be halted if fluid within the BCL™ System exceeds a preset temperature.
2. Operation of the system will be halted if Differential Pressure falls below a preset level during operation, or is not developed within a preset time after startup.
3. Operation of the system will be halted if motor current exceeds a preset maximum setting.

Only after assessment and rectification of the ‘fault’ (following automatic pumpset shutdown from any of the above three functions), should authorised access to the Control Console’s keylock-protected reset be initiated - before attempting to resume normal pumping/dispersing operation again.



Operation

Protects against pump and system operation outside specification of Differential Pressure, Temperature & Motor power.

Features

- ✓ PLC controlled
- ✓ Adjustable DPS override timer
- ✓ Hour run meter
- ✓ Visible fault recognition
- ✓ Tamperproof enclosure
- ✓ Protected fault isolation
- ✓ Pre-wired and pre-tested
- ✓ Key for OFF, TEST, RUN

Specifications of EBSRAY

RX10 Standard Control Console

| | |
|---------------------------------|------------------------------|
| Enclosure | IP55 |
| Differential Press. bypass | |
| Adjustable Timer | 0 - 127 Seconds |
| Control Circuit | 50Hz/60Hz |
| Conditions Monitored | Differential Pressure |
| | Temperature |
| | Motor Current |
| Control Circuit Isolation | Manual reset circuit breaker |
| Motor Run Contactor | 12 Amp 3 Phase |
| Motor Overload Relay | 7 - 10 Amp 3 Phase |

Note: Optional Models available for total “LPG Systems” control. Refer Ebsray

Electrical Fitting Kit

The RX10 Pumpset requires an electrical termination point within the tank/pump pit.

Ebsray’s Flameproof Ex d Electrical Fitting Kit comprises all electrical fittings necessary for this part of the installation (When designated as a Class 1 Zone 1 Hazardous Area).

Items supplied in the Australian Flameproof Ex d Electrical Fitting Kit include:

- ✓ Junction Box with Terminals and optional 4 or 8 port Entries
- ✓ Armoured Cable Barrier Gland
- ✓ Conduit Seal
- ✓ Hex Nipple
- ✓ Plugs



EBSRAY “PPV™” Valve

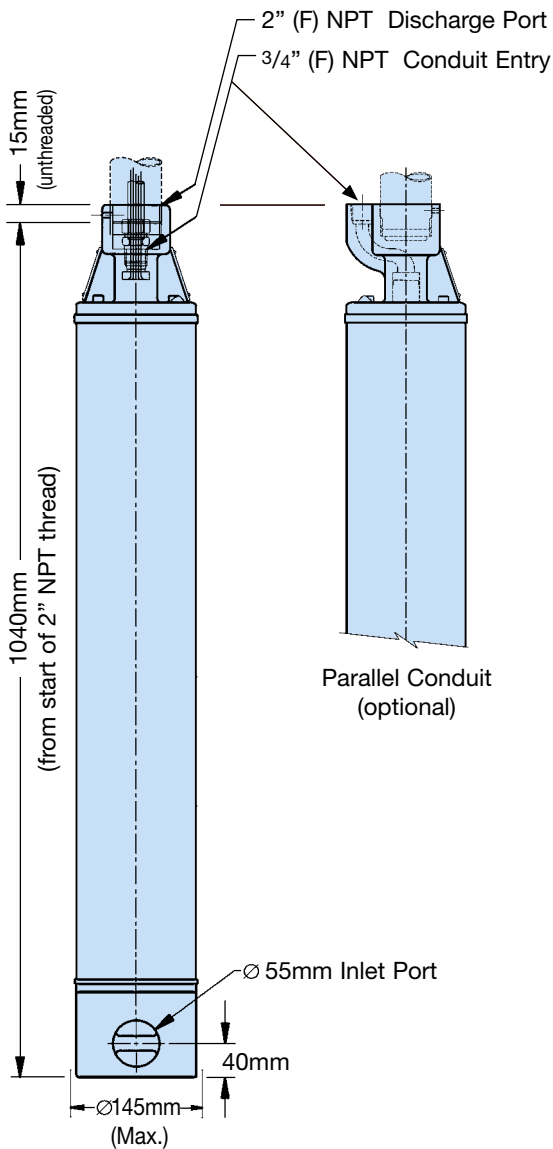
(Positive Pressure Ventilation Valve)

The PPV™ Valve with its low opening/closing pressure allows equalisation of liquid level in the pump housing when the pump is not operating. It also prevents rapid dropping of the liquid level in the pump housing during start up, thus enabling maximum utilisation of the tank’s storage capacity. Correct installation (vertically mounted) is essential for proper functioning of the PPV™ Valve.

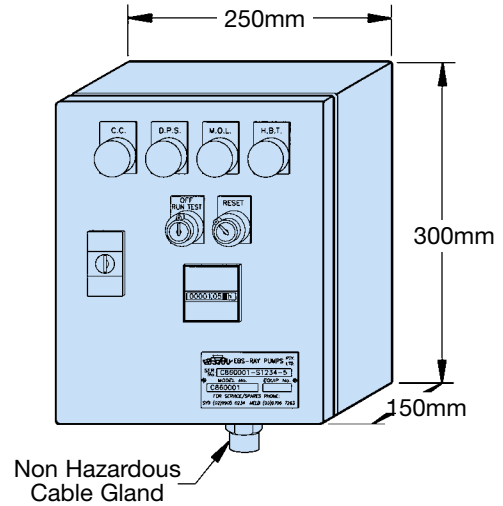
| | |
|----------------------------------|----------------|
| Porting (inlet and outlet) | 1/2” (F) NPT |
| Max Working Pressure | 30,000 kPa |
| Parts (wetted) | Bronze/Nitrile |



Dimensions



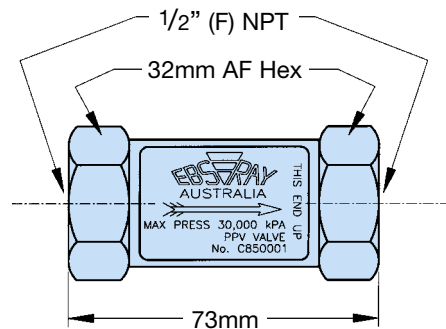
EBSRAY RX10 & RX10-60 Pumpset
(50Hz & 60Hz)
Weight 62 kg (unpacked)



EBSRAY RX10 'Standard' Control Console

Weight 7 kg (unpacked)

Note: Optional Models available for total "LPG Systems" control. Refer Ebsray



EBSRAY PPV™ Valve

- NOTES:
1. All specifications, descriptions and illustrations in this brochure are typical only and subject to revision without notice.
 2. Certified data available upon request.
 3. BCL™ and PPV™ are Registered Trademarks of EBS-RAY Pumps Pty Limited.

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