

# DMC

多美時燃氣設備有限公司  
DMC GAS EQUIPMENT LIMITED

Address: Unit 11, 11/F, Tower One, Ever Gain Plaza, 88 Container Port Road, Kwai Chung, NT, Hong Kong  
Website: [www.dmc-gas.com](http://www.dmc-gas.com) Email: [dmcsaleshk@dmc-gas.com.hk](mailto:dmcsaleshk@dmc-gas.com.hk)  
Tel: +852 2851 2121 Fax: +852 2851 2129

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# EBSRAY PUMPS



## **R Series**

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

**...for Submersible  
LPG APPLICATIONS**





## Submersible Pumpset Model RX10 (including RX10-60)



EBSRAY MODEL RX10 REGENERATIVE TURBINE SUBMERSIBLE PUMPSETS are specifically designed and precision built for efficient, high pressure pumping of LPG, Autogas, Propane and Butane from underground or aboveground storage tanks.

### Features

- ▼ Single Stage Regenerative Turbine pumping element
- ▼ Quiet, smooth, pulse-free operation
- ▼ Submersible concept guarantees rapid priming and pressure generation
- ▼ CE marked, ATEX compliant
- ▼ Certified Explosion-proof design Submersible Electric Motor
- ▼ Australian Certification - ANZEx\_06\_3046X (Ex s IIA T4 Class 1 Zone 0)
- ▼ EU Certification - LCIE 03 ATEX 6390 (Ex II 2 G EEx d IIA T4 for Class 1 Zone 1)
- ▼ IECEX Certification - IECEX LCI 05.0003
- ▼ Internal *BCL™* 'Bearing Cooling and Lubrication' System for ultimate pumpset reliability
- ▼ EBSRAY 'Three-Tier' Protection System for Pump, Motor and pumping system
- ▼ High Differential Pressure capability
- ▼ Robust design, Heavy Duty construction
- ▼ Pumpset is designed to enable complete servicing by Certified and Ebsray qualified persons

### Typical Services

Underground or Aboveground Submersible LPG installations for:

- ▼ Autogas Driveway Dispensing for up to 6 hoses - site & usage dependent
- ▼ Forklift Refueling
- ▼ Aerosol Industries
- ▼ Agricultural Industries
- ▼ Marine Dispensing
- ▼ Cylinder Filling
- ▼ Direct Burner / Vaporiser feed

### Allied Ancillary Equipment

Manufactured and/or supplied by EBSRAY for the RX10 Pumpsets:

- ▼ Bypass Valves
- ▼ *PPV™* Valves
- ▼ Differential Pressure Switches
- ▼ Pump Controllers, Drives and System Protection Equipment

### Assured Quality and Performance

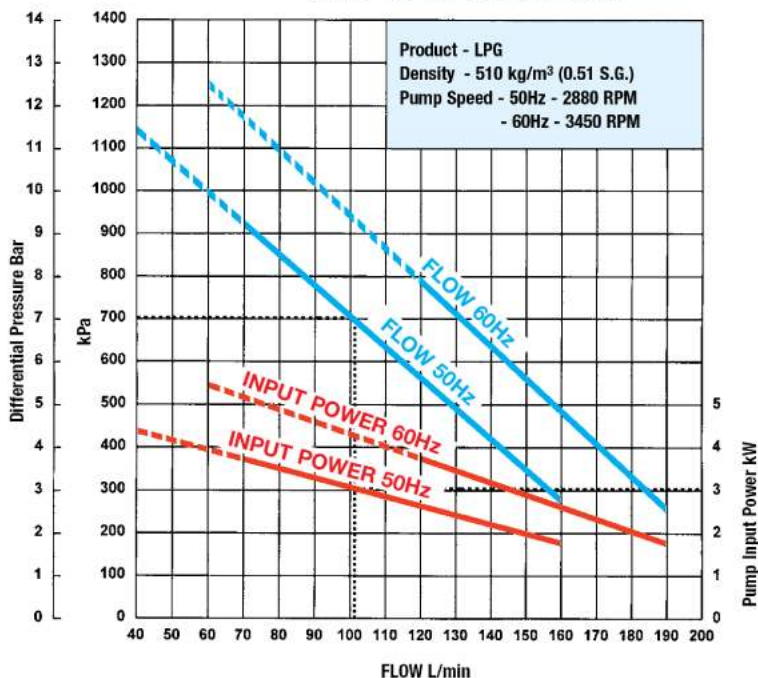
EBSRAY's ISO 9001:2000 Quality Management System assures compliance with the high safety and quality standards demanded by the LPG Industry.

All EBSRAY RX10 pumpsets are manufactured and individually test-run under strict guidelines. Mandatory quality checks and electrical compliance tests during production guarantee pump and motor integrity and pumping performance – all in accordance with the specifications.

**All EBSRAY LPG Pumps and Bypass Valves are designed and manufactured in Australia and comply with the requirements of International Standards, Codes and Directives including European ATEX 94/9/EC, Australian ANZEx, IECEX and other recognized Ex Certifications schemes.**

## Specifications

### Performance — RX10 for 50Hz Supply RX10-60 for 60Hz Supply



### Pumpset

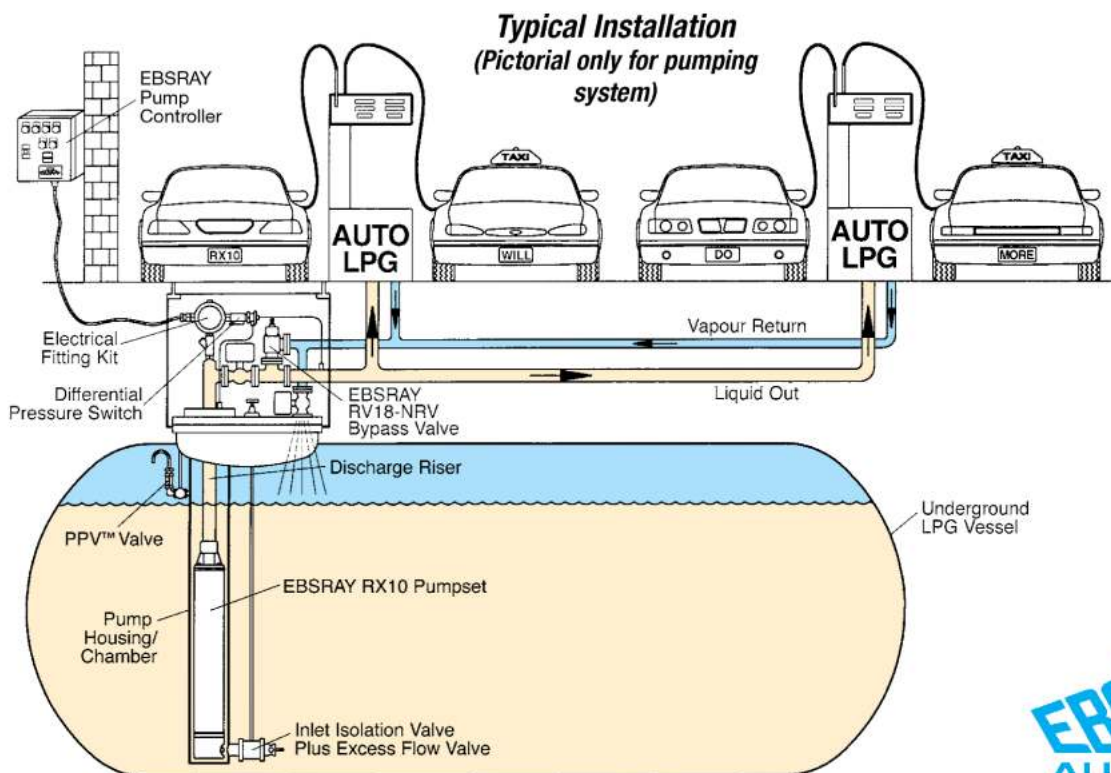
- Pump type..... Single stage Regenerative Turbine Principle
- Porting..... Inlet 55mm NB  
Discharge 2" (F) NPT  
(coaxial or parallel with conduit)  
Conduit entry 3/4" (F) NPT
- Bearings..... Sleeve type/Kingsbury type, product lubricated
- Materials..... Body/Cover/Discharge Head: Ductile Iron (ASTM A395)  
Casing: Steel (ASTM A53 Type E)  
Bearings: Carbon Composite  
Elastomers: Viton  
Impeller: Gunmetal
- Motor..... Certified explosion proof design  
3.7 kW 2-pole, Ex s (including EEx d)  
50Hz Model - 380V to 415V  
60Hz Model - 460V
- Certification..... Australian ANZEx\_06\_3046X  
(Ex s IIA T4 Class 1 Zone 0)  
European LCIE 03 ATEX 6390  
(Ex s I 2 G EEx d IIA T4 Class 1 Zone 1)  
IECEX LCI 05.0003

### 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 Warranty conditions.



## Model RX10 (including RX10-60)

### Pump

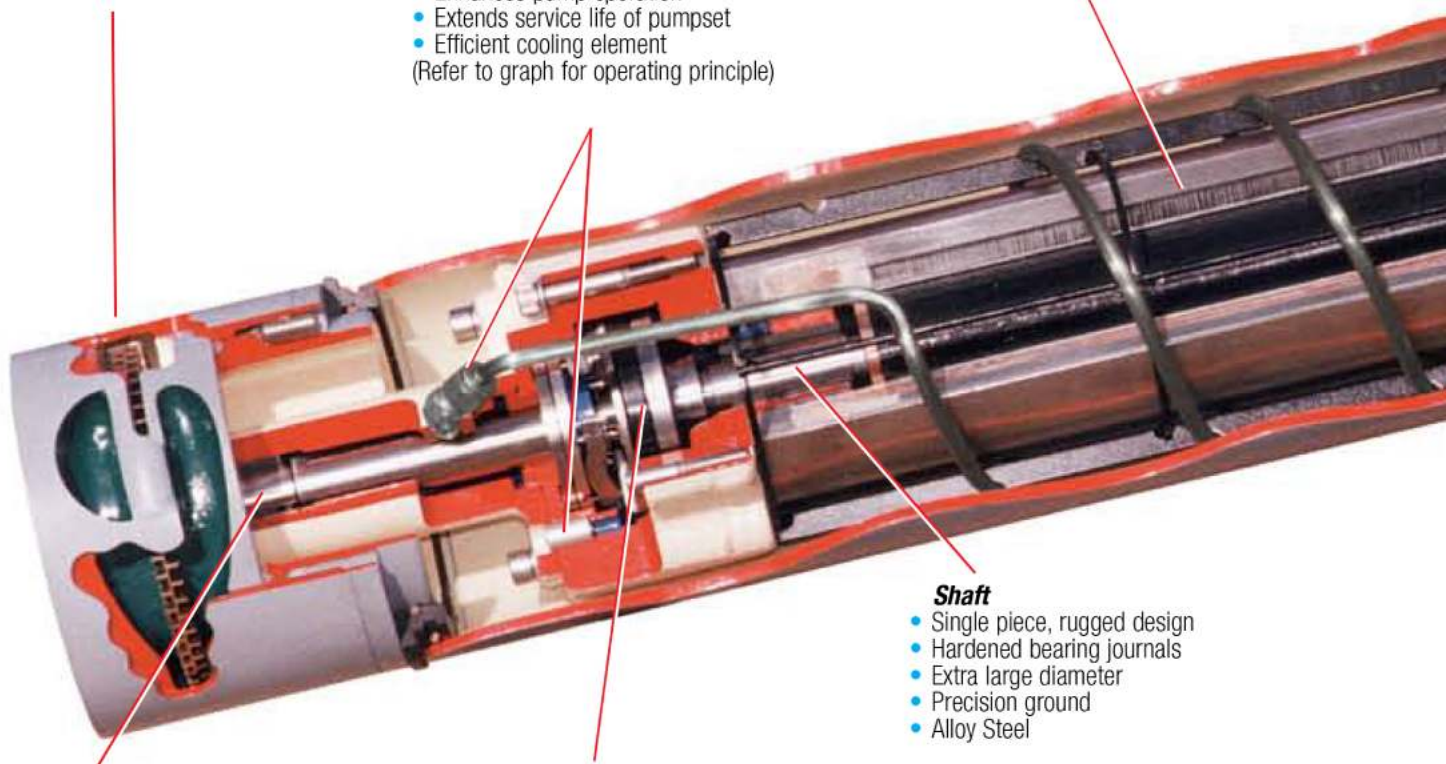
- Regenerative Turbine Principle
- Single Stage Gunmetal Impeller, axially located. 50Hz model & 60Hz model.
- Computer Optimised hydraulics for maximum performance
- Quiet, smooth, pulse-free operation
- Unique anti-cavitation shrouded inlet (suction) port. Low NPSH design.
- Excellent vapour handling 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

- Certified Explosion-Proof design
- Australian Certification ANZEx\_06\_3046X (Ex s IIA T4 Class 1 Zone 0)
- CE marked, ATEX compliant
- EU Certification - LCIE 03 ATEX 6390 (Ex II 2 G EEx d IIA T4 for Class 1 Zone 1)
- IECEx Certification - IECEx LCI 05.0003
- 3.7kW, 2-pole, 3-phase, 50Hz (380 to 415 volt) or 60Hz (460 volt)
- Temperature Rating T4
- Bi-metallic Temperature Switch (HBT) embedded in Motor
- Encapsulated, sealed stator windings
- Pumpset is designed to enable complete servicing by Certified and Ebsray qualified persons

### 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)



### 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

### Thrust Bearing

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

### Shaft

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

**"QUALITY ENGINEERED FOR PERFORMANCE"**

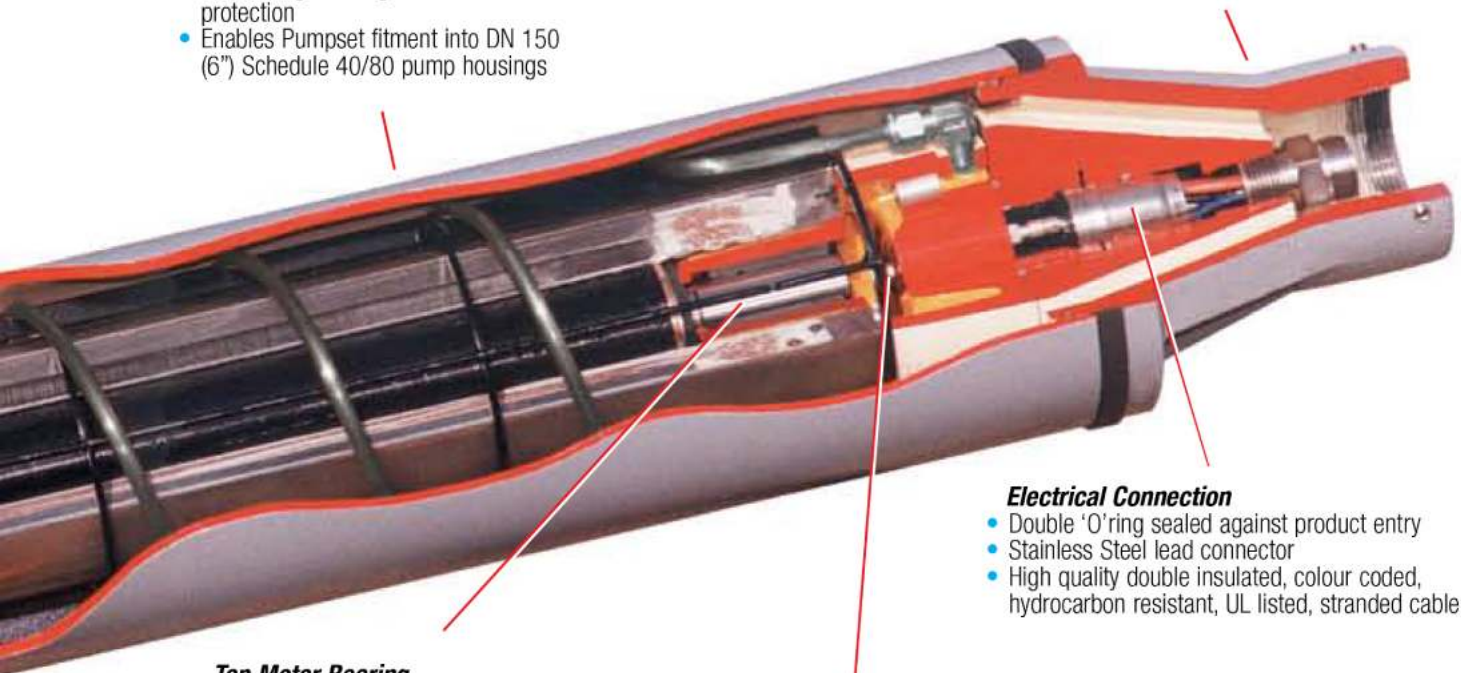
# Pumpset Features

### 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

### 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

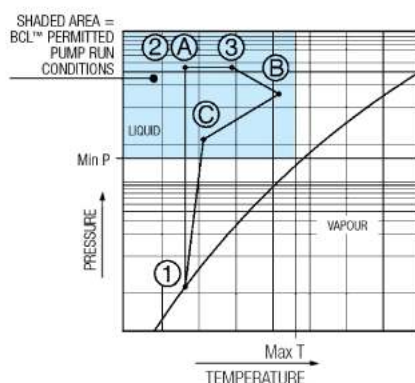
- Double 'O' ring sealed against product entry
- Stainless Steel lead connector
- High quality double insulated, colour coded, hydrocarbon resistant, UL listed, stranded cable

### 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



## 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.

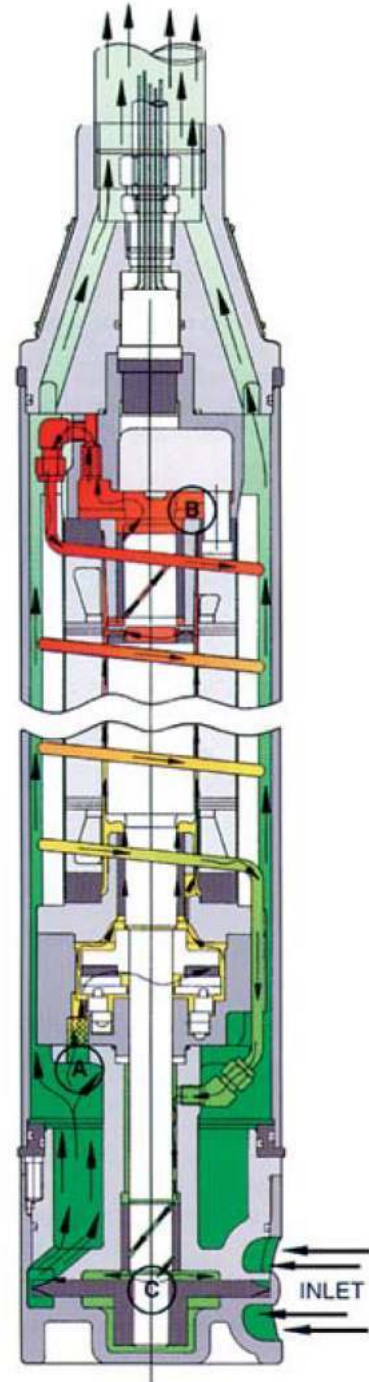
The principle of the BCL™ System maintains and guarantees 'liquid-state' internal circulation and lubrication of the RX10 Pumpset.

#### **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.



### **Electrical Fitting Kit (Australian Certification Only)**

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



## Allied Ancillary Equipment

### Pump Controller 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 protection against operation outside the specified duty points of Temperature, Differential Pressure and Motor Current parameters.

Also includes protection against dry-running/empty tank, closed or blocked discharge, high LPG temperature in tank, rapid cycling etc.

The basic functions of the system are:

1. **'HBT'** - Operation of the pumpset will be halted if the internal motor temperature exceeds a preset maximum level.
2. **'DPS'** - Operation of the pumpset will be halted if differential pressure falls below a preset minimum level during operation; or is not developed within a preset time after startup.
3. **'MOL'** - Operation of the pumpset will be halted if motor current exceeds a preset maximum level.

**Note:** If one of the above 'faults' occurs, Pumpset operation should only be restarted after assessment and rectification of the 'fault'.

#### Features

- ▼ PLC controlled, LCD screen
- ▼ Visible fault recognition
- ▼ Run and fault logs recall
- ▼ Protected fault isolation and retention
- ▼ Isolation key switch for OFF/RUN/TEST modes
- ▼ Adjustable DPS override timer
- ▼ Hour run meter
- ▼ Tamperproof enclosure
- ▼ Pre-wired and pre-tested
- ▼ IP55 Enclosure for non-hazardous area installation

*Note: Optional Models available for total LPG pumping 'System' control. Refer EBSRAY*



### Bypass Valve – EBSRAY Model RV18-NRV

#### Function/Operation

The Bypass Valve plays a pivotal role in the overall LPG pumping/dispensing system; it controls the following functions:

- ▼ Adjustable for setting system differential pressure for optimum dispensing flow rates
- ▼ Maintains the RX10 BCL™ system internal pressure requirements
- ▼ Forms part of the overall 'Three-Tier' protection system function
- ▼ Protects Pumpset against excessive differential pressure
- ▼ Soft-seated 'NRV' (Non-Return Valve) function prevents LPG drain-back when pumpset is idle
- ▼ ATEX compliant

### Differential Pressure Switch (DPS)

#### Function/Operation

To ensure adequate cooling and lubrication flow through the RX10 pumpset internals, overall pumping system differential pressure must be maintained above a preset minimum level. The DPS signals the Pump Controller if the minimum  $\Delta P$ :

- a) falls below the preset minimum level during operation,
- b) is not developed within the preset maximum time after startup

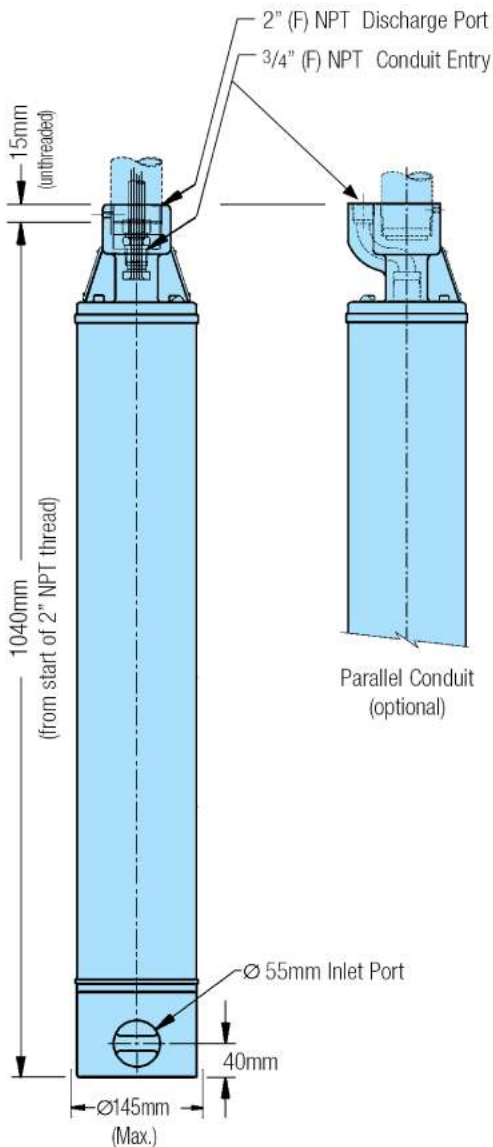
Ex Certifications to ATEX, ANZEx, UL for Class 1 Zone 1 Hazardous locations



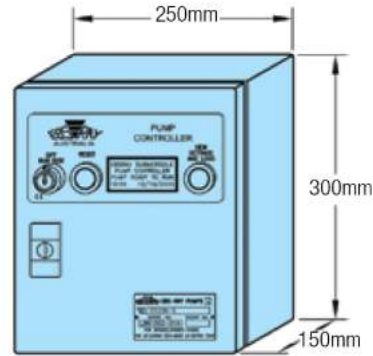
### EBSRAY PPV™ Valve (Positive Pressure Ventilation Valve)

Maintains the maximum possible liquid level inside the Pump Chamber / Manifold (if fitted) – thus enabling maximum access to and utilization of the LPG tank's storage capacity.

### Dimensions



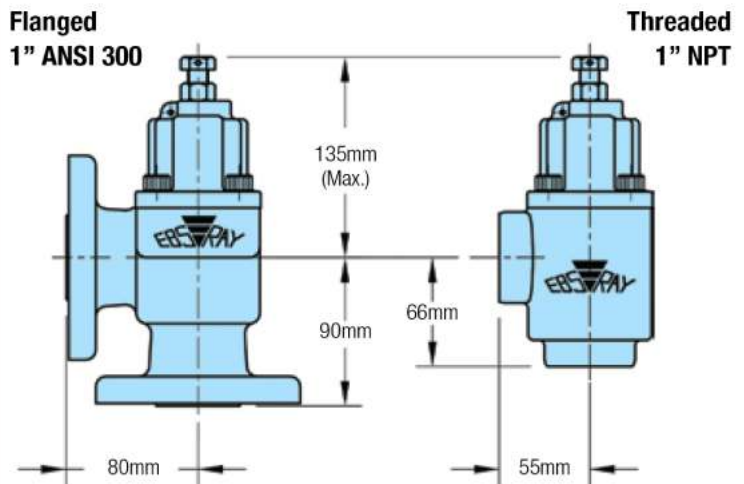
**EBSRAY RX10 & RX10-60 Pumpset**  
 (50Hz & 60Hz)  
 Weight 62 kg (unpacked)



**EBSRAY RX10 PUMP CONTROLLER**

IP55 Enclosure  
 Weight 5.6kg (unpacked)

*Note: Optional Models available for total LPG 'System' control.  
 Refer EBSRAY*



**EBSRAY RV18-NRV BYPASS VALVE**

Weights: Flanged 6.2kg } (unpacked)  
 Threaded 4.2kg }

*Note: All specifications and illustrations are typical only and are subject to revision without notice. Certified data available upon request*



Quality  
 ISO 9001  
 SAI GLOBAL