

P.I. 335 PP12 POWER PACK



PURPOSE

The PP12 Power Pack and Filter Break Booster Tank (FBBT) is designed to provide high-pressure water to hydro powered in-Stope Bolters, Panel Cleaning Tools and associated ancillary equipment from low pressure mine service water (MSW). The FBBT was added to the Power Pack to ensure filtered water at the correct suction flow and pressure.

DESCRIPTION

The PP12 Power Pack consists of four pumps and motors mounted on a rail flatcar type sub assembly. The system is designed to be modular, easily serviceable and energy efficient. An advanced PLC controlled electrical panel provides digital feedback and system control. The PLC system monitors outlet pressure and controls water hydraulic unloader valves to generate high pressure hydropower water.

Of particular importance is the ability of the unit to load and unload pumps whilst keeping the motors and pumps rotating. This feature results in the pumps having constant hydrodynamic lubrication when cycling on and off which prolongs the pump life. Pumps are always started and stopped under no load conditions.

The Power Pack is connected to an electrical 525 VAC electrical power supply as well as a 100NB low pressure mine service water connection. The 80NB outlet from the Power Pack is connected to the high-pressure downstream line.

FEATURES

- Multiple 3.0 l/s pumps versus one large pump results in improved reliability and allows for regular preventative maintenance whilst not compromising functionality.
- The pumps are easy to change and align as they are coupled with Fenaflex tyre couplings which are capable of considerable misalignment.
- Motors may be individually isolated however the system will still be able to operate as usual apart from a lower total pumping capacity.
- A large capacity 1200-micron strainer is incorporated to ensure strained water is supplied to the pumps. Recirculated water re-passes through the strainer to enhance the protection.
- A low-pressure switch is fitted on the suction line to prevent the pump from being started if the inlet pressure to the PP12 is less than 0,4 MPa (4 bar). This will protect the pumps from dry running. Similarly, if the strainer becomes blocked, the unit will shut down. An additional low-pressure transducer is also included to monitor the inlet pressure.
- The system control panel has earth leakage protection and electrical surge protection. Each motor has individual over current protection.
- The electrical panel is mounted so that the doors are on the 'dry' side of the unit. The flat car is fitted with robust buffers and protection frames at the ends but is open on the sides to allow easy access to the motors and pumps.
- Pressure gauges are fitted in multiple locations for monitoring and diagnosis.
- Lights are fitted to the electrical panel to provide ambient lighting over the unit.
- The flatcar may be fitted with buffers and axles which incorporate vibration minimizing rubber elements. The electrical panel is mounted on anti-vibration mountings.
- Indicator lights are provided for faults and to assist diagnosis for fault-finding. These include:
 - Low inlet pressure
 - Loading and Unloading of pumps
 - System active / Power
 - Faults
- A Siemens HMI interface is used to access detailed information and settings for the PP12. The interface allows technicians and administrators to monitor pump life, equipment service, basic troubleshooting and diagnosis information.
- Robust hydraulic hoses are used to connect the solenoid control valves, the inlet pressure switch and the unloading pressure transducer to the respective pressure sources.
- The PP12 has two modes of operation, Auto Unload & Manual.
- Dual thermal relief valves modulate and regulate any recirculated water to prevent the system from overheating. Integral thermal fuses permanently open in the event of a severe overheating event.
- If one or more pumps fail, then the system will automatically recover by starting additional 'healthy' units in the chain.
- A low-pressure relief valve protects inlet low pressure equipment.
- A WIFI network connection is available for downloading data logs of critical operation information. The option of connecting via Profi-Bus network to SCADA systems is available.

PRODUCT INFORMATION

- Industry 4.0 ready
- Revised low pressure control manifold provides easy access to sensors and solenoids which makes maintenance easy.
- Sensor connections are simple and all external requiring no access to the electrical panel internals.
- Automated 18.5kW Booster Pump switchgear incorporated into panel. (See Product Information 344 for Filter Break Boost Tank System).
- Client specific monitoring and electrical integration solutions available on request.

SAFETY

Please see Operational Risk Assessment in Product Manual before use.

OPERATION

HPE is required to be present for initial start-up commissioning. This is to ensure the system has been installed correctly and that the equipment is in good working order prior to use.

Please see Operations Chapter in Product Manual for details.

MAINTENANCE

Please see Maintenance Chapter in Product Manual for details.

INSTALLATION

- The Power Pack should be installed in a well-drained, well-lit cubby with sufficient "through" ventilation for cooling and safety requirements.
- Concrete flooring is recommended.
- Cubby not less than 3m wide x 5m long x 2,5 m high.
- 525 VAC 3 phase, 250kW capacity gulley box within 6 m of cubby, ensure sufficient inrush current available.
- Unload and manual mode have all four motors starting on Direct-On-Line (not simultaneously).
- 100 NB minimum service water supply (500kPa minimum pressure up to 1600 kPa) within 2 meters of cubby.
- Fit 80NB 25 MPa rated piping from the outlet to downstream demand.
- Connect to 525 VAC 3 phase supply.
- Pumps to face sidewall to reduce risk to passers-by.
- Fire Extinguisher to be placed in upstream ventilation close to the Power Pack.

TECHNICAL SPECIFICATIONS

Wheels/Skids	-	Multiple gauges & buffers (Optional)
Operation Modes	-	Auto Unload with Manual override
Total Nominal Flow Rate	(ℓ/s)	12.0
Flow per pump	(ℓ/s)	3.0
Mean outlet pressure	(MPa)	17.5
Nominal operational pressure droop	(MPa)	2.0 (HMI interface adjustable)
Pump relief valve setting	(MPa)	19
Motor Efficiency Rating	-	IE1 or IE3 (Optional)
55kW motor quantity	-	4
18.5kW motor switchgear	-	1
Nominal Voltage Requirement	(V)	525VAC ±5% 3PH
Motor Starting	-	DOL (Direct-On-Line)
Installed power (per pump)	(kW)	55
Absorbed power (per pump)	(kW)	54
Booster Pump Power	(kW)	18.5
Total Installed Power	(kW)	239
Full Load Current	(Amps)	326
Full Load Power Factor	-	0.85-0.88
Full Load Apparent Power	(kVA)	281
Cable Entries	-	2 x 5-50 glands
Dual 70mm ² Cables Max Cable Run*	(m)	260 (OEM Recommended Maximum)*
Dual 95mm ² Cables Max Cable Run*	(m)	350 (OEM Recommended Maximum)*
Inlet Connection	-	SABS 100NB T2500
Outlet Connection	-	HPE Hub 80NB 25 MPa
Maximum inlet pressure	(MPa)	1.6 (16 bar)
Minimum inlet pressure	(MPa)	0.5 (5 bar)
Pump Oil Capacity	(ℓ)	±4.2 liters (SAE 85W-90)
Track Gauge	(mm)	To suit mine
Part No	-	PP12 Series
Dimensions:	(m)	W: 1.43m H: 1.75m L: 3.36m
Weight	(kg)	±5500

**It is recommended that ONE PP12 is best connected with 2 off x 70 mm² cables in parallel. Smaller cables are easier to pull and terminate and the cost of 2 off x 70 mm² or 1 off x 150 mm² are similar. In addition, a single 150 mm² cable would require changes to the mini-sub as these typically have 4 x 250 A (max) breakers. Furthermore, 150 mm² cable is hard to bend, install & terminate and has a large gland. Cable & gland size based on full load running current & copper cables in air (Copper 4-core PVC Insulated PVC bedded SWA PVC sheathed cable in AIR to SANS 1507-3).*

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