SPECTRUM *Advance*

Medium Voltage Variable Speed Drive

Minimize ESP electrical stress

The SPECTRUM ADVANCE Medium Voltage (MV) Variable Speed Drive (VSD) is a NEMA 4 rated drive designed with a reduced footprint to provide offshore operators with a cost effective method for control of ESPs. The SPECTRUM ADVANCE MV VSD incorporates new technologies that deliver cleaner power to the submersible motor, reducing electrical stresses, increasing ESP run life, reducing both capital and operational expenditure.

Remove unnecessary transformers to reduce CAPEX and footprint

A typical offshore installation has one 2,000 KVA step down transformer that supplies four or five skids, each with their own low voltage VSD and step up transformer. With a medium voltage drive, supply line voltage up to 6.6KV does not need to be stepped down for the VSD or stepped up for the ESP motor, removing the need for two transformers. The smaller and lighter VSD skids allow operators to make savings on the size, load bearing capabilities and fabrication costs of new offshore platforms.

Advanced technologies to increase efficiency

Cascaded Pulse Width Modulation (PWM) rectification significantly reduces the input harmonic distortion reflected back onto the supply, avoiding penalties from energy providers. Multi Level Inverter technology on the output provides a near sinusoidal waveform, removing the need for the Sine Wave Filter (SWF) typically required for ESP installations.

Maintains stable operating temperature

The cleaner power being delivered to the motor reduces the motor operating temperature and stress on the electrical system's insulation resulting in a longer run life. The SPECTRUM ADVANCE VSD features a Thermo Electric Cooler (TEC) system, utilizing the principle of the Peltier Effect, maintains a stable operating temperature and has no moving parts (nor chlorofluorocarbons). The TEC system is inherently reliable and economical in comparison to traditional A/C units. The compact size of the TEC modules and the ability to operate them in any orientation permits further reductions in skid footprint.

APPLICATIONS

- Offshore ESP installations
- Surface pumping system applications
- Hot environments

BENEFITS

- Reduced capital costs – no need for step down, step up transformers or sine wave filter
- Reduced VSD skid footprint for offshore applications
- Increased ESP run life – multi level inverter provides near sinusoidal waveform, delivering cleaner power to motor
- Reduced operational costs – TEC system removes need for A/C units
- Designed for hot environments – rated for 55°C (131°F)
- Reduced harmonics reflected onto supply

FEATURES

- Low input harmonic distortion, IEEE 519-1992 compliant
- Modular design resulting in high reliability and low maintenance costs; each core power cell can be individually removed for maintenance
- Integrated motor controller

SPECTRUM *Advance*

Medium Voltage Variable Speed Drive

POWER SYSTEM SPECIFICATIONS

Power system	Sinusoidal, multilevel PWM control, fully isolated
Control system	Integrated ESP motor controller
Base control method efficiency	Open loop vector control, V/F control, flux vector control with feedback
Efficiency	> 97% at rated load and speed
Input power factor	0.99
Over current protection	200% (programmable)
Overload capacity	Standard overload 120% for 10 mins or 150% for 60 secs
Input voltage supply	3.3kV to 6.6kV, 50/60Hz
Input tolerance	Voltage: ±10%; Frequency: ±2%
Output	Voltage: 1 to 3,300/6,600 V; Frequency: 50 or 60 Hz
Integrated protective functions	Overcurrent, current limits, overvoltage, undervoltage, output ground fault, motor overheating, output open phase, cooling fan error

CONSTRUCTION SPECIFICATIONS

Panel construction	Free-standing, front maintenance type, bottom access for motor and input power cables
Cooling	Forced air cooling with proprietary TEC system (patented)

ENVIRONMENTAL RATINGS

Ambient operating temperature, °F (°C)	14°F to 131°F (-10°C to 55°C)
Altitude	<1,000 m without de-rating, can be customized for high altitude
Enclosure type	NEMA-4, NEMA-4X = IP66

COMPLIANCE & STANDARDS

UL 61800-5-1	IEC 60721-3-3:2002	IEC 61000-4-6:2009
IEEE 519-1992	IEC 60146-1-1:2010	IEC 61000-6-2:2008
IEC 61800-4:2004	IEC 61000-4-2:2011	IEC 61000-6-4:2008
IEC 61800-3:2008	IEC 61000-4-3:2007	IEC 60721-3-1:2002
IEC 60721-3-1:2002	IEC 61000-4-4:2013	IEC 60721-3-2:2002
IEC 60721-3-2:2002	IEC 61000-4-5:2010	IEC 60721-3-3:2002