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VARIABLE SPEED DRIVE ALENN E-2000

ALENN E-2000 ALENNTRONICS TEKNO ASIA

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E-200

JAKARTA INDONESIA



SPECIAL BENEFITS



Compensation Mode: Utilizes the motor's kinetic energy by switching it to generator mode during operation (for induction motors). Additional Power Ride Through Module: Ensures continuous operation during voltage sags.



Function: Allows the induction motor to seamlessly resume operation, ensuring stable turbine rotation.

Gas Lock Algorithm

Prevents upstream flow disruptions by intelligently adjusting the output frequency, controlling the pump unit, and eliminating well intake decompression.

• Effortless Commissioning

Automatic Well Commissioning: Enables the VSD to operate in automatic time mode, gradually increasing motor speed until the calculated formation depression is achieved, followed by a mode that maintains the specified technological parameters.

Pre-Emergency Status Detection

Detects pre-emergency conditions and automatically adjusts output signals when the VSD auto-restarts (feature coming soon).







SOFT START

• Jog Mode:

VSD startup mode where a sequence of overvoltage pulses is applied to the motor during acceleration at low frequency.

• Shimming Mode:

VSD startup mode that enables maximum motor torque development at low frequency. In this mode, at a predetermined motor slip value, lowfrequency voltage is applied for two seconds so that the ESM current reaches twice the nominal ESM current at that frequency.



• Hard Start Mode:

The output frequency and VSD voltage increase according to the configured V/Hz characteristic at a predetermined rate. Upon reaching the split frequency, the output voltage increases by a specified amount at a defined rate.

• Swing Mode:

The VSD starts by inching with alternating rotation directions.

• "With Synchronization" Mode

In this mode, the output frequency increases at a specified acceleration rate until it reaches the synchronization frequency. During the synchronization period, the output frequency remains constant. After synchronization, the frequency continues to increase at the specified acceleration rate until it reaches the nominal value.

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VSD ALENN E-2000 INTERFACE

12/17	16:33	PLIMP OVERVIEV	ALENNTRO
7 16:32	2:47 ACTIVE		
MANUAL	. MODE	GAS LOCK CONTROL- SET VALUE PID STATUS 0 PSI OFF	No Load Test
	FREQUENCY 0Hz	ACTUAL VALUE STATUS ROTATION	FWD REV
	s 0.85	Haximum Speed VS0 50.0 Hz Hell Name	
Intake Pr Motor Tem Actual Vo VSD	ressure 0 mperature 0 bltage 0.0	VSD VSD 0.0 A Field Name VSD 0.0 A Customer F Loading 0 % ESP/HPS Type V	= .
000	VSD PARAMETER SETTING	IL Ready Pressure Svitch IOR READING ALARM HELL AND ESP/HPS TYPE ROCKING MODE	

Easy and Error-Proof Configuration

- Simple Settings with Protection from Errors: No need for highly skilled operational staff.
- All Settings Accessible from the Main Display: A direct and time-saving approach to configuration.
- Adjustable Operation in Full-Screen Mode: A convenient solution for controlling the production process.
- 40% to 70% Fewer Clicks: Streamlined navigation for efficiency.
- Up to 50% Time Savings on Configuration: Faster setup for improved productivity.

ESP RUN LIFE EXTENSION



- ESP Run Life Extension
- Integrated High-Quality Sine Filter (<3%): Ensures smooth operation across all models.
- **Current Optimization Mode:** Reduces heating in the step-up transformer and submersible motor, extending the lifespan of winding insulation.
- **Torque Fluctuation Protection:** Prevents excessive mechanical stress on the system.
- Backspin Control & Start Protection: Prevents motor startup while rotating due to fluid column influence.
- **Built-In Insulation Monitoring System:** Continuously monitors the submersible section for safety and reliability.
- Advanced Grounding System: Minimizes skin effects in cables,
 ensuring efficient power transmission.

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VSD ALENN E-2000

INVESTMENT SAVINGS & VERSATILE SOLUTIONS

- Over 100 Models Across 6 Product Lines: Ensures the best-fit solution for every well.
- Universal Compatibility: Supports both Induction and Permanent Magnet Motors.
- **Compact Design:** Minimizes footprint, reducing investment in platforms and groundwork.
- **Broad Protocol Compatibility:** Seamlessly integrates with any digital network.
- Flexible Cable Connection: Junction box with terminal lugs allows easy connections without special tools.
- **Integrated Sensor Section**: Eliminates the need for a separate cabinet, simplifying installation.

COST-SAVING FEATURES

- Voltage Optimization Mode: Automatically calculates and adjusts output voltage, compensating for losses in circuit elements to reduce overall power consumption.
- Automatic Restart Modes: Special algorithms enable system restart without operator intervention after conditions normalize following an emergency stop.
- Alenn Vector Control Mode: Maximizes the efficiency of the submersible Permanent Magnet Motor (PMM), enhancing performance and energy savings.



OPERATING MODES





- Scheduled Operation: Runs on a predefined time program with separately programmable motor on/off times.
- Smooth Acceleration & Deceleration: Motor ramps up and down at a controlled rate.
- **On/Off Motor Settings:** Configurable motor activation and deactivation.
- **Reversing Mode:** Allows motor rotation in both directions.
- Motor Start Modes:
 - 1. Start with Buildup
 - 2. **Inching Start** (can be used to uncouple the submersible unit)
 - 3. Smooth Start with Synchronization
 - 4. **Wedging Start** (ensures maximum motor torque at low speed)
- Field Weakening Mode: Enables operation beyond nominal speed for induction motors.
- Electric Motor Operation Modes:
- 1. Manual Mode: No automatic re-activation after a protection trip.
- 2. Automatic Mode: Allows ESM to re-activate automatically.
- 3. Automatic (Time-Based Mode): Operates according to a predefined time schedule.
- Automatic Frequency Adjustment: Output frequency changes based on the set time program.
- **Delayed Auto-Start:** Motor automatically starts after an adjustable delay when power is supplied.
- **Current Optimization Mode:** Reduces energy consumption when the specified motor speed is reached.



SUPPORT OF THE FOLLOWING DMS

Alenn	Novomet	ViewPoint	RMSpumptools
Borets	Phoenix PICv2	Oxford R5	Scout
Izhevsk	WoodGroup	SPT-2	Solvapli
Phoenix	Phoenix/Uniconn	ACE Downhole	Transfer+
Centrilift	Zenith	WellLift	Oxford R4 10K

Custom protocol for any downhole sensors connection (available soon)

MOTOR INSULATION CONTROL

- · Continuous monitoring of insulation resistance of the "Cable Motor" system with
- motor disconnection at unacceptable reduction of insulation;
- Ability to operate with reduced insulation resistance of the "Cable-Motor" system
- with high-speed disconnection at overload.

EQUIPMENT PROTECTION

- Surface Light Indicators: Displays VSD operating status (Operation, Standby, Shutdown, Backspin).
- On-Site Configurable Protections, including:
 - 1. Overload and underload protection
 - 2. Protection against unacceptable mains voltage and DC link fluctuations
 - 3. Current imbalance protection
 - 4. Long-term low-frequency operation protection
 - 5. Overheating protection for power switches and chiller
 - 6. Protection against exceeding limits of the downhole measuring system
- Motor Braking with Turbine Rotation: Enables controlled braking of the motor when turbine rotation is detected, followed by a smooth restart.
- Continuous Three-Phase Voltage Monitoring: Ensures stable power supply by detecting phase availability; prevents motor startup or disconnects it if any phase is missing.



SAFETY FEATURES

at underload (protection against supply disruption)

in case the door of the power compartment of the cabinet is open

at an unacceptable pressure in the pipeline (according to the signals of the contact pressure gauge)

when the specified parameters of downhole measuring system are exceeded

> in case of power modules overheating

due to unacceptably low output frequency of the electric drive

> at unacceptable reduction in the insulation resistance of Cable-Motor system

MOTOR SWITCH OFF at overload (in accordance with the programmable ampere - second characteristic)

when the protection of the power tongs of the electric drive is triggered

for overcurrent protection

in case of deviation of the mains power supply voltage (if this deviation leads to an unacceptable current overload with the possibility of reclosing after voltage recovery)



The Alenn E-2000 Variable Speed Drive is a premium solution designed for complex applications, with a strong emphasis on minimizing maintenance time during installation, operation, and repair. Its advanced control algorithms and modular design ensure maximum safety, reliability, and efficiency across the entire equipment system.

This VSD is engineered to control both **submersible and surface installations** of **electric submersible pumps (ESP)** and **positive displacement pumps**, even in **harsh environmental conditions.**

With Alenntronics' specialized control algorithms, the Alenn E-2000 delivers **highperformance operation** for both **induction** and **permanent magnet motors**. **Technical Specifications :**

- Rated Output Current: 100 A 3000 A
- Supply Voltage: 380/480 V, 50/60 Hz (with optional versions up to 690 V)
- **Compliance:** The Alenn E-2000 is UL certified for enhanced safety and regulatory compliance.





OVERALL DIMENSIONS

Rated current (output current), Amps	Rated power, kVA	Full output power, kVA (with sine wave filter)	Cabinet	Width, mm (inch)	Depth, mm (inch)	Height, mm (inch)	Mass (max), kg (lb)		
100	83	75							
160	133	120	Nº1	Nº1	Nº1	1350 (53.15)	1210 (47.64)	1955 (76.97)	540 (1190)
250	208	187							
300	249	224							
360	299	269	N≌2	1350	1110	2000	600		
400	333	299	IN≝∠	N-∠	(53.15)	(43.7)	(78.74)	(1323)	
420	349	314							
515	428	385							
590	491	441	NOO	1670	1210	2000	830		
630	524	471	Nº3	(65.75)	(47.64)	(78.74)	(1830)		
675	561	505							
800	665	599	Nº4	1690 (66.54)	1210 (47.64)	2000 (78.74)	975 (2150)		
900	748	673							
1000	831	748	Nº5						
1200	998	898		Nº5	2130 (83.86)	1250 (49.21)	2180 (85.83)	1650 (3638)	
1400	1164	1048					. ,		
1600	1330	1197							

Up to 3000 Amps VSD's available on tandem drives

*overall dimensions and mass can have deviations **power for 480V supply voltage; if grid 380V reduce power for 21%.



INPUT PARAMETERS

Parameter	Value
Power supply, V	3x380 ± 15% / 3x480 (-15% + 10%) -50% continuously with reduced output power; -65% up to 500 ms (with a decrease of output power)
Input frequency, Hz	50/60 (-5% + 5%)

OUTPUT PARAMETERS

Parameter	Value
Rated output current, A	100 - 3000
Overcurrent characteristics	120% of rated value for 60 sec
Output frequency	1.5 - 80 Hz, in induction motor control mode 1.5 - 200 Hz, in permanent magnet motor control mode Up to 600 Hz, in high-speed PMM control mode

MAINTAIN PARAMETERS

Parameter	Value
Light alarm	"Work", "Waiting", "Stop", "Backspin"
Operator control voltage	Option: 10 V DC, +/- 2% current not more than 30 mA, 24 V, 300 mA 110/220 V, 10A for connecting of third-party consumers
Insulation	Galvanic isolation between power and user circuits
Insulation resistance	> 5 MOhm
Protection type	Overcurrent protection; Power switched temperature (IGBT); Max. and min. voltage in the DC link.
Material of enclosure	Carbon steel, stainless steel
Relative humidity	100 %
Cooling type	Type of cooling air-to-air heat exchanger for cooling of power compartment, air forced to cool the winding elements of the power circuit



INPUTS/OUTPUTS

Parameter	Value
Number of Al	2 by default, optional extension +8
Al type	Programmable 420 mA, 05 mA, 010 V (frequency reference / multifunction analog input)
Number of DIN	2 by default, optional extension +4 or more
Number of AO	Option, 4 or more programmable 420 mA, 05 mA, 010 V
Number of Relay Outputs	Option, 8

COMMUNICATION

Parameter	Value
Communication port	Modbus
Physical interface	-2-wire RS-485/232 for Modbus by default -Ethernet (optional) - for communication with ACS/automated control system/ -wire RS-485/232 for Modbus - for communication with a surface downhole measuring system
Frame Transmission	Modbus RTU up to 115200 bps

CONSTRUCTION

Parameter		
DC bus Choke	Built-in	
Sine filter	Built-in	
Capacitor unit (for voltage sags)	Option, outdoor	
Braking IGBT	Option, built-in	
Braking resistor	Option, outdoor	
Electrical power meter	Option, built-in	
GPRS router	Option, built-in	



VSD CONFIGURATION

Parameter	Value
Change of frequency task increment	0,1 Hz
Efficiency	96 %
PID mode	YES
PWM frequency	Up to 8 kHz depending on VSD type
Speed maintenance accuracy (static)	+/- 10% of rated speed in open-loop system
Control type	 vector control in an open-loop system without speed feedback (for PMM) scalar control: based on the characteristic voltage / frequency U / F (for induction motors)
Acceleration and deceleration rates	 linear, from 0.1 Hz / s; program mode with adjustable time of reaching given frequency

Standards



ISO 9001:2015 Quality management systems – Requirements



2014/35/EU Low Voltage Directive CE

2014/30/EU Electromagnetic compatibility directive



RETIE UL 61800-5-1 Standard for Adjustable Speed Electrical Power Drive Systems



Expect More. Contact Us.

To learn how ALENNTRONICS TEKNO ASIA can assist you in addressing your power quality challenges, reach out to us at our head office:

PT.ALENNTRONICS TEKNO ASIA JAKARTA, INDONESIA



: <u>sales@alenntronics-pa.com</u> Website : https://alenntronics-pa.com LinkedIn: https://www.linkedin.com/company/ptalenntronics-tekno-asia



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