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Oil Field Solutions

OTDS VSD - Control for Artificial Lift Applications

APPLICATION

+ Electrical Submersible Pumps and Electrical Submersible Progressing Cavity Pumps
+ Surface Pumps
+ Horizontal Pumping System

BENEFITS

+ More reliable, efficient and safer
+ Saves footprint, operating and maintenance costs
+ Prolongs the lifetime of the downhole units
+ Minimises downtime of the surface equipment

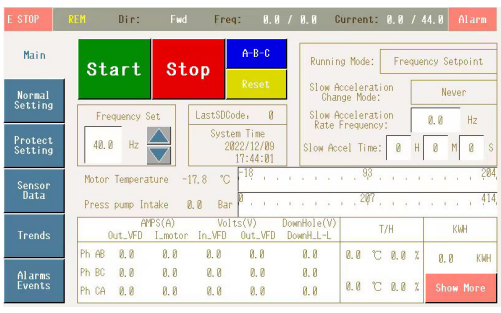
FEATURES

+ Control components are sealed in a IP66 section and cooled by air-conditioning units
+ 6 pulse or 12 pulse VSDs
+ Ratings up to 1600A
+ Surge protective device and space heater for outdoor use
+ Standard output sine wave filter
+ Easy to use operating interface
+ ESP / ESPCP / HPS control program loaded onto the controller
+ Variety of options are available

380V/630kW/1170A, 6 pulse HPS VSD

327kVA@480V, 12 pulse ESP VSD

Modular design, Cost effective, Easy-to-use and Easy-to-maintain VSD



Operating interface

+ Separated power and control sections allow field staff to safely troubleshoot control, communication, or instrumentation issues without exposure to dangerous voltage sources.
+ Flange mounted drive module and air-conditioning units make it easy to be maintained and replaced when breakdown.
+ The controller consists of SCHNEIDER PLC and HMI, with various built-in application control program to meet the requirement of different Artificial Lift applications
+ Standard output sine wave filter is mounted in the filter section, cooled by fans. The sine wave filter is used in long power cable layout application e.g. ESP and ESPCP to prolong the cable and motor lifetime.
+ IoT module based on 3G/4G make it is easy to check the data via cell phone or PC terminal remotely.

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Specifications & Features		Environment Rating & Features	
Input power supply	3 phase 380V to 480V ±10%	Enclosure rating	Junction box & main power sections: IP66 (equivalent to NEMA4)
	50/60Hz ±5%		
Input configuration options	6 or 12 pulse input		Magnetics section: IP24 (equivalent to NEMA 3R)
	Integrated passive harmonic filter		
Input current protection	Circuit breaker(s)	Cooling system	IP66: Air-conditioning unit, Heat sink
Input surge suppression	IEC test classification/EN type: II/T2		IP24: Forced Air Cooling
	Maximum continuous voltage: 350V (L-N)	Altitude	0 to 1000m without derating, 1000m to 4000m with derating 1%/100m
	I_{SCCR}: 50kA (max. 200A gG)		
	Voltage protection level: 1500V	Ambient operating temp deg C	-30 to 55
	I_n: 20kA 8/20 µs	Relative humidity	20% to 95% maximum (noncondensing)
	I_{max}: 40kA 8/20 µs	H_2S protection	Conformal-coated PCBs & bus bars
Harmonic mitigation	Standard DC bus choke	Material	Carbon steel, the thickness is 2.5mm
Output voltage	The same as power supply	Line-side termination	Circuit breakers lugs in power junction box
Output frequency	0.1 to 120Hz		
Output waveform	High performance Sinewave	Load-side termination	Lugs in power junction box
Motor control	Constant or Variable Torque (V/F)	Control termination	Mounting plate on the dedicated swing door
	Vector control		
Motor technology	Induction motor (IM)	Safety features	Emergency stop button
	Permanent Magnet Motor (PMM)		Electronic interlocks
Efficiency	>97% at full load		Separated power and control sections
Power factor	0.98 across entire speed range		Backspin indication LED on the door
Overload rating	120% for 1 min of 5 min		Prewired IO junction box
Certifications	CE	I/O Specifications & Features	
Power system MTBF	>86,000 hours	Analog inputs (AI)	Qty 2: 4-20 mA, resolution 12 bits
Frequency resolution	Analog setting: 0.05% for Max. frequency	Digital inputs (DI)	Qty 5: DC24V, sink wiring
	Digital setting: 0.01Hz	Digital outputs (DO)	Qty 4: Relay output, NC, up to 5A
Speed accuracy	Analog setting: ±0.2% of Max. frequency	Serial Communication	Qty 1 : RS485 Modbus Master (for DHS)
	Digital setting: ±0.01% of Max. frequency		
			Qty 1 : RS485 Modbus Slave (for SCADA)

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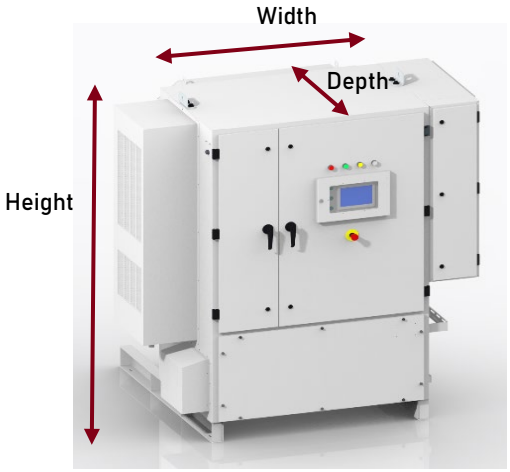
Available Power Ratings

6 pulse VSD for Induction Motor (IM)- Fuji Drive Module integrated

VSD Type	Output rating			Frame
	A	kVA@380V	kVA@480V	
3 phase 380V to 480V ±10%, 50/60Hz ±5%, standard output sine wave filter				
LIFT3-0139-SWD-6P-F	139	87	111	D1
LIFT3-0168-SWD-6P-F	168	105	134	D1
LIFT3-0203-SWD-6P-F	203	127	162	D1
LIFT3-0240-SWD-6P-F	240	150	191	D1
LIFT3-0290-SWD-6P-F	290	181	231	D2
LIFT3-0361-SWD-6P-F	361	225	288	D2
LIFT3-0415-SWD-6P-F	415	259	331	D3
LIFT3-0520-SWD-6P-F	520	324	414	D3
LIFT3-0590-SWD-6P-F	590	368	470	D3
LIFT3-0740-SWD-6P-F	740	461	590	D4
LIFT3-0840-SWD-6P-F	840	524	669	D4
LIFT3-1040-SWD-6P-F	1040	648	829	D5
LIFT3-1170-SWD-6P-F	1170	730	932	D5
LIFT3-1386-SWD-6P-F	1386	864	1104	D6
LIFT3-1480-SWD-6P-F	1480	923	1179	D6



Frame	Height [mm]	Width [mm]	Depth [mm]
D1	2000	800	700
D2	2000	1000	700
D3	2000	1200	700
D4	2000	1700	800
D5	2000	1900	800
D6	2000	2200	800

Further information

- The Frame size is only the size of enclosure, not including power cable junction box, "backpack", air conditioning unit or VSD skid.
- Two types air conditioning units for selection: T1 conditions (ambient operating temperature up to 55 degC), T3 conditions (ambient operating temperature up to 65 degC). T1 is standard and T3 optional.
- We accept custom design of VSD dimensions to match the mesh skid or the skid container's dimensions.
- For full detailed full dimensions of the VSDs, please contact us

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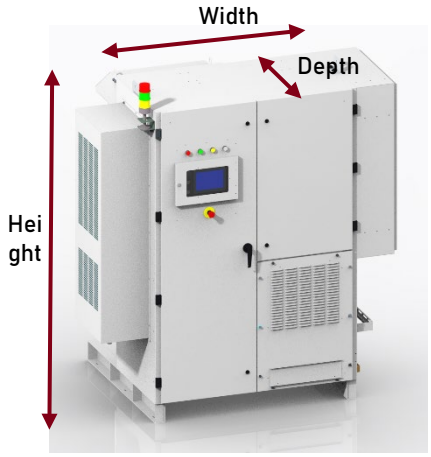
Available Power Ratings

6/12 pulse VSD for Induction Motor (IM) and Permanent Magnet Motor (PMM) - ABB Drive Module integrated

VSD Type	Output rating			Frame
	A	kVA@380V	kVA@480V	
3 phase 380V to 480V ±10%, 50/60Hz ±5%, standard output sine wave filter				
LIFT3-0156-SWD-6P-A	156	97	124	D1
LIFT3-0180-SWD-6P-A	180	112	143	D1
LIFT3-0240-SWD-6P-A	240	150	191	D1
LIFT3-0260-SWD-6P-A	260	162	207	D2
LIFT3-0361-SWD-6P-A	361	225	288	D2
LIFT3-0414-SWD-6P-A	414	258	330	D2
LIFT3-0460-SWD-6P-A	460	287	366	D7
LIFT3-0503-SWD-6P-A	503	314	400	D7
LIFT3-0583-SWD-6P-A	583	364	464	D7
LIFT3-0635-SWD-6P-A	635	396	506	D7
LIFT3-0715-SWD-6P-A	715	446	570	D8
LIFT3-0820-SWD-6P-A	820	511	653	D8
LIFT3-0880-SWD-6P-A	880	549	700	D8
LIFT3-1010-SWD-12P-A	1010	630	805	D9
LIFT3-1160-SWD-12P-A	1160	723	924	D9
LIFT3-1310-SWD-12P-A	1310	817	1044	D9
LIFT3-1610-SWD-12P-A	1610	1004	1283	D9



Frame	Height [mm]	Width [mm]	Depth [mm]
D1	2000	800	700
D2	2000	1000	700
D7	2000	1300	700
D8	2200	1500	700
D9	2200	2800	1000

Further information

+ Only VSDs with D9 frame have a 12 pulse solution
+ The Frame size is only the size of enclosure, not including power cable junction box, "backpack", air conditioning unit or VSD skid.
+ Two types air conditioning units for selection: T1 conditions (ambient operating temperature up to 55 degC), T3 conditions (ambient operating temperature up to 65 degC). T1 is standard and T3 optional.
+ We accept custom design of VSD dimensions to match the mesh skid or the skid container dimensions.
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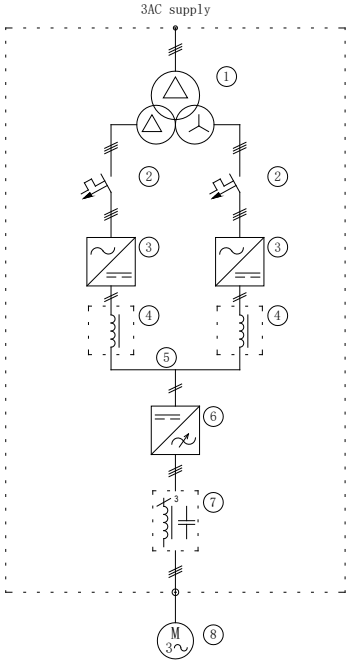
Available Power Ratings

6/12 pulse VSD for Induction Motor (IM) –custom designed Drive Module integrated



① 12 pulse phase shifting transformer

② 12 pulse main breakers

③ 6 pulse diode bridges

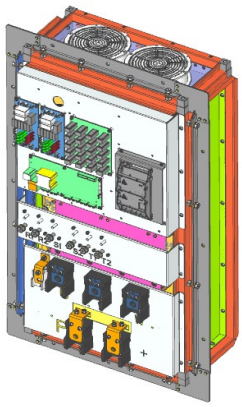
④ DC reactors

⑤ DC bus

⑥ Inverter

⑦ Output sine wave filter

⑧ Electrical Submersible Motor



VSD Type	Output rating			Frame
	A	kVA@380V	kVA@480V	
3 phase 380V to 480V ±10%, 50/60Hz ±5%, standard output sine wave filter				
LIFT3-0145-SWD-12P-S	145	90	116	D10
LIFT3-0169-SWD-12P-S	169	105	135	D10
LIFT3-0208-SWD-12P-S	208	130	166	D10
LIFT3-0248-SWD-12P-S	248	155	198	D10
LIFT3-0298-SWD-12P-S	298	186	237	D11
LIFT3-0350-SWD-12P-S	350	218	279	D11
LIFT3-0410-SWD-12P-S	410	256	327	D11
LIFT3-0456-SWD-12P-S	456	284	363	D12
LIFT3-0510-SWD-12P-S	510	318	406	D12
LIFT3-0573-SWD-12P-S	573	357	457	D13
LIFT3-0640-SWD-12P-S	640	399	510	D13
LIFT3-0715-SWD-12P-S	715	446	570	D13
LIFT3-0810-SWD-12P-S	810	505	645	D14
LIFT3-0900-SWD-12P-S	900	561	717	D14
LIFT3-1010-SWD-12P-S	1010	630	805	D14

Frame	Height [mm]	Width [mm]	Depth [mm]
D10	2000	800	800
D11	2000	1000	800
D12	2000	1200	800
D13	2000	1700	1000
D14	2000	1900	1000

Further information

+ 6/12 pulse VSDs
+ The Frame size is only the size of enclosure, not including power cable junction box, “backpack”, air conditioning unit or VSD skid.
+ Two types air conditioning units for selection: T1 conditions (ambient operating temperature up to 55 degC), T3 conditions (ambient operating temperature up to 65 degC). T1 is standard and T3 optional.
+ We accept custom design of VSD dimensions to match the mesh skid or the skid container's dimensions.
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