Electrical Submersible Pump

6 pulse Variable Frequency Drive

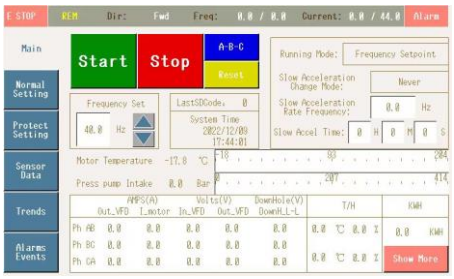
Voltage rating: 380V to 480V, 50/60Hz

DCUS

EVR 3 Series Variable Frequency Drives

Industry Power & Control for Artificial Lift Application

Modular design, Cost effective, Easy-to-use and Easy-to-maintain Variable frequency drive



Input power supply	3 phase 380V to 480V ±10%, 50/60Hz ±5%
Converter type	Fuji drive module, 6 pulse diode rectifier
Inverter type	Fuji drive module, IGBTs
Input current protection	Circuit breaker
Input surge suppression	IEC test classification / EN type: II/T2 Maximum continuous voltage: 350V(L-PE) I_{SCCR}: 50kA (max.200A gG) Voltage protection level: 1500V I_n: 20kA 8/20 µs I_{max}: 40kA 8/20 µs
Harmonic mitigation	Standard DC bus choke
Output voltage	The same as power supply
Output frequency	0.1Hz to 90Hz
Output waveform	High performance Sinewave
Motor control	Constant or Variable Torque (V/F)
Motor technology	Induction motor (IM)
Efficiency	>97% at full load
Power factor	0.98 across entire speed range
Overload rating	120% for 1min/5min
Certifications	ISO9001, ISO14001, CE
Enclosure rating	Junction box & main power section: IP66 [equivalent to NEMA4] Magnetics section: IP24 [equivalent to NEMA3R]
Cooling system	IP66: air-conditioning unit, heat sink IP24: forced air cooling
Altitude	0 to 1000m without derating
Ambient operating Temp.	-30 degC to 55 degC
Relative humidity	20% to 95% maximum(noncondensing)
H_2S protection	Conformal-coated PCBs & bus bars
Material	Carbon steel, the thickness is 2.5mm
Line-side termination	Circuit breaker's lugs in power junction box
Load-side termination	Lugs in power junction box
Control termination	Mounting plate on the dedicated swing door
Safety features	Emergency stop button Electronic interlocks Separated power and control sections Backspin indication LED on the front door Prewired IO junction box
Analog inputs (AI)	Qty 2: 4-20mA, resolution 12 bits
Digital inputs (DI)	Qty 5: DC24V, sink wiring
Digital outputs (DO)	Qty 4: relay output, NO, up to 5A
Serial communication	Qty 1: RS485 Modbus Master (for DHS) Qty 1: RS485 Modbus Slave (for SCADA)

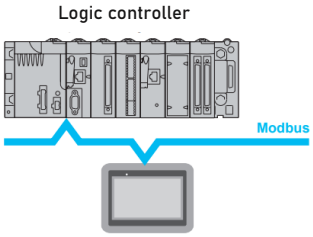
VFD design

Industry Power & Control for Artificial Lift Application

Fuji Electric drive modules

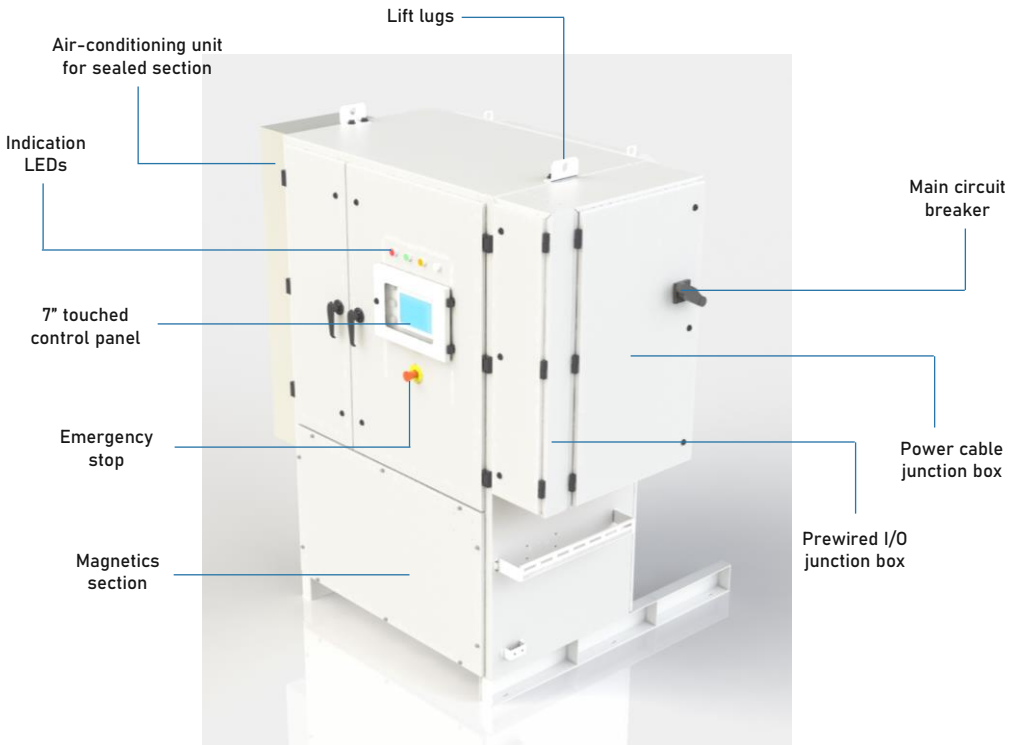
+ Through-wall mounted drive module, used to be integrated in outdoor installation VFD
+ Benefits of reliable long service life design continue after installation (10 year design)
+ V/F control, 120% overload capacity
+ Conforms to the UL standards and CE directives

VFD controller



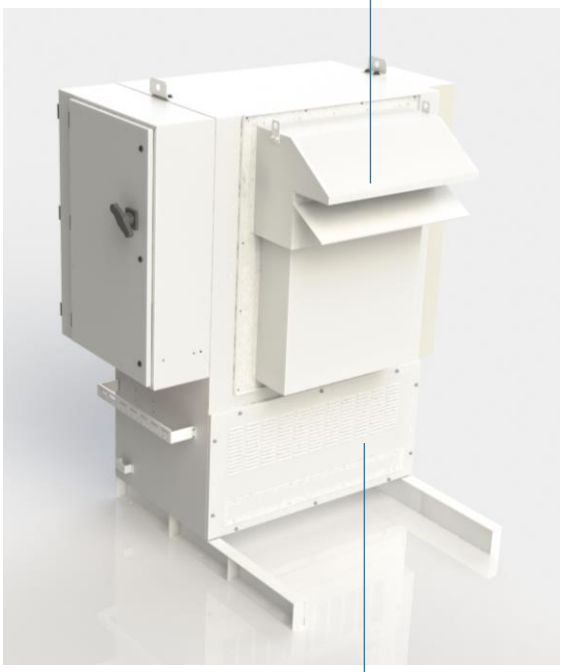
+ Loaded control program e.g. rocking start, hard start, backspin observer, which enhance downhole and surface operation
+ The controller is the single user interface for parameters setting and all wellsite control
+ The single point for all well site data gathering including data from different vendors of artificial lift downhole monitoring system
+ Accept reasonable user's customized requirements

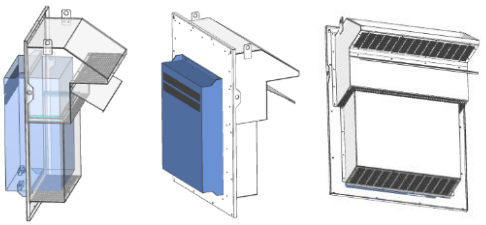
VFD introduction



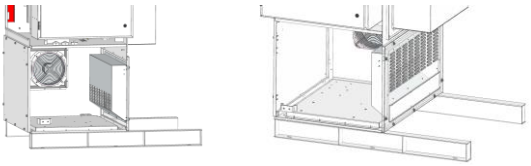
VFD design

Industry Power & Control for Artificial Lift Application

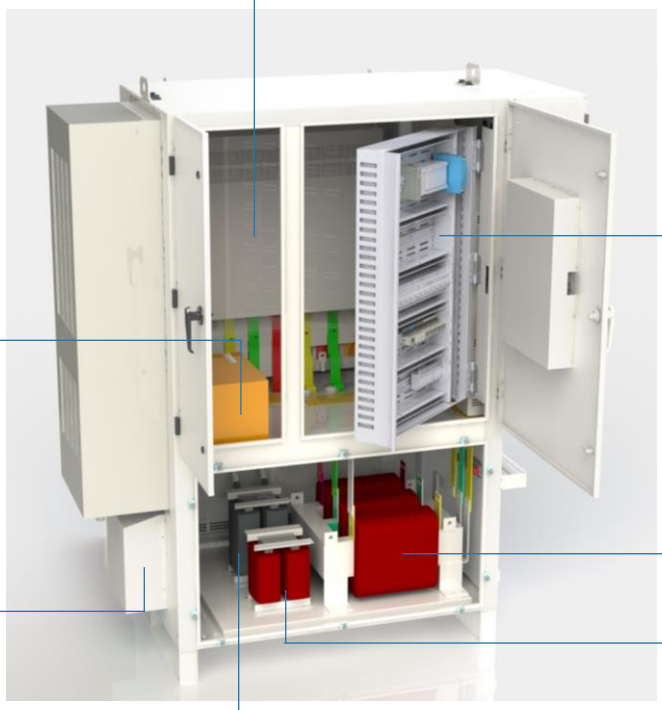




+ Fuji Electric drive module is flange mounted on the backpack
+ The control part and heat sink of drive module are separated. The control part of drive module is located in the sealed section of VFD and cooled by air conditioning unit and the heat sink is located in the backpack and cooled by fans.
+ The backpack is flange mounted on the back of the VFD. It is easy to maintenance or replace the drive module



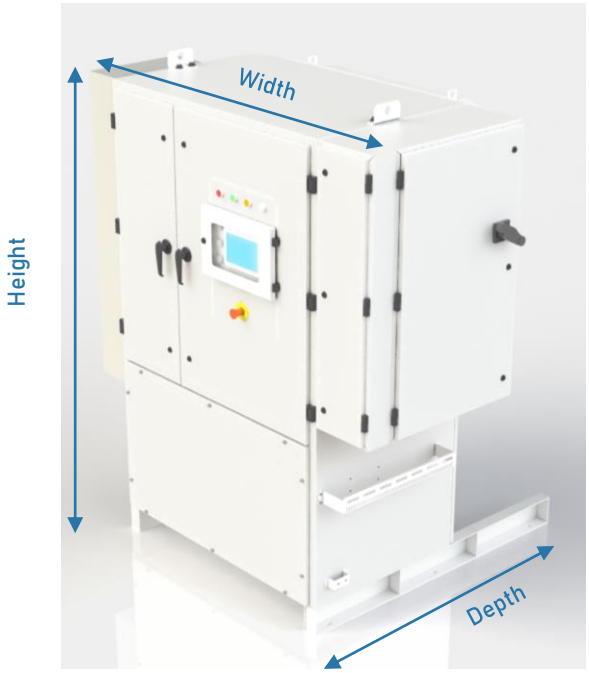
+ The magnetics section is cooled by fan
+ Cooling air enters from the air inlet of the outer layer
+ The cooling air enters the VFD inside through the inner air inlet
+ The sand and dust will settle on the slope at the bottom of the sand sink
+ Open the outer movable baffle, the sand and dust will slide down the slope of the sand sink



VFD data sheet

Industry Power & Control for Artificial Lift Application

VFD Type	Output Rating			Dimension [mm]			Approximately Weight [kg]
	A	kVA@380V	kVA@480V	Height	Width	Depth	
3 phase 380V to 480V ±10%, 50/60Hz ±5%, standard output sine wave filter							
EVR3-0168-SWD-6P-F	168	105	134	2075	1421	1270	676
EVR3-0203-SWD-6P-F	203	127	162	2075	1421	1270	682
EVR3-0240-SWD-6P-F	240	150	191	2075	1421	1270	688
EVR3-0290-SWD-6P-F	290	181	231	2075	1621	1470	864
EVR3-0361-SWD-6P-F	361	225	288	2075	1621	1470	920
EVR3-0415-SWD-6P-F	415	259	331	2075	1863	1470	954
EVR3-0520-SWD-6P-F	520	324	414	2075	1863	1470	1076
EVR3-0590-SWD-6P-F	590	368	470	2075	1863	1470	1258
EVR3-0740-SWD-6P-F	740	461	590	2075	2325	1470	1532
EVR3-0840-SWD-6P-F	840	524	669	2075	2325	1470	1640
EVR3-1040-SWD-6P-F	1040	648	829	2075	2595	1470	2010
EVR3-1170-SWD-6P-F	1170	730	932	2075	2595	1470	2134

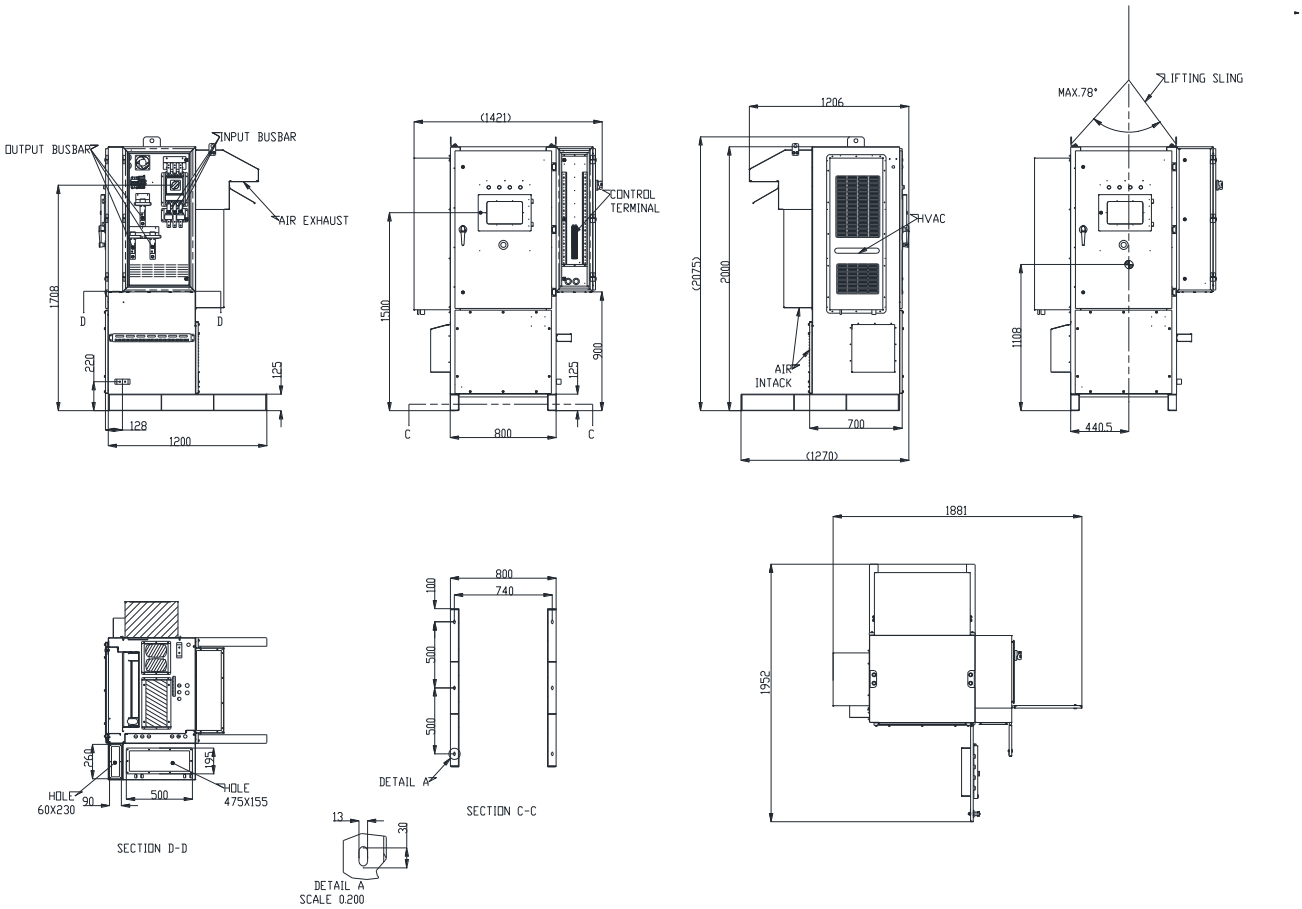


Remark

+ 6 pulse VFDs
+ There are two types of air conditioning units for your selection: one is T1 condition (The ambient operating temperature is up to 55 degC), the other one is T3 condition (The ambient operating temperature is up to 65 degC). T1 is standard and T3 is option.
+ We accept customized design of VFD dimensions to match the mesh skid or the skid container's dimensions in order to save theshipment cost.
+ We accept custom design of VFD dimensions for our OEM customers

VFD drawings

Industry Power & Control for Artificial Lift Application



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EVR3-0590-SWD-6P-F	590	368	470	2075	1863	1470	1258
EVR3-0740-SWD-6P-F	740	461	590	2075	2325	1470	1532
EVR3-0840-SWD-6P-F	840	524	669	2075	2325	1470	1640
EVR3-1040-SWD-6P-F	1040	648	829	2075	2595	1470	2010
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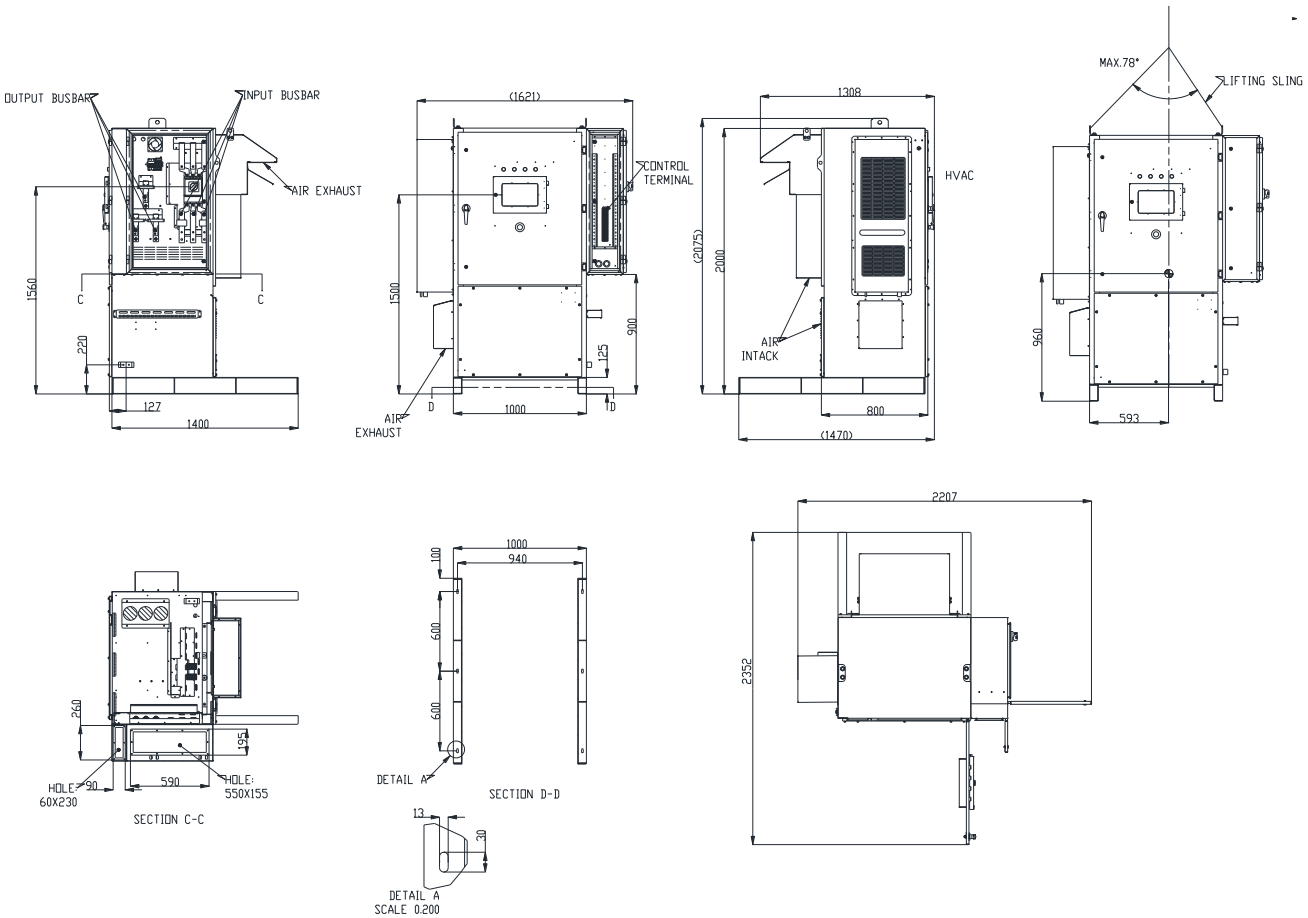
VFD drawings

Industry Power & Control for Artificial Lift Application



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EVR3-0415-SWD-6P-F	415	259	331	2075	1863	1470	954
EVR3-0520-SWD-6P-F	520	324	414	2075	1863	1470	1076
EVR3-0590-SWD-6P-F	590	368	470	2075	1863	1470	1258
EVR3-0740-SWD-6P-F	740	461	590	2075	2325	1470	1532
EVR3-0840-SWD-6P-F	840	524	669	2075	2325	1470	1640
EVR3-1040-SWD-6P-F	1040	648	829	2075	2595	1470	2010
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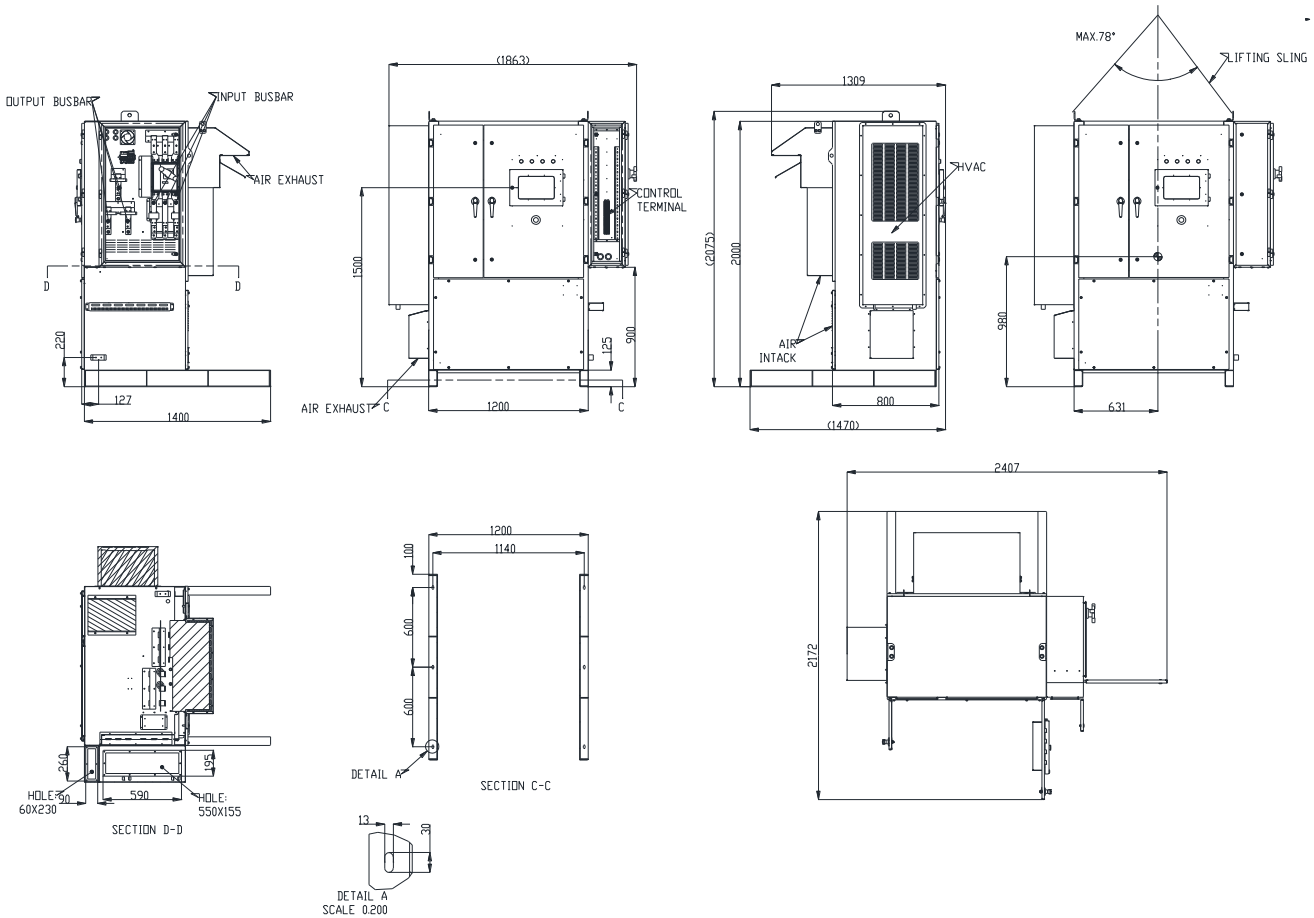
VFD drawings

Industry Power & Control for Artificial Lift Application



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EVR3-0840-SWD-6P-F	840	524	669	2075	2325	1470	1640
EVR3-1040-SWD-6P-F	1040	648	829	2075	2595	1470	2010
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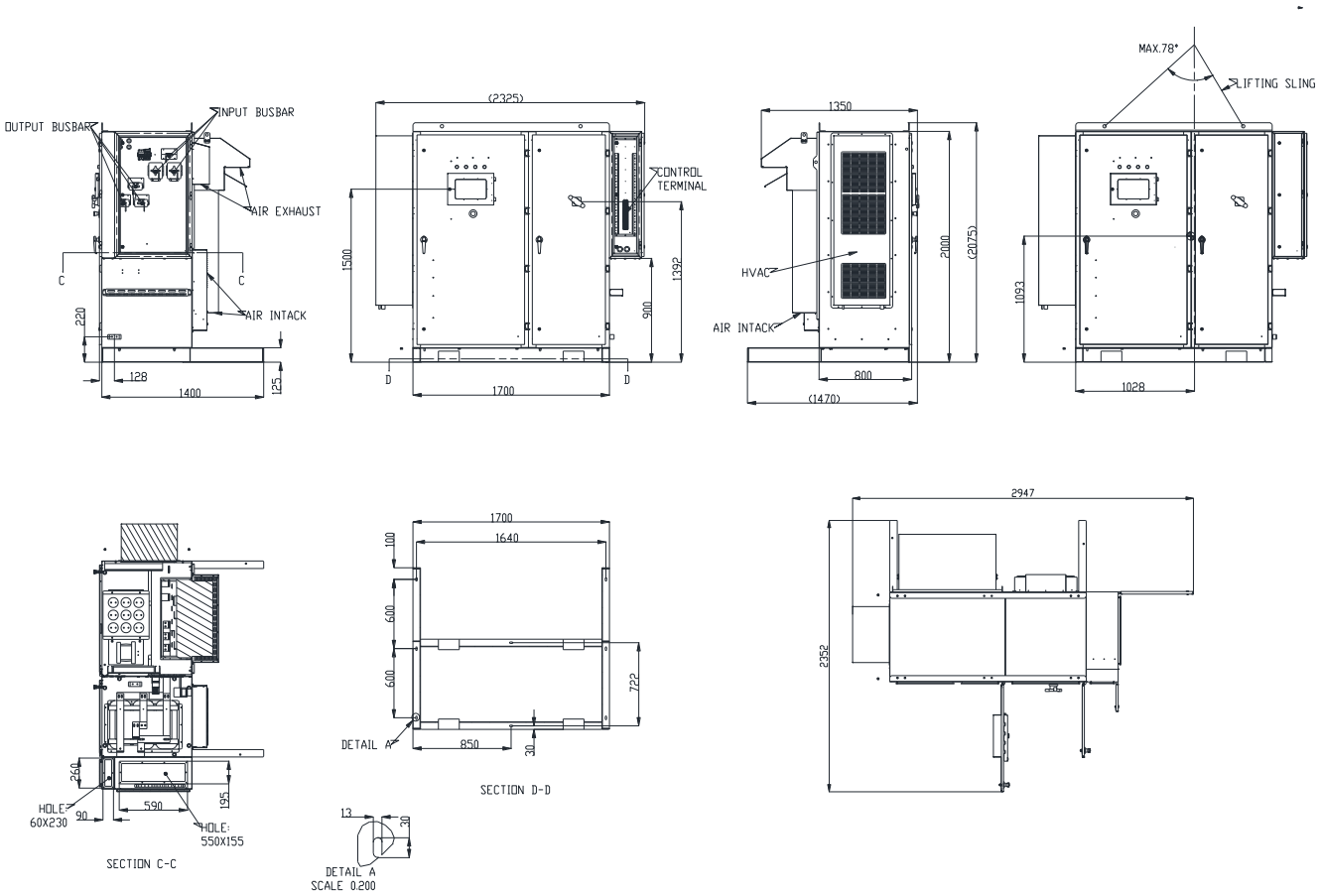
VFD drawings

Industry Power & Control for Artificial Lift Application



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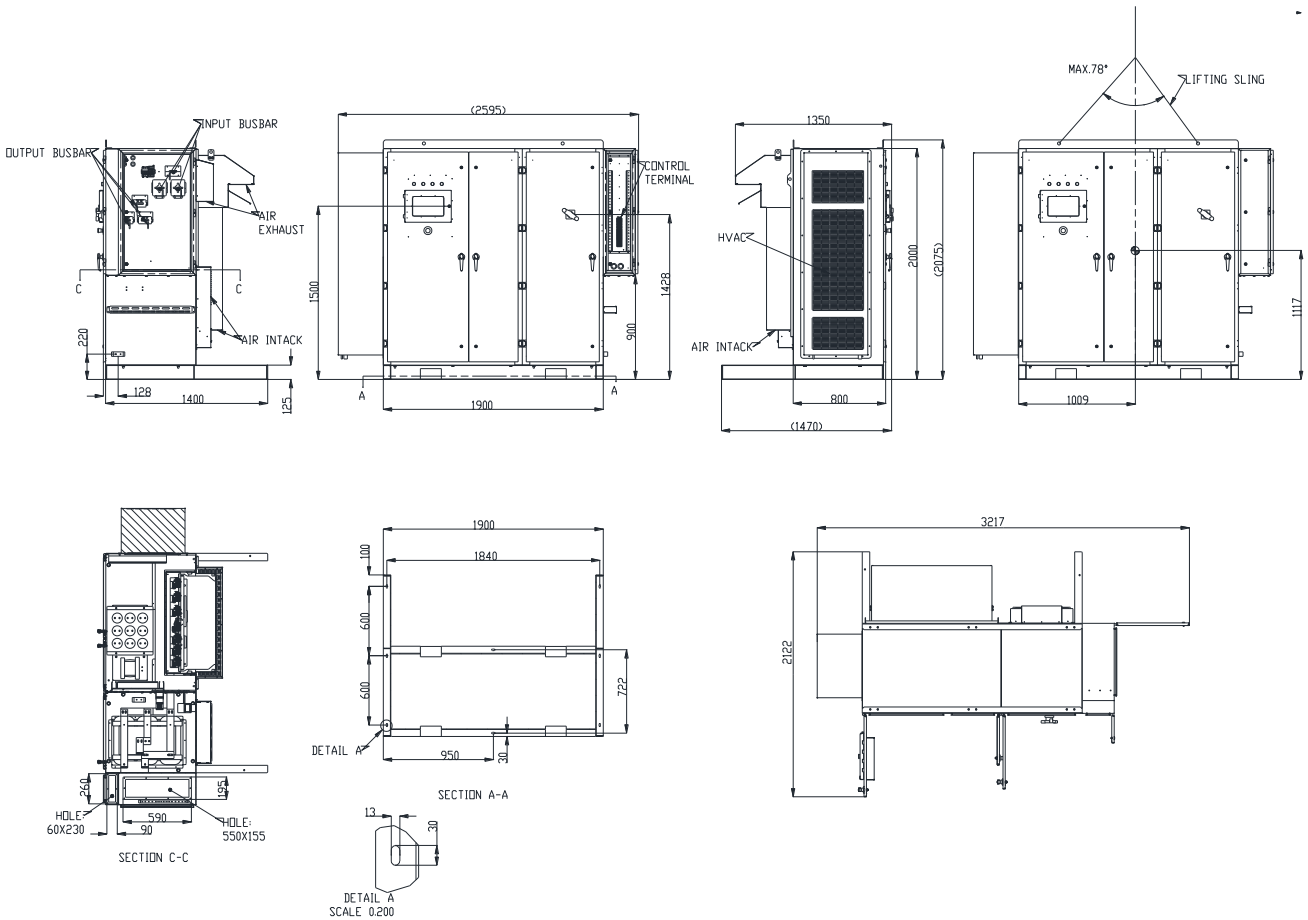
VFD drawings

Industry Power & Control for Artificial Lift Application



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