

CANLIFT Group

CANLIFT

Variable Frequency Drives

Product Specifications

CanLift VFD Packages

CanLift is a Manufacturer and Systems Integrator of Variable Frequency Drive (VFD) systems for Oil Field and Industrial applications where environmental and operating conditions may be very adverse due to Harsh Terrain and High Temperatures (Desert), a Water Deluge & Corrosion (Offshore/Monsoon).

CanLift drives are designed for the toughest oil field and industrial environments. They are rugged and reliable, with a core VFD MTBF of 28 years. We have worked closely with our Customers to determine the actual Enduser requirements and combining this with our in-house experience, we have developed a line of custom NEMA I and , NEMA 3R / 4 VFD products for all ALS systems. VFD packages are available for low voltage 380-480V with 50 or 60Hz configurations, the CanLift drive is also available at 600V. Standard environmental packaging includes air cooled NEMA I and NEMA3R, air/air heat exchanger NEMA3R / 4 or air conditioned NEMA 3R / 4 for -40C to +55C.

Neoprene gaskets finish off door openings to prevent dust and moisture ingress. Special door clasps secure doors tightly to their gasketed openings. Enclosures can optionally be fitted with input harmonic filters, output sinewave filters, bypass contactor systems, chart recorders, PLC control systems, redundant air conditioning systems, incoming and outgoing cable junction boxes, auxiliary power panels and virtually any other device the enduser wishes to have installed.

CanLift skidded VFD systems are custom designed to meet field requirements and may be up to 40ft long with step-down and step-up transformers pre-mounted and connected, single or multiple VFD's with optional direct on line bypasses, harmonic filters on input and output, advanced control systems, multiple redundant air conditioning systems, fire monitoring & protection and a host of other components.

CanLift VFD Applications

For Electrical Submersible Pump (ESP), Progressive Cavity Pump (PCP), Horizontal Pumping Systems (HPS) and Sucker Rod (SRP) applications, the CanLift VFD family is an ideal choice. The drive is provided in either 40degC and 55degC Normal Duty ratings with 110% or 170% overload capability dependent upon model.

CanLift offers a full HP range AC drive for both induction and permanent magnet synchronous motors. The CanLift VFD incorporates multiple control modes in one product; V/Hz, open loop vector, and closed loop flux vector for induction motors, as well as closed loop, open loop and advanced open loop for permanent magnet motors. Advanced current, voltage and torque sensing allows for fast acting response and positional sensing for permanent magnet synchronous motors in both closed and open loop operation.

The CanLift I00 Series also provides the user with a means to create custom parameters and drive functionality. Using a PC and our dedicated software the user can create and modify application programs for monitoring, controlling and customizing operation to their specific needs, eliminating the need for external an PLC.

All CanLiftVFD's are offered with optional Sinewave Filters, these attach to the side of the VFD enclosure and are factory cabled. In cases where VFD's are initially specified without filters these are readily installable in the field using the interconnecting gland plate openings.

The CanLift VFD is factory-programmed and ready to run with the iCon Intelligent VFD Controller providing a simplified and intuitive user interface. All typical application programming is available thru the iCon interface eliminating the need for secondary programming of the VFD on board keypad. The iCon provides all of the protective features normally associated with ALS applications such as speed control and setpoints, under and over load, over current, torque monitoring, under & over voltage, reverse rotation, backspin and true fundamental output voltage monitoring through our Reverse Rotation & Ground Fault Relay (RRGFR).



CanLift Standard Chassis Drives

The CanLift Standard Chassis product covers a range from 10 to 1000kVA. Meeting the power requirements is also easy with 380, 415, 480 and 600 volt ratings, built-in bus choke above 30 HP, common bus capability, and other energy savings options the CanLift Standard VFD will meet most oilfield and industrial needs.

With an optional multi-pulse inputs or IEEE input filters the standard CanLift VFD offers superior low harmonic solutions, reducing input current harmonic distortion factor by over 90%.



With lower EMI/RFI emission and lower total harmonic distortion contribution, the CanLift VFD meets or exceeds the generally accepted power quality standards. Inherent motor protection features resulting from low noise/low carrier technology provides for longer lead lengths without additional motor protection devices.

CanLift High HP Modular Drives

The CanLift line of high horsepower VFDs utilize a modular design with separate converter and inverter sections installed in a common enclosure. These sections can be paralleled to increase capacity to 1800 amps (VT) at both 460 and 600 volts. Utilizing the modular approach, the drives offer a commonality of parts throughout the 350 to 2000 Hp ratings. Slide-rail construction techniques permit easy access for maintenance, removal or replacement.

As with the standard chassis drives the HHP VFD incorporates multiple control modes in one product; V/Hz, open loop vector, and closed loop flux vector for induction motors, as well as closed loop, open loop and advanced open loop for permanent magnet motors. The HHP product line provides increased versatility in installations of up to 2000 Hp, including ESP / HPS / Industrial pumps, fans, chillers, pulp and paper manufacturing, mining industry conveyors, rock crushers and extruders.

iCon Controller

The iCon offers comprehensive log files and 16 independently selectable trending channels. To enhance data management the iCon controller may be connected to PC devices through direct USB-USB cable, all operating software is on-board the iCon and use the PC's web browser to interact with the user. Log data can be accessed through either a wired or wireless link to a PC or by downloading to a generic USB key. Once on the PC our proprietary Trendview software can be used to graph selected data - including in a circular format.

The CanLift VFD product also support connectivity demands with network communication choices such as TCP/IP & MODBUS. Drive coordination with other equipment is simplified with 24 Bit analogue inputs and outputs with user selectable 4 to 20mA or 0-10V, and programmable digital inputs and outputs.

CanLift VFD Specifications and Features

Enclosure

- Type
NEMA 1 indoors forced air cooled
NEMA 3R outdoor forced air or air-to-air heat exchanger cooled
NEMA 4 sealed, air-to-air heat exchanger cooled
- Application
Indoor / Outdoor
- Material
12 gauge steel, optionally Stainless Steel for NEMA4X
- Finish
Powder coat White, 5 mil
- Cable terminations
Lugs installed, aluminum cable gland plate on enclosure
- Main compartment
Separate lockable enclosure, door interlocked, gasketed
- Sine Wave Filter compartment
Separate lockable enclosure
- Base frame
6-8" steel channel for floor mounted
- Lifting eye
Four top mounted
- Pilot devices
NEMA 4 when applied

Service Conditions

- Ambient Temperature:
NEMA 1/3R -10°C to 40°C NEMA 1 / 3R
NEMA 4 -10°C to 55°C NEMA 4
ARCTIC Cold weather kit to extend low temperature operation to -40C
- Humidity: 95% RH, non-condensing
- Altitude: 3300 ft; higher by derate
- Input voltage: +10%/-15%
- Input frequency: 50/60 Hz ± 5%
- 3-phase, 3-wire, phase sequence insensitive

200 Series Performance Features

- Ratings:
5 - 560KVA, 480 VAC
- Overload capacity:
Nominal 110% for 60 sec, 150% peak
Nominal 150% for 60 sec, 200% peak
- Starting torque: 100% at 3 Hz
- Electronic reversing
- Adjustable accel/decel: 0.1 to 6000 sec.
- Controlled speed range:
(v/hz) 40:1, (Vector) 200:1 Open, 1000:1 CL
- Power loss ride-thru: generally 2 sec
- Inertia ride-thru

100 Series Performance Features

- Ratings:
10 - 997KVA, 480 VAC
10- 251 KVA, 600 VAC
- Overload capacity:
Nominal 120% for 60 sec, 150% peak
Heavy duty 150% for 60 sec, 200% peak
- Starting torque: 150% at 3 Hz (v/hz), OLV 200%
- Electronic reversing
- Adjustable accel/decel: 0.1 to 6000 sec.
- Controlled speed range:
(v/hz) 40:1, (Vector) 200:1 Open, 1500:1 CL
- Power loss ride-thru: generally 2 sec
- Permanent Magnet Motor VFD

iCon Intelligent VFD Controller Protective Features

- iCon Controller Increased operating control functionality
16 Digital Inputs, 5 Digital Outputs
4 Analogue Inputs, 2 Analogue Outputs (24 Bit)
iCon HMI has reduced function set and uses A/D in/out of VFD
- Direct VFD Control through MODBUS, Real Text control of all normal ESP alarms & settings
- Current Overload & Underload based upon operator selected values
- Backspin & Ground Fault through CanLift RRGFS
- Optional down hole tool monitoring & trending through MODBUS
- Current & Voltage measured through VFD, line voltages measured through CanLift RRGFS
- 4 line 20 digit high clarity transfective display & 24 key keyboard
- On-board high intensity LED pilot lights displaying AUTO START, BACKSPIN, ALARM, ON, OFF
- On-board control devices, AUTO, HAND, START, STOP
- Zoom button to increase size of display digits
- 2 RS 485 Communication, 1 USB Communications port, 1 Ethernet port
- Backspin Reverse Rotation and Ground Fault monitoring with optional Reverse Rotation Sensor
- Time stamped Data and Alarm Log registering up to 2000 events
- Trending with 16 independent channels and user selectable time periods and variables
- Standard on board 256 MB (200MB User) memory with optional memory of up to 8 GB
- Data Log and Trend point download via USB memory stick or by Wired LAN connection
- Industry standard platform independent web based programming and communication software
- Wireless LAN, Cable LAN when optional converter is purchased, TCP/IP ready

500 Series Performance Features

- Ratings:
350 to 1500 HP at 460 VAC, Variable Torque
450 to 2000 HP at 600 VAC, Variable Torque
- Overload capacity:
120% for 60 sec, Variable Torque
Nominal 150% for 60 sec, 200% peak
- Starting torque: 150%
- Electronic reversing
- Adjustable accel/decel: 0.1 to 6000 sec
- Controlled speed range:
(v/hz) 40:1, (vector) 100:1, (flux vector) 1000:1

300 Series Performance Features

- Ratings:
10 to 1000 HP at 480 VAC, Constant Torque
- Overload capacity:
150% for 60 sec
- Over Torque capacity:
170% for 60 sec, 200% for 2 sec
- Output frequency to 500 Hz
- Adjustable accel/decel: 0.1 to 6000 sec
- Controlled speed range:
(v/hz) 50:1,
(open loop) 100:1,
(closed loop flux vector) 1000:1

Protective Features

- Current-limited stall prevention
- Heat sink over-temperature, speed fold-back
- Bidirectional start into rotating motor
- Current-limiting DC bus fuse
- Optically-Isolated controls
- Short circuit protection: Phase-phase and phase-neutral
- Ground fault protection
- Short circuit withstand rating: 65K RMS, 100K RMS with bus reactor
- Electronic motor overload: UL
- Current limit
- Fault display: on iCon unlimited, on VFD last 10 faults
- Fault circuit: OC, OV, OT
- Over torque and under torque protection,
- Reverse rotation lockout

Incoming Power Circuit Breaker

- | | |
|------------------------|--------------------------------------|
| • Manufacturer | Group Schneider
NSE/NSJ/PowerPact |
| • Voltage Rating | 480 / 600 Volts |
| • Current Rating | Up to 1800 Amps |
| • Control Voltage | 120 / 240 V, 50/60 Hz |
| • Interrupting current | Up to 4400 Amps |
| • Expected life | 1,000,000 operations |

Control Transformer

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|---------------------|-----------------|
| • Rating | up to 2 kVA |
| • Primary Voltage | 380/415/480/600 |
| • Secondary Voltage | 120 Volt |
| • Phase | Single |
| • Frequency | 50/60 Hz. |



Sinewave Filter (Optional)

The optional CanLift Sinewave Filter use state of the art components to block the high frequency harmonics generated on the output of the VFD from travelling beyond the VFD output. With the harmonics removed, the VFD output resembles a true sinewave resulting in longer motor runlife and lower stress on the complete cabling system.

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|-----------------------|--|
| • Manufacturer | CanLift |
| • Enclosure Rating | NEMA 3R Steel |
| • Finish | White Powder Coat |
| • Protective Features | Internally fused
Optional breaker on Capacitors |
| • Frequency Response | 1800 - 4000 Hz |



Bypass Features (Optional)

The optional CanLift bypass package is a 3-switch style bypass with contactor, allowing motor operation from the drive or across the line. This facilitates drive maintenance while the motor continues to operate.

The optional CanLift Direct On Line Bypass is more normally used in NEMA I enclosed drive systems where space is not at a premium. It can however be installed into NEMA 3R/4 VFD systems. The DOL bypass is engaged by external selector switch and uses state of the art components to disengage the VFD and engage the DOL Bypass. The DOL Bypass is controlled by the iCon DOL motor controller block the high frequency harmonics generated on the output of the VFD from travelling beyond the VFD output. With the harmonics removed, the VFD output resembles a true sine wave resulting in longer motor runlife and lower stress on the complete cabling system.

- Input, output, and bypass switch
- Motor contactor
- Circuit breaker disconnect (MCP)
- Drive/Bypass Hand Operator selector
- Pilot lights

Transient Voltage Surge Suppressors (Optional)

The optional CanLift TVSS uses state of the art transient voltage surge suppressor devices that utilize individual MOV devices assembled in a non-destructive package. This allows the TVSS device to be mounted inside the VSD enclosure without the use of additional protective devices such as fuses or circuit breakers.

Amp Chart Recorder (Optional)

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|----------------|--|
| • Manufacturer | Bristol Babcock |
| • Enclosure | NEMA 4, die cast aluminum, Grey epoxy |
| • Chart Drive | 8" circular, 1 or 7 day, spring wound, fiber tip pen |
| • Meter | 0-5 Amp, 50/60 Hz |

Oil Field Skids

All CanLift drive packages may be offered skid mounted for immediate field installation, these are heavy duty skids that can be provided with suitable transformers and with optional gates. Skids may be specified as top or bottom lift.



CanLift VFD General Specifications:

- All equipment shall meet CSA, UL, or IEC and shall be built to ANSI or NEMA standards.
- KVA Rating up to 1800KVA
- Control System 6, 12, 18 or 24 pulse type –Volts per Hertz, Vector Control
- Input Voltage: 380-480V (All series), 600V (100 & 300 Series)
- Input Frequency: 50/60 Hz
- Input Voltage Tolerance -15%. +10%
- Frequency Tolerance $\pm 6\%$
- Output Voltage 0.1 to 100% of input supply voltage
- Frequency Resolution 0.001 Hz
- Output frequency 0.1 to 200 Hz (100 & 300 series to 500Hz)
- Transistor Type Insulated gate bipolar (IGBT)
- Inverter Efficiency 98%
- Power Factor 0.96 at all loads and speeds
- Accel/Decel time 0.1 – 6000 sec.
- Run Direction Forward and Reverse capabilities
- Soft Start Automatic load reduction during overload
- Frequency Jump 3 jump frequency settings
- iCon VFD Interface 4-line plain text backlit LCD display
- Enclosure Type NEMA 1, NEMA 3R, NEMA 4
- Main Breaker Molded Case Circuit breaker
- Cooling Forced Air; air/air heat exchanger; single or dual Air Conditioning,
- Altitude Full rating to 3000 feet, de-rate for higher altitudes
- Analog Inputs 6 @ 0 to 10VDC and/or 4 to 20 mA, 2 onboard VSD, 4 onboard controller
- Analog Outputs 4, 2 onboard VSD, 2 onboard controller
- Digital Inputs 21, 5 fully programmable on VSD plus 16 onboard iCon controller
- Digital Outputs 7, 2 configurable and 1 alarm on VSD plus 5 onboard iCon controller
- Loop Control PID from optionally integrated Down Hole Tool
- SCADA Compatibility Modbus RTU
- Jog Capability Including Multiple Jog Mode “Pump Release”
- Start Modes Separate Accel/Decel times including programmable stepped acceleration, 6 steps
- Stopping Modes Ramp-to-stop, coast-to-stop.
- Automatic Restart Adjustable delay and number of tries
- Carrier Frequency Adjustable between 0.5 and 4 kHz
- Full Trending capability on controller; 16 channels at minimum 1 second sample time