

VFD-3 System for Shuttle Cars

VFD-3 System

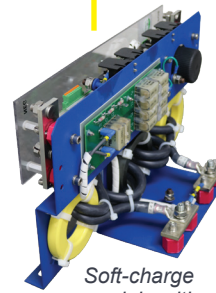
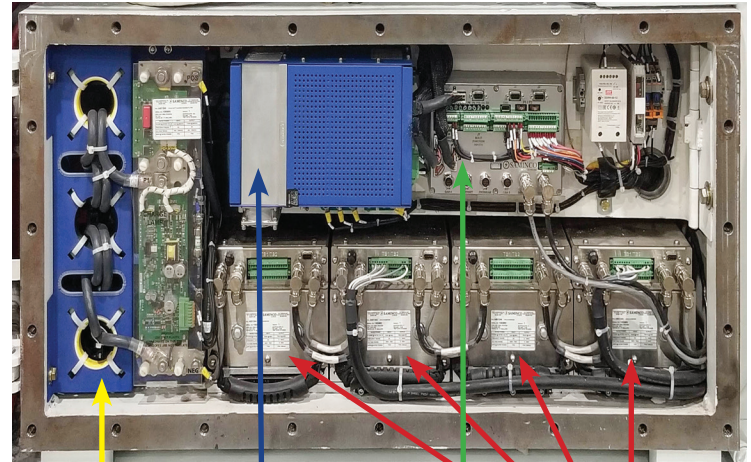
This system is comprised of standard inverters capable of functioning as traction, pump, or conveyor drives when paired with the VCU (Vehicle Control Unit), and includes a 24V power supply, a soft charge with EMI filter, upgraded CAN foot switch and CAN conveyor switch. Specific drive functionality is determined by parameter setup on the VCU, allowing full function flexibility. Control Command uses SamCANII command messaging and hardware I/O control. It is a drop-in replacement for the VF1-75 drive system, using the same or similar power components.

Features

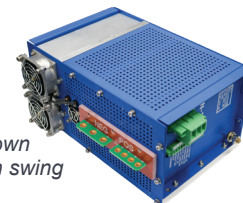
- All drives are identical and interchangeable (spares can be used in any position: pump, motor 1, motor 2, conveyor).
- Installation is simplified with high power pre-wired in the back of the XP enclosure, and low voltage kept in the front. A hinged back panel assembly holds the heavy wire connections and the inverter is slid into it.
- Power and control are separated for better signal isolation and noise immunity.
- Control voltages are consolidated to a single 24V DC supply.
- Control and communications are simplified by daisy chain connections across the front.
- Lower drive profile allows for more enclosure space.
- Soft-charge module is incorporated within the EMC filter assembly for easy access.
- Auto tune is based on nameplate information.
- Volts to Hertz, torque control, speed control, encoder feedback and sensorless control methods are all supported.
- Flying Start is in both sensorless control and Volts to Hertz control methods, including opposite direction restart.
- DC injection braking.
- Dynamic braking capability with programmable I/O to disable regeneration.
- Drive addressing has been expanded up to 13 devices using easily accessible selector switch located on the front of each module.
- ETM is enhanced with date and time stamp event log.
- All circuits leaving the XP enclosure have been designed to meet MSHA 30 CFR § 18.51 (a), to eliminate most, if not all, external fuse blocks for control wiring.



Sample layout of VFD-3 System.



Soft-charge module with EMI filter



24V Power Supply (shown mounted on swing out panel)



VFD-3 inverter with high power connections shown in back

Vehicle Control Unit (VCU)

The new VCU uses CAN Bus to communicate with drives. All drive control functions of the inverters are handled through the VCU, including communications with all other vehicle equipment. A simple selector switch located on the front of the drive will tell the VCU what function is intended for the drive.

Features:

- Multiple CAN ports for diagnostics/ programming, CAN protocol, device CAN and auxiliary customer equipment.
- Industrial ethernet port and Wifi support via bridge / router
- USB flash drive programming and data logging with 1GB flash internally used for logging
- CAN based I/O control reduces wires required
- Automated inverter configurations: store/ load parameter sets
- Multiple parameter configurations
- Hardware diagnostic ports available

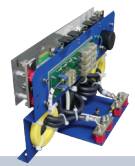


VCU system is comprised of two parts which may be mounted separately near each other. In this application, they are mounted on a swing panel, one on each side.



Specifications

Electrical Specifications	VFD-3 Inverter Part # A801244 For Traction, Pump or Conveyor		Power Supply Part # A801243 24V, 1kW for lights and other auxiliary features		Soft Charge Module Part # A801246 with easy access EMI Filter	
	Rectified Input (DC)	Output (AC)	Rectified Input (DC)	Output (AC)	Rectified Input (DC)	Output (AC)
Rated Power @ Rated Volts	72kW @ 550V	75kVA @ 440V	1.13kW @ 650V DC	1.04kW @ 26V	114kW @ 650V DC	114kW @ 650V DC
Frequency Range	DC	0 - 125 Hz	DC	DC	DC	DC
Voltage Range	500V - 750V	0 - 525V	450V - 1000V	26V DC	400V - 1200V DC	400 - 1200V DC
Amps @ Rated Power	110A	110A / 250A peak	1.75A @ 1.13kW	40A @ 1.04kW	175A	175A
Dimensions	VFD-3 Inverter		Power Supply		Soft Charge Module	
Height	208mm (8.2")		141mm (5.6")		445mm (17.5")	
Width	198mm (7.8")		206mm (8.1")		233mm (9.2")	
Depth	336mm (13.2")		309mm (12.2")		181mm (7.1")	
Weight	28 lbs		(18 lbs)		(16 lbs)	
Environmental						
Ambient Operating Temperature	-20°C (no frost) to +50°C (-4°F to 122°F)					
Typical Operating Temperature	45°C (113°F)					
Baseplate Temperature Range (@2kHz PWM)	-20°C to +80°C (-4°F to 176°F)					
Typical Baseplate Temperature Range (@2kHz PWM)	50°C (122°F)					
Relative Humidity	100% non-condensing					
Pollution Degree	2 (preferred)					



Specifications for the Vehicle Control System

		VCU Interface Module Part # A801245	Vehicle Control Unit Part # A801248-A
Dimensions			
Height	97mm (3.8")	51mm (2")	
Width	147mm (5.8")	138mm (5.4")	
Depth	239mm (9.4")	217mm (8.5")	
Electrical Specification	Description	Specification	
Power	Supply Voltage	8...32VDC (24VDC nominal)	
	Supply Current	~500 mA + Output Current (8A max)	
	Ignition Signal	7.0V min	
Control I/O	33x Digital Inputs	40 VDC max	
	6x Analog Inputs	40 VDC max	
	8x Digital Outputs (7 external, 1 internal VCU E-Stop)	Supply Voltage @ 2.5 A max each	
	1x CAN-BUS	Can Bus based I/O control	
Communication	3x CAN-Bus, 1x Ethernet, 1x WiFi, 1x USB, 2x RS232, 2x LED		
Logging	Onboard FLASH	1GB storage	

CAN Foot Switch and CAN Convey Switch

- Designed to work seamlessly via CAN with VFD-3 Systems
- Safety features: neutral sensing contact and missing ground/ common wire protection via CAN
- Gearless construction allows CAN output variation:
 - For the foot switch: 0° to 45° foot pedal movement from either direction
 - For the convey switch: 0° to 90° rotation in either direction
- Rugged assembly
- Configured for symmetrical forward/ reverse operation
- Mounts inside commonly available, explosion-proof housings
- DC supply input reverse polarity protected. Misconnection to other terminals will not damage foot switch circuit.



Shown:
CAN
Foot Switch

Saminco Cool-Torque Motors

Saminco Cool-Torque Motors are available:

- AC or DC input
- 120V DC to 500V DC
- 230V AC to 1000V AC
- Air-cooled or Liquid-cooled
- Internal encoders give Closed Loop Control down to zero speed
- Low current draw of motor (Low AMPS) will extend life of motor
- Torque and speed-sharing between motors with greater starting torque.



Displays

- Multiple options available

Operator Display



Digital Display in explosion proof enclosure



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