



## Market Line Card Transit Bus

EXPERIENCE POWER... EXPERIENCE VANNER.

### Battery Equalizers

The Vanner **VANN-Guard Power Management System** permits the operation of 12-volt loads from 24-volt electrical systems. With leading edge equalization technology and ergonomic design, the ever vigilant VANN-Guard will ensure optimized DC performance whatever the application. Combined with advanced system monitoring technology (through J-1939 CanBUS or Vanner's integrated battery monitor) the power management system is ideal for transit bus, private coach, tour bus and charter bus applications. Uses also include heavy trucks, off-highway equipment and even alternative energy solutions.



### Key Features

- Battery Equalizer with 24 Vdc to 12 Vdc Converter (Extends battery life / Safe 12V connection)
- System Monitoring Capability (J1939 CanBUS / MUX interface capability)
- 60, 80, 100 Amp Models (12 Vdc output)
- Battery Cab Strain Relief System (Assuring safe and secure DC connections)
- Cast-Aluminum Housing (Waterproof, mounts anywhere)
- Vibration and Shock Resistant Design (Built using proven anti-vibration process)
- 24/7 High Transient Surge and Load Dump Protection (Protects entire electrical system)
- Internal Fused Protected (Self-Protecting)
- Advanced Battery Cable Post Design (Eliminates post-to-post arcing due to wrench contact)
- Remote Sensing (Able to be located anywhere on the vehicle/ More accurate equalization)
- Lightweight Design - Only 6.5lbs. (+5lb. weight savings over other units)
- Factory Repairable (Future factory refurbish program to lower cost of replacement units)

### Vann-Guard-Equalizers

Model	Input Voltage	Max Input Current (24 Vdc)	Output Current	Dimensions	Weight
70-60	18-32 Vdc	32 Amps	0-60 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.
70-80	18-32 Vdc	43 Amps	0-80 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.
70-100	18-32 Vdc	53 Amps	0-100 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.



### Vann-Guard-Monitored Equalizers (Internal EM-70D Monitor)


Model	Input Voltage	Max Input Current (24 Vdc)	Output Current	Dimensions	Weight
70-60M	18-32 Vdc	32 Amps	0-60 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.
70-80M	18-32 Vdc	43 Amps	0-80 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.
70-100M	18-32 Vdc	53 Amps	0-100 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.



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## VANN-Guard – CAN Bus Management System (SAE J-1939)

Model	Input Voltage	Max Input Current (24 Vdc)		Dimensions	Weight
70-60CAN	18-32 Vdc	32 Amps	0-60 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.
70-80CAN	18-32 Vdc	43 Amps	0-80 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.
70-100CAN	18-32 Vdc	53 Amps	0-100 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.



**VoltMaster:** Technology advanced battery equalizers allow operation of 12-volt devices on a 24-volt vehicle.

Model	Input Voltage	Max Input Current (24 Vdc)	Output Current	Dimensions	Weight
60-10B	20-35 Vdc	6 Amps	0-10 Amps	4.25.H x 8.5.W x 3.2.D	2.3 lbs.
60-20A	20-35 Vdc	12 Amps	0-20 Amps	9.4.H x 8.5.W x 3.2.D	5 lbs.
65-60	18-32 Vdc	32 Amps	0-60 Amps	9.8.H x 8.5.W x 2.5.D	6.0 lbs.
65-80	18-32 Vdc	43 Amps	0-80 Amps	9.8.H x 8.5.W x 2.5.D	6.3 lbs.
65-100	18-32 Vdc	53 Amps	0-100 Amps	9.8.H x 8.5.W x 2.5.D	6.3 lbs.
66-60	18-32 Vdc	32 Amps	0-60 Amps	9.8.H x 8.5.W x 2.5.D	6.0 lbs.
66-80	18-32 Vdc	43 Amps	0-80 Amps	9.8.H x 8.5.W x 2.5.D	6.3 lbs.
66-100	18-32 Vdc	53 Amps	0-100 Amps	9.8.H x 8.5.W x 2.5.D	6.3 lbs.


## VANN – Bus Power Management Systems

The Vanner **VANN-Bus CAN Power Management System** is an efficient and highly reliable method of obtaining a 12 volt DC power source from a 24 volt DC electrical system. The Vann-Bus makes the batteries look like they are in series and parallel at the same time. In addition to providing regulated 12 volt power, the system ensures that battery voltages remain equal which significantly extends battery life. Ideally suited for vehicle and alternate energy applications, the Vann-Bus is designed to save your batteries and the money you would spend replacing them. Users of the Vanner Vann-Bus know that it is the most cost effective and dependable solution for dual voltage systems.

The **CAN (Controller Area Network) Capable Smart Monitor** is a device designed to monitor and report the status of several critical functions in the vehicle electrical system. This unit provides real time fault signals over the CAN bus to the vehicle electrical system controller. Fault indications can then be given from the vehicle's electrical system controller. Battery-monitoring algorithms have been incorporated into the 80-series Vann-Bus, **transmitting real time battery state of charge, state of health, and run time messages over CAN.**

## VANN-Bus-Equalizers

Model	Input Voltage	Max Input Current (24 Vdc)	Output Current	Dimensions	Weight
80-60 CAN	18-32 Vdc	32 Amps	0-60 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.
80-80 CAN	18-32 Vdc	43 Amps	0-80 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.
80-100 CAN	18-32 Vdc	53 Amps	0-100 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.



### CAN Bus Current Sensors

Model	Maximum Current	Output Voltage	Supply Voltage	Supply Current	Weight
VSS-C80	80 Amps	.5 - 4.5 Vdc	4.5 – 5.5 Vdc	25 ma	< 1.0 lb.
VSS-C600	600 Amps	.5 - 4.5 Vdc	.5 - 4.5 Vdc	25 ma	< 1.0 lb.
VSS-C80/600	600 Amps	.5 - 4.5 Vdc	.5 - 4.5 Vdc	25 ma	< 1.0 lb.



### CAN Bus Voltage/Temperature Sensor

Model	Supply Voltage	Supply Current	Output Voltage	Temperature Range
VSS-VT	4.5 – 10.0 Vdc	10ma	.5 – 4.5 Vdc	-40 F to + 150 F (-40 C to +65 C)

### Dual Low Voltage Disconnect

Model	DC Input Vdc	P2 Switch Current	P1 Switch Current	Weight
LVD	24 Vdc nominal	33 Amps	10 Amps	1.6 lbs.

### StartSentry Ultra Capacitor Heavy Duty

Model	Rated DC Voltage	Cold Cranking Amps	Dead Battery Start	Dimensions	Weight
UCS24-80KJ-GS	32V Maximum	1800 Amps	Yes	12.5H x 22.0D x 7.5W	40 lbs.
UCS24-80KJ-IS	32V Maximum	1800 Amps	No	12.5H x 22.0D x 7.5W	40 lbs.

**TRUWave Inverters:** Commercial grade pure sine wave static inverters for medium to light-duty applications.

Model	Continuous Watts	3 Second Surge	Input Voltage	Weight
VLT12-600	600	6.67 Amps	12 Vdc	6.6 lbs.
VLT12-1000	1000	16.0 Amps	12 Vdc	15.1 lbs.
VLT12-1500	1500	16.7 Amps	12 Vdc	15.4 lbs.
VLT24-600	600	6. 67 Amps	24 Vdc	6.6 lbs.
VLT24-1000	1000	16.0 Amps	24 Vdc	15.1 lbs
VLT24-1500	1500	16.7 Amps	24 Vdc	15.4 lbs.
VLT12-2000	2000	30.0 Amps	12 Vdc	20 lbs.
VLT24-2000	2000	30.0 Amps	24 Vdc	20 lbs.




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**Output Waveform:** True sine-wave.

**Mouting:** May be mounted in any orientation.


### Battery Chargers

Model	AC Input	DC Output Volts	DC Output Amps	Dimensions	Weight
SP00143	120 V	28.6 Bulk/26.6 Float	41 Amps	9.85 W x 6.70 H x 15.75 D	35 lbs.
SP00155	120 V	28.6 Bulk/26.6 Float	41 Amps	9.85 W x 6.70 H x 15.75 D	35 lbs.



**DC-DC Converters:** Vanner DC to DC converters provide high current 12 and 24 voltage conversions.

Model	Input Voltage	Max Input Current (24 Vdc)	Output Current	Dimensions	Weight
90-20A	22-35 Vdc	12.8 Vdc	20 Amps	9.38 x 8.5. x 3.5	5 lbs.
90-50A	22-35 Vdc	12.8 Vdc	50 Amps	13.38 x 8.5. x 3.5	7 lbs.
91-10A	11-16 Vdc	24.2 Vdc	10 Amps	9.38 x 8.5. x 3.5	5 lbs.
90-60 CAN	18-32 Vdc	10-30 Vdc	60 Amps	10.6. H x 8.5. W x 3.6.D	6.5 lbs.
SP00158	11.4-20.0 Vdc	27.5 Vdc	45 Amps	10.6 H x 8.5 W x 5.26 H	14 lbs.
VC-30	18-32 Vdc	13.5 Vdc	30 Amps	6.5"L x 8"W x 2.5"H	3.8 lbs.



**Battery Isolators:** Isolators allow dual battery systems to be charged from a battery charging source while preventing one battery from discharging the other.

Model	Description	Max Amps	Dimensions	Weight
50-140	Silicon 2-leg isolator	180 Amp Alt/165 Amp per leg	2.5"x4.5"x8"	3.2 lbs
50-120E				
50-160E				
50-200				
51-140	Schottky 2-leg isolator	250 Amp Alt/200 Amp per leg	2.5"x4.5"x8"	3.2 lbs
52-75	Schottky 1-medical isolator	75	2.5"x4.5"x3"	1.5 lbs

**DC Electrical System Monitors:** These monitors sense critical voltages in 12 or 24 /12 volt DC vehicle electrical systems.

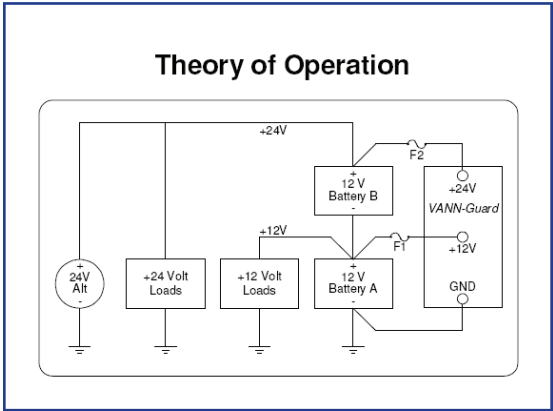
Model	Description	Dimensions	Weight
EM-70D	Monitors 24/12 volt systems. Monitors 12 volt systems.	.75 x 4.5 x 6.625	1 lb.
EM-71	Monitors- Battery low,Battery High, and Battery Faults.	.75 x 4.5 x 6.625	1 lb.



**Theory of Operation**

In many 24 volt electrical systems it is desirable to tap into the battery system to obtain power for 12 volt loads. This method, while seemingly simple, causes a charge imbalance resulting in Battery B (see diagram) being overcharged, and possibly boiling, while Battery A discharges.








To solve this application problem the Vanner equalizer is connected to the battery system at the +24 volt, +12 volt, and ground points. The equalizer makes the batteries look like they are in series and in parallel at the same time. The equalizer maintains the voltage balance and therefore the charge acceptance rate of each battery. The equalizer hold Battery A and B voltages range from within 0.05 volts under light loads and to within 0.1 volts at full rated load.



When the voltage of Battery A is higher than or equal to Battery B the equalizer is in the standby mode, i.e., it is not transferring power from its 24 volt input to its 12 volt output. When a 12 volt load is present, and Battery A's voltage decreases to just below the voltage of Battery B, the equalizer activates and transfers sufficient current from Battery B to Battery A to satisfy the load and maintain an equal voltage and charge in both batteries.

**A key advantage of a system containing a Vanner equalizer, compared to a DC to DC converter,** is that if the 12 volt load requires a momentary surge current which exceeds the rated capacity of the equalizer, Battery A will supply the extra current to the load. The equalizer will then replenish the energy to Battery A after the surge has passed.



							
Equalizer and Converter Part Numbers	VANNER 66-40 66-80 66-100	VANNER 70-40 70-80 70-100	VANNER 70-40M 70-80M 70-100M	VANNER 70-80CAN 70-80CAN 70-100CAN	VANNER 80-80CAN 80-80CAN 80-100CAN	VANNER 90-60CAN Converter Isolator	VANNER VC-35 Converter
12VDC AMPERAGE (OUTPUT)	60, 80, 100	60, 80, 100	60, 80, 100	60, 80, 100	60, 80, 100	60	35
ENCLOSURE - DESIGN / MATERIAL	EXTRUDED ALUMINUM	CAST ALUMINUM	CAST ALUMINUM	CAST ALUMINUM	CAST ALUMINUM	CAST ALUMINUM	EXTRUDED ALUMINUM
EPDM PORTED DESIGN	NO	NO	NO	NO	NO	NO	NO
MOISTURE PROTECTION	WATER RESISTANT COATING / GASKET	WATER PROOF COATING / VITON SEAL	WATER PROOF COATING / VITON SEAL	WATER PROOF COATING / VITON SEAL	WATER PROOF COATING / VITON SEAL	WATER PROOF COATING / VITON SEAL	WATER RESISTANT COATING / GASKET
VIBRATION PROTECTION	SMT ANTIVIBRATION PROCESS AND DESIGN	SMT ANTIVIBRATION PROCESS AND DESIGN	SMT ANTIVIBRATION PROCESS AND DESIGN	SMT ANTIVIBRATION PROCESS AND DESIGN	SMT ANTIVIBRATION PROCESS AND DESIGN	SMT ANTIVIBRATION PROCESS AND DESIGN	SMT ANTIVIBRATION PROCESS AND DESIGN
MECHANICAL POST SEPARATION	YES	YES	YES	YES	YES	YES	5 Pin Delphi
INTEGRATED BATTERY CABLE STRAIN RELIEF	NO	YES	YES	YES	YES	YES	5 Pin Delphi
FACTORY REPAIRABLE	NO	YES	YES	YES	YES	YES	NO
DIMENSIONS	10.5" X 8.5"	10.5" X 8.5"	10.5" X 8.5"	10.5" X 8.5"	10.5" X 8.5"	10.5" X 8.5"	6.5" X 8.5"
WEIGHT	6.3 LBS.	7.3 LBS.	7.3 LBS.	7.3 LBS.	7.3 LBS.	7.5 LBS.	3.9 LBS.
PEAK EFFICIENCY	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%	95.00%
180% ENDURANCE TESTED	YES	YES	YES	YES	YES	YES	YES
INTEGRATED SYSTEM VOLTAGE MONITORING	NO	NO	YES	YES	YES	NO	NO
INTEGRATED DEUTSCHE CONNECTOR	NO	NO	YES	YES	YES	YES	5 Pin Delphi
MULTIPLIER SYSTEM COMMUNICATION	NO	NO	NO	YES	YES	YES	NO
CAN CONTROL - USER ADJUSTABLE SET POINTS	NO	NO	NO	YES	YES	YES	NO
INTEGRATED BATTERY ANALYSIS	NO	NO	NO	NO	YES	YES	NO
INTEGRATED ELECTRICAL SYSTEM ANALYSIS	NO	NO	NO	NO	YES	YES	NO
COMMENTS	STANDARD EQUALIZER	SMART PC FORM FUNCTION AS 66 SERIES MORE ROBUST ENVIRONMENTAL PROOFING	BATTERY MONITOR OVER VOLTAGE - UNDER VOLTAGE - REBALANCE	BATTERY MONITOR COMMUNICATES WITH BULK SYSTEMS	ELECTRICAL SYSTEM ANALYSIS STATE OF CHARGE, STATE OF HEALTH - CONNECTION FAILURE - AND MORE	ELECTRICAL SYSTEM ANALYSIS ALLOWS CHARGING AND BALANCING OF TWO SEPARATE BATTERY BANKS	DIFFERENTIAL ON LOADS OR HYDRO BOLDS. EQUALIZER VERSION PENKING

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