DIFFERENTIAL PRESSURE
BATTERY CHARGERS

CONVERTING PIPELINE ENERGY TO BATTERY POWER

Free Uninterruptible
Power 24/7

10 - 20 Watt
Units Available

12 or 24 Volts -
Field Selectable

Consumes No Gas

Emission Free

Class I, Division I,
Group D certified

Operates in Parallel with
Station Regulators

Only 16-22 scf/m Bypass
Flow when Charging

Maintenance Free

Compact Design
Eliminates Theft and
Vandalism
Introduction to the DB1

The DB1 Differential Pressure Charger is an efficient and reliable alternative to solar panel systems that are used to power electronic instruments on gas pipelines. In applications where a lead acid battery is used to provide high peak power for short burst requirements (such as for wireless communications at remote monitoring sites), the DB1 produces a 12 or 24 volt power output to keep the battery fully charged. The battery’s temperature and charge level are continuously monitored and the DB1 produces up to 20 watts to keep it charged.

Unlike solar panels, the DB1 can be installed in almost any location and is unaffected by shade, snow, freezing rain, ice, dust build-up, or birds.

The DB1 battery charger uses the differential pressure developed across a pressure regulator on natural gas pipelines to run a small turbine-powered Generator. The Generator output can be used to charge a lead acid battery – similar to PGI’s Thermo-Electric Chargers (TECs). Unlike the TECs, the DB1 does not consume any natural gas. Power is produced by allowing a small portion of the gas to flow through a turbine, bypassing the pressure regulating valve. The amount of gas flow through the DB1 turbine is low relative to the total line flow, and stable, keeping the DB1 transparent to the pressure control system.

The pressure regulator automatically adjusts for the slight decrease in flow resulting when the DB1 runs.

The power generated is micro-processor controlled to provide the ideal temperature compensated battery charging current and voltage to the battery. Internal diagnostics detect possible system problems and the system status can be remotely monitored using the open collector alarm output.

Controlled start-up for the DB1 makes turning the system ON as simple as flipping a switch.
System Overview

The DB1 system consists of three main components: the Generator, the Controller, and the Battery Interface Module. The Generator is installed on or near the pipeline, typically in a division 1 or 2 hazardous location. The Controller and Battery Interface Module should be mounted on or near the battery, in a safe area location.

The above diagram shows the system wiring between the Generator, Controller and Battery Interface Module. The Generator and the Controller each have a micro-processor. By using separate micro-processors, the Generator can monitor itself and the communications link to the Controller, and shut the Control Valve using power from the Generator (until the turbine stops) if necessary. The Generator will monitor RPM, charge current, Control Valve operation, and output voltage while controlling the charging process. All other parameters (battery voltage, battery temperature, Emergency Shut-Down [ESD] input, alarm output, status LED’s) are monitored and managed by the Controller micro-processor. The DB1 can be monitored without removing the cover on the Generator’s explosion proof enclosure. The battery temperature sensor, battery interface field terminals, and over-current protection is provided in a Battery Interface Module mounted on or as close to the battery as possible.
DB1 Specifications

Models
DB1-10: 10 Watt Max
DB1-20: 20 Watt Max

Accessories & Options
SK-DB1-001: Software Interface Cable c/w Software
VCH Option: Carbon Steel Remote Mount Kit
VSH Option: Stainless Steel Remote Mount Kit

Unlike solar panels, the DB1 keeps remote batteries charged in any weather condition. As shown here, a winter freeze or overcast day won't affect the DB1’s operation.

Detailed Specifications

Charger Output: 12/24V (temp comp) for Lead Acid Batteries
Output Power when Charging: 10 or 20 Watts continuous at 68°F (20°C) ambient
Remote Battery Temperature Sensor: Silicone diode
Alarm Status & Notification: LED & NPN Open Collector (2) 30V max, 200mA max
Transient Protection: Bi-directional TVS 1500 Watts peak pulse power
Battery Short Circuit Protection: 5 amp PTC Over Current Protection
Electrical Connections: ½” NPT Rigid Conduit Opening (2) [Explosion Proof]
Wire Connections: Terminal Strip w/Screw Clamp, 14 AWG max

Inlet Gas Supply Pressure: 1440 psig Maximum
Gas Flow During Charge Cycle: 16 scfm @ 10W – 20 scfm @ 20W
Gas Supply Connections: Inlet 3/8” OD SS Tubing, Outlet 3/4” FNPT

Operating Temperature Range: -40°C (-40°F) to 60°C (140°F)
Enclosure: Cast Aluminum A356-T6,316 SS NEMA 4X
Mounting Configuration: Direct mount, or optional 2” pipe mount
Weight: 15 pounds