



Automated Independent Backup (AIB)



Chemical processing sometimes poses significant risk to personnel and the community. Some process risks can be significantly reduced through inherently safer design practices. The remaining risk is managed by engineered and administrative safeguards. An independent safety instrumented system (SIS) is installed when it is necessary to override the operation of the process equipment in order to prevent the process hazard from occurring. The SIS must be independent and separate from the control system unless the user intends to design and manage the entire system as an SIS (ANSI/ISA 84.00.01/IEC 61511 Clause 11.2.4).

Legacy control systems are generally not designed to meet SIS requirements. Unfortunately, during the early migration into digital controls, many users implemented their SISs within their process control systems. Many of these users have implemented or intend to implement open systems to support business and plant operations. They do not want to impose SIS design or management restrictions on their control systems. Consequently, many users are looking for an independent back-up system that meets the appropriate safety standards and connects easily to existing plant equipment.

The **DIAMOND-SIS®** is a low-cost, stand alone, non-PE SIS logic solver designed to backup the current process control trip logic. A complete documentation package can also be purchased that covers the safety requirements specification, SIL verification, and the mechanical integrity requirements of ISA 84.01/IEC 61511. Process disruption is minimized; existing field devices and wiring can often be reused.



Safety device power is provided by the **DIAMOND-SIS®**. Rated for -30C to +75C and constructed using Class I Div II components the **DIAMOND-SIS®** can be installed in the harshest process units near the equipment under control. The **DIAMOND-SIS®** reduces implementation costs by 80% compared to safety-PLCs. **DIAMOND-SIS®** provides the end user with an IEC 61508 logic solver that is functionally independent from the control system.

DIAMOND-SIS® can receive any analog input and has two field adjustable trip points. This allows the process to be shutdown on high and/or low process variables or to detect an out of range signal fault. Further, the number of inputs and voting architecture, 1oo1, 1oo2, 2oo2 or 2oo3, can be adjusted to meet your performance requirements. For greater flexibility, the **DIAMOND-SIS®** is modularized to fit your specific application.

SPECIFICATIONS

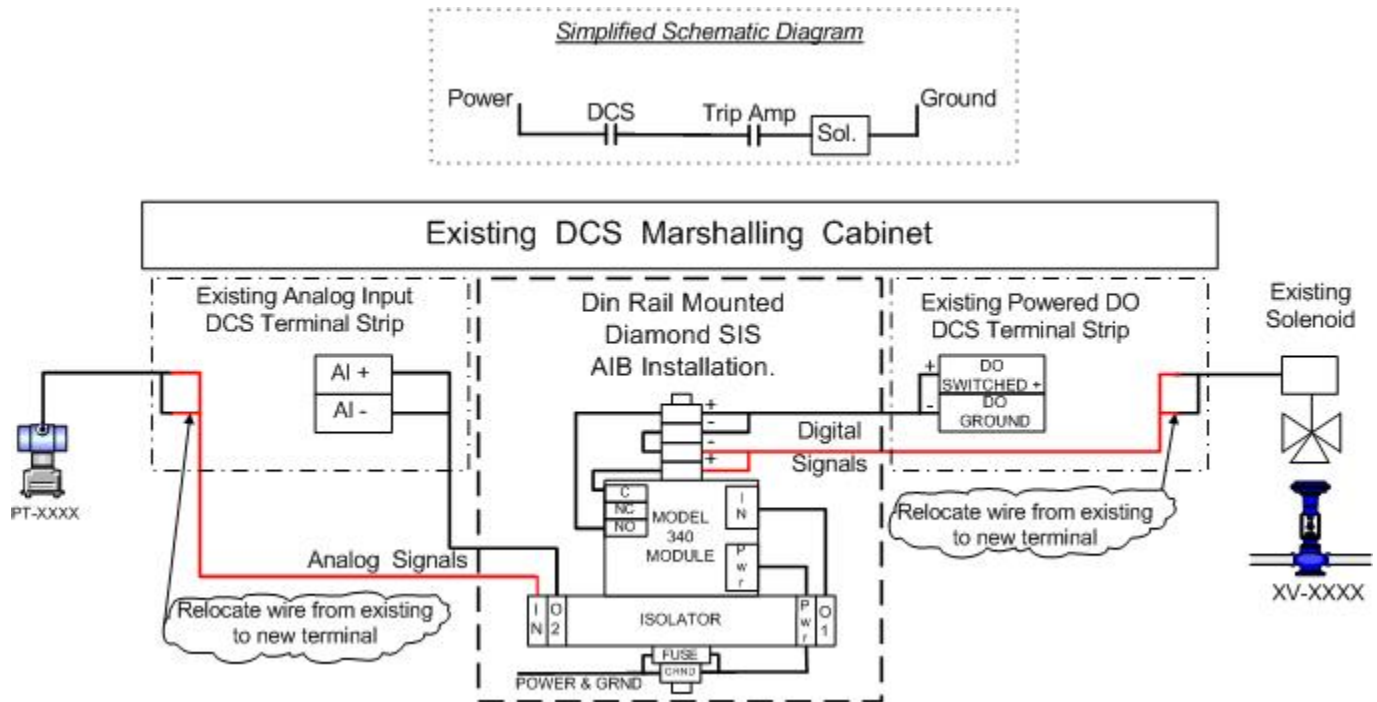
Supply Power:	User specified, 24VDC is standard
Input:	4-20 mA DC or discreet (dry contact)
Output:	5 Amp resistive dry contact / 4-20 mA
Mount:	DIN Rail
Accuracy:	1% of span
Temperature:	-40 to +80°C Storage / -30 to +75°C Operating
Environment:	All components rated Class I Div II Groups A/B/C/D
Optional Enclosure:	NEMA 4X – choice of materials

ENGINEERING/DOCUMENTATION OPTIONS

Safety requirements specification for complete instrumented loop, including SIL Verification.

DIAMOND-SIS®

FUNCTIONAL DESCRIPTION



The DIAMOND-SIS® AIB arrives with pre-mounted and wired DIN rail (1) signal isolator, (2) Model 340 Alarm Module Trip Amp, (3) Fuse Block, and (5) terminals ready to accept existing wiring. The AIB unit wires the trip amp contacts in series with the DCS contacts. The AIB trip amp independently backs up the trip functionality of the DCS.

After mounting the AIB unit into the existing DCS marshalling cabinet, 24vDC power and ground is wired to the unit using jumpers. A 0.5Amp fuse mounted in the AIB unit protects the voltage supply system.

The existing input signal wires from the transmitter are relocated from the existing DCS input terminals to the AIB input terminals on the signal isolator. Jumpers are wired from the second set of output terminals on the AIB signal isolator to the existing input terminals on the DCS. The DCS continues to receive the process signal and its programming is not modified.

The existing output signal wires to the field solenoid (or other device) are relocated from the existing DCS digital output terminals to the AIB digital output terminals. Jumpers are wired from the AIB digital input terminals to the existing digital output terminals on the DCS. The DCS continues to supply power to the field device and trip as originally designed; its programming and configuration are not modified.

The power and ground to the signal isolator are pre-wired. The power, ground, and input signal to the Model 340 trip amp are pre-wired. The user then adjusts the two set points; this allows the process to be shutdown on high and/or low process variable or detect out of range signal faults. The set point settings are accurate to 1% of span.

The output contacts of the Model 340 trip amp are rated for 5 amps. Enough contacts exist to pre-wire a typical 2oo3 SIL3 voted trip without the use of auxiliary relays (each transmitter requires a signal isolator and Model 340 trip amp).

When ordering please specify the DIAMOND-SIS® AIB and provide the number of 1oo1 (as illustrated), 1oo2, 2oo2, or 2oo3 voted trip units required.