



iVPI®

Safe, Fast, And Reliable Vital And Non-Vital Processing

The integrated Vital Processing Interlocking (iVPI®) has an innovative, modular design that supports a wide range of scalability and interconnectivity options. It provides the flexibility needed to control interlockings ranging in complexity from inline to sidings to very complex multi-operator interlockings.



KB SIGNALING™

iVPI®

Vital and Non-Vital Processing

Key Benefits

- Vital subsystem 250 ms application cycle time and program capacity of 9000 variables/expressions for urban transit designed Automatic Train Control systems.
- Event-driven non-vital subsystem.
- Integrated redundancy maximizes interlocking availability and reduces design, testing, and commissioning time.
- Vital processor board supports a separate non-vital application.
- Vital field settable software timers eliminate time and necessity to reprogram the entire application.
- Vital and non-vital event logging capability. Logs are easily downloaded using the Maintenance Management System (MMS) tool.
- Remote diagnostics and maintenance interface can lead to a reduction in both preventative and corrective troubleshooting costs.

General Description

KB Signaling's iVPI® delivers service-proven, AREMA-compliant interlocking control systems that build on the legacy VPI systems installed worldwide. iVPI seamlessly incorporates microprocessor-based vital and non-vital subsystems in hot- and warm-standby systems, supporting stand-alone and redundant configurations. In fact, an iVPI system can include a single vital subsystem interfacing with up to four non-vital subsystems. The iVPI integrated hot standby redundancy allows the same vital and non-vital applications to be programmed into two iVPI units. Its quarter-second processing speed and application programming tools makes iVPI the ideal interlocking processor solution. When replacing relay-based technology, iVPI provides the flexibility needed to interface to existing legacy systems for brownfield applications. iVPI uses Ethernet to reliably transmit vital and non-vital data, replacing aging communication technologies.

The iVPI vital and non-vital subsystems operate independently, using an application data exchange channel that can be configured to facilitate communication between the vital and non-vital subsystems. Alternative configurations include vital-only and non-vital-only functionality. The vital processor board also allows non-vital applications to run within a nonvital processor, separate from the vital application, saving the cost and space required for a non-vital processor board.

Customer Benefits

Modular Design, Compact Footprint

The modular iVPI design uses a 19" rack-mounted subrack to hold a set of plug-in printed circuit boards. These boards are applied in varying quantities to meet customer-specific interlocking application requirements. Its compact footprint is ideal when train-control room space is limited. When additional vital inputs and outputs are required, iVPI supports up to two expansion chassis, which are controlled from a single vital processor.

Control System Capabilities

The iVPI family of fail-safe vital I/O communicates to/from remote signaling devices and vital field apparatus, including switch machines, train stops, track circuits, signal lamps and LED arrays, highway crossing equipment, cab signaling, and more.

NISAL™ Safety Integrity

iVPI vital application safety level is achieved using KB Signaling's field-proven Numerically Integrated Safety Assurance Logic™ (NISAL) which meets the design and implementation requirements defined by IEEE Standard 1483-2000.



iVPI® Vital and Non-Vital Processing

Operating Conditions

Data	AREMA Class C	AREMA Class D
Operating Temperature	-40° F to +158° F (-40° C to +70° C)	
Relative Humidity (Non-condensing)	0 to 95%	
Vibration: 5-20 Hz 20-200 Hz	in: 0.07 p-p 1.5 g p	in: 0.05 p-p 1.0 g p
Mechanical Shock (11ms)	10 g p	
EMI (µV/m): 50 kHz-88 MHz 88-216 MHz 216-1000 MHz	150 250 350	150 250 350
Dielectric Strength (Volts RMS)	2000 Vrms	

The iVPI® product line is designed, validated and verified for operation per the AREMA Communication and Signal Manual, Part 11.5.1 for Class C (Wayside Signal Enclosures) and Class D (Wayside Control Rooms) environments without the need for any special environmental conditioning.

Communications Protocol Library

iVPI uses a failsafe Vital System Processor 2 (VSP2) board to provide integrated Ethernet communications. The Non-vital System Processor 2 (NVSP2) board provides integrated non-vital Ethernet communications, three serial communication ports and serial communications over Ethernet. VSP2 and NVSP2 can each simultaneously support multiple communication protocols.



Subsystem	Protocol Type	Supported Protocols
VSP2	Vital Ethernet	KB Signaling Vital Serial over Ethernet (VSoE2), Siemens DigiSAFE®, KB Signaling FSFB/2
VSP2 NVSP2	Non-Vital Ethernet	KB Signaling DT8, Hitachi Genisys, Modicon Modbus RTU, Modbus/TCP Server & Client, NTP
NVSP2	Non-Vital Serial	KB Signaling DT8, Hitachi Genisys, Modicon Modbus RTU; all supported on RS232/422/485

Contact your KB Signaling Business Development Manager
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