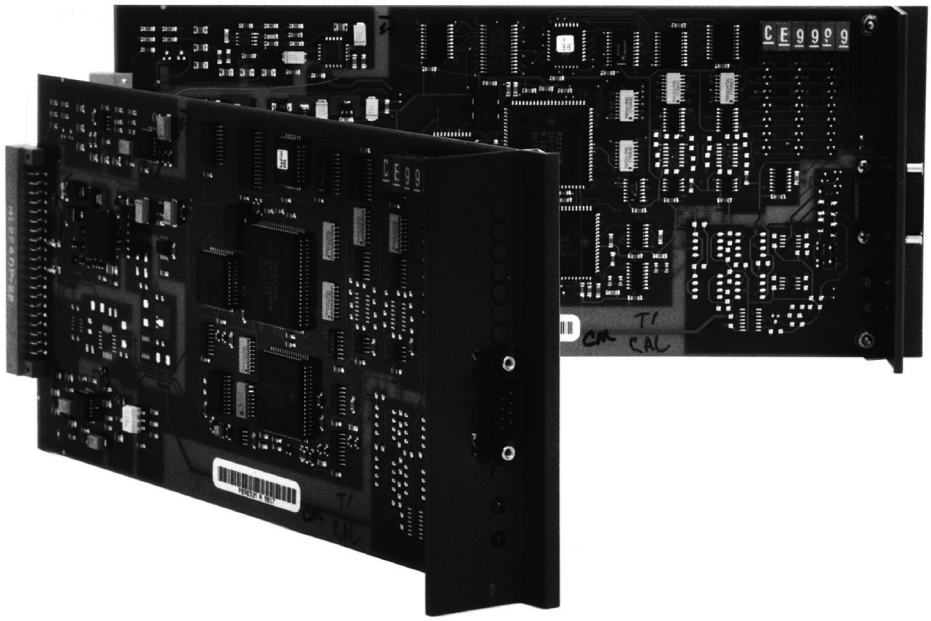
I/A Series® HARDWARE
Product Specifications

invensys
Foxboro®

PSS 21H-7R1 B3

SPEC 200® Control Integrators



The SPEC 200 Control Integrators provide input to I/A Series display and supervisory functions as well as allow a single point for I/A Series configuration, integrated system management, and advanced I/A Series control features.

SPEC 200 Control Integrators (S2I) plug directly into the 2AC modules to replace SPEC 200 controller cards. This provides single point of configuration, integrated system management, and advanced I/A Series control and features to SPEC 200 analog control systems.

SPEC 200 Control Integrators provide a migration path from SPEC 200 control components to I/A Series display and supervisory functions.

SPEC 200 Control Integrators (S2I) include appropriate connectors to enable integration of SPEC 200 control to I/A Series control while keeping the field interface and wiring.

Basic Product Description

The I/A Series SPEC 200 Control Integrator replaces 2AC controller cards in SPEC 200 racks. It provides SPEC 200 control loop measurement and output connections to the I/A Series Fieldbus (Figure 1). An optional configuration provides additional analog and digital input/output to support specialized loops. An I/A Series Fieldbus Isolator mounts to the front of any available SPEC 200 Power Distribution Module within the SPEC 200 nest area. This provides remote-to-local Fieldbus isolation.

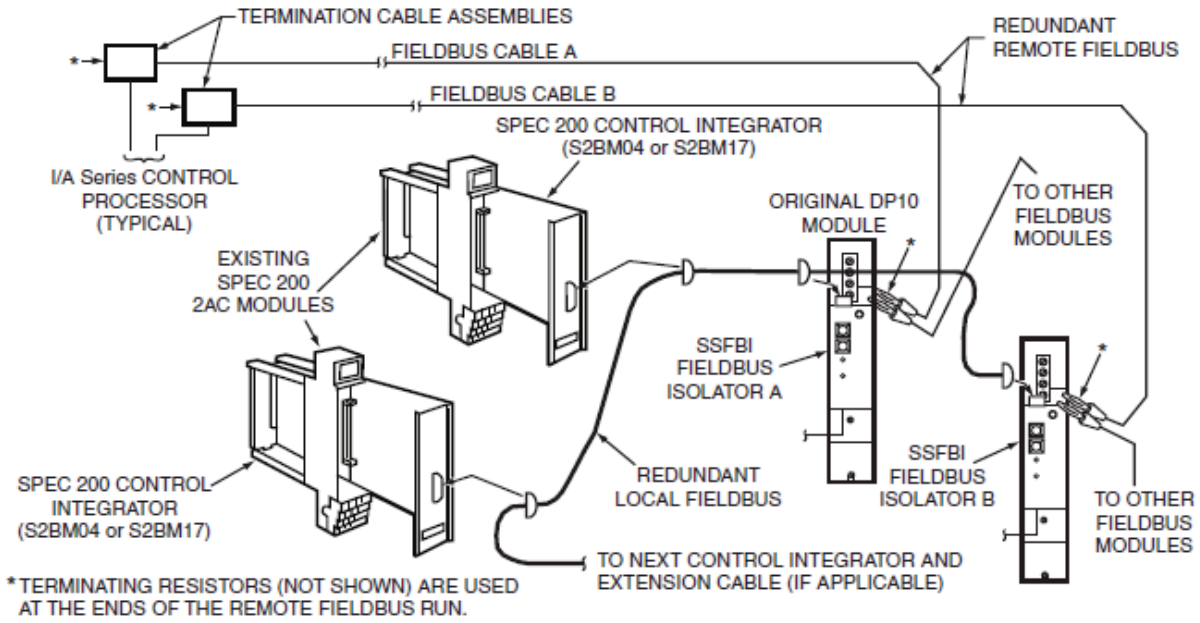


Figure 1. Typical Configuration

Basic Hardware Platform

The I/A Series SPEC 200 Control Integrator has a SPEC 200 form factor. The card fits into a SPEC 200 mounting structure, such as 2AC module and Controller Communication Module (CCM). The integrator replaces original analog cards, such as the 2AX+A4 controller card. (See the "SPEC 200 Integrator User's Guide" [B0193RD] for examples.)

Local Fieldbus connections are accomplished from the I/A Series SPEC 200 Control Integrator front plate. One 9-pin D connector is used. Both Local Fieldbus A and Local Fieldbus B are routed through one 9-conductor cable to each module. Individual I/A Series SPEC 200 Control Integrator modules may be removed from the Fieldbus without losing communication to other modules. Modules may be added to an implemented Fieldbus using up to two extension cables for a total of 30 feet maximum.

I/A Series Fieldbus addressing is accomplished by a standard letterbug fixture mounted on the module substrate. All I/A Series addressing, configuration, and documentation is consistent with current I/A Series software operation. All versions of I/A Series software support the SPEC 200 Control Integrators.

Basic Loop Interface (S2BM04)

The basic I/A Series SPEC 200 Control Integrator (S2BM04) receives power and analog signals from the rear connector. The S2BM04 handles one analog 0 to 10 V dc input (measurement) and one analog 0 to 10 V dc output (see Figure 2). The basic loop design provides single loop integrity at the lowest possible cost.

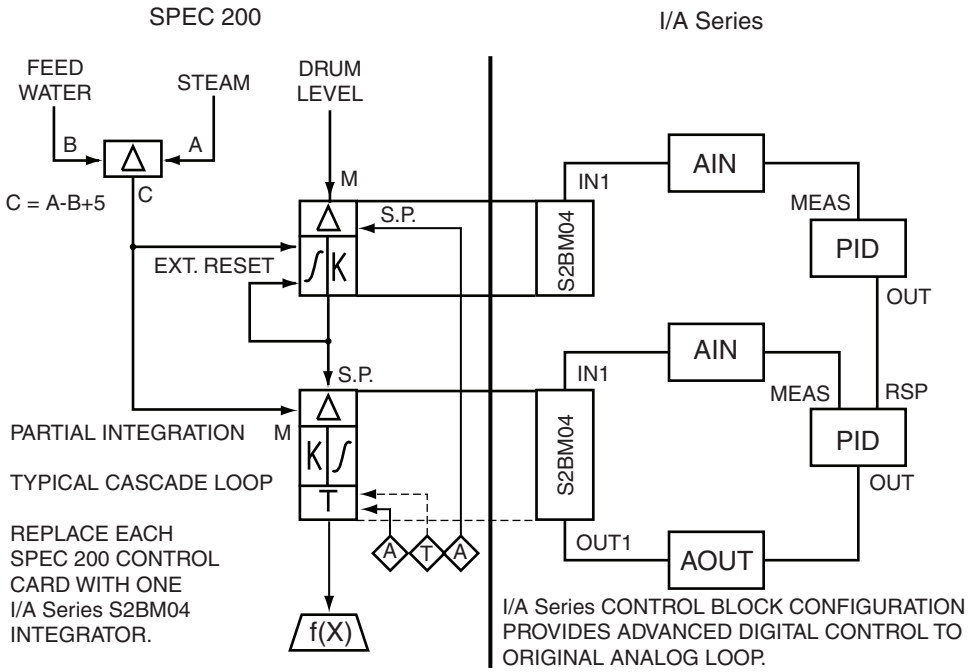


Figure 2. S2BM04 Typical Implementation

Configurable Loop Interface (S2BM17)

The configurable I/A Series SPEC 200 Control Integrator (S2BM17) receives power and analog signals from the rear connector. The S2BM17 handles four analog 0 to 10 V dc inputs, two 15 V dc logic inputs, two 15 V dc logic outputs, and two analog 0 to 10 V dc outputs (see Figure 3).

By default, one analog input is always connected to the module process measurement and one analog output to the module process output. The other analog inputs are connection-selectable. A board-mounted selector allows connection to several widely used process signals (e.g., secondary measurement, remote setpoint, external high, and external low limits). The other outputs offer a similar arrangement to supply process signals to existing control schemes (e.g., secondary valve position, bias). The logic inputs and outputs similarly offer connections to other SPEC 200 control components (e.g., external alarms, controller mode status and switching).

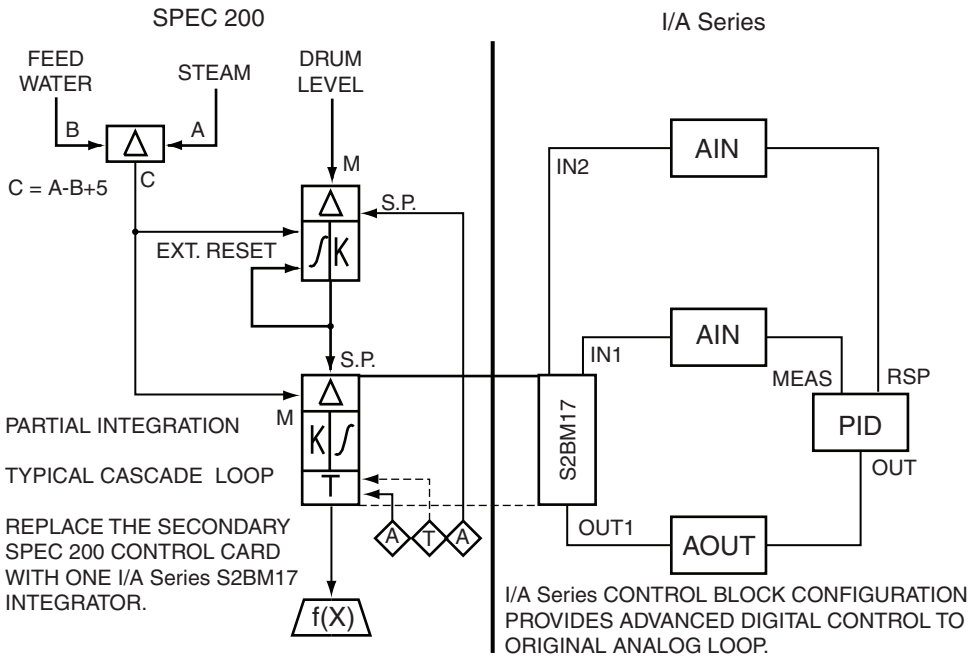


Figure 3. S2BM17 Typical Configuration

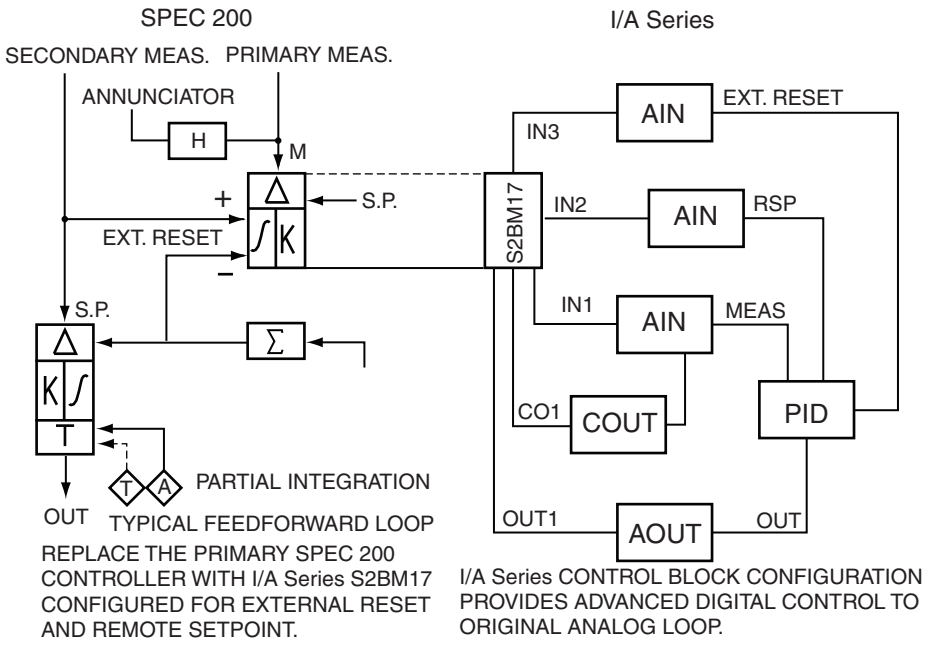


Figure 4. S2BM17 Feedforward Implementation

CCM Loop Interface (S2CM17)

The I/A Series SPEC 200 CCM Integrator (S2CM17) replaces the analog control cards +A4/+A5 and interfaces each CCM control loop with a corresponding digital controller executing in an I/A Series control station. To the I/A Series control station, each CCM control loop appears as a FBM17. The S2CM17 receives power and analog signals from the rear connector. The S2CM17 handles four analog 0 to 10 V dc inputs, two 15 V dc logic inputs, two 15 V dc logic outputs, and two analog 0 to 10 V dc outputs. (See the "SPEC 200 CCM Control Integrator User's Guide" B0193VU.)

The integrator is designed to operate with a parallel, INTERSPEC, or SPECTRUM CCM. Circuitry provides interoperation with existing 2DC Computer Interface Cards. Removing the CCM 2AX+A4/A5 and 2DC, the S2CM17 allows CCM users a loop-by-loop migration path to I/A Series control. Additionally, the S2CM17 allows users the flexibility of maintaining legacy interfaces or removing interfaces, when deemed appropriate, leaving the I/A Series control station interface. The S2CM17 circuitry supports coordination through 2DC computer interface cards of all legacy interfaces. These include VS, 240, 261, 270 Display Stations(1), and Supervisory Computer. I/A Series software configuration supports the necessary logical interactions between the aforementioned CCM legacy interfaces and the new I/A Series control station interface.

SPEC 200 Fieldbus Isolator (SSFBI and SDFBI)

I/A Series remote Fieldbus communications signals must be isolated and repeated to a local Fieldbus media. The I/A Series SPEC 200 Single Fieldbus Isolator (SSFBI) and redundant option I/A Series SPEC 200 Dual Fieldbus Isolator (SDFBI) mount to the front of any available SPEC 200 Power Distribution Module within the SPEC 200 nest area.

A power cable supplies power to the isolator through a standard 30-pin display connector. The connector is plugged into any available 2AC module display connector, 2AX+DSP, or 2AX+DIO distribution module connector.

For the CCM implementation, the SSFBI/SDFBI mounts to the front CCM rack and receives power through 30-pin display connector. I/A Series remote and local Fieldbus connections are accomplished from the isolator top plate. The remote Fieldbus connects using an appropriate quick-disconnect terminal block. Inbound and outbound remote Fieldbus wires are connected using screw type terminals of the quick disconnect connector. The entire connector assembly attaches to the module top plate. This allows the remote Fieldbus to be disconnected for servicing the SSFBI while maintaining remote Fieldbus continuity.

One 9-pin D connector is provided to connect local Fieldbus. When redundant Fieldbus is implemented, the SDFBI is used. The SDFBI consists of a pair of SSFBI modules that are independent in serving each Fieldbus. Each isolator is independent and can communicate with any combination of up to 24 S2BM04 or S2BM17 integrators mounted in 2AC SPEC 200 modules. In the CCM implementation, the isolator can communicate with up to 16 S2CM17 Integrators when mounted in controller communication nests. This independence maintains redundant Fieldbus integrity. The maximum distance for the local Fieldbus is 30 feet.

(1) The CCM configuration of 240SJ or 261PJ with 2DC-J, there is no loop manual operation support from the 240SJ or 261PJ station once migrated to S2CM17.

Basic Hardware Functionality

Each migrating 2AC-mounted controller card is removed and replaced with a corresponding integrator. This integrates the entire control loop to I/A Series control. The associated panel display should be disconnected from the display connector on the 2AC module. The panel display may be left in place, however no control action is available at the display after integration. Process loop measurement, output, and any auxiliary indicators continue to display current operating parameters.

Each cluster of up to 24 S2BM04/17 modules requires a corresponding SSFBI Isolator (SDFBI if redundant Fieldbus is used). This isolator is mounted to the front plate of any available SPEC 200 Power Distribution Module. Neither isolator affects existing intrinsically safe certification when used on certified intrinsically safe SPEC 200 installations.

Hardware Platform Options

The S2BM17 offers functional options implemented on a loop-by-loop basis depending on existing loop configuration. Variations are implemented either in the factory or the field by Foxboro or customer personnel. Typical variations include, but are not limited to, external alarm outputs, logic state inputs, analog bias outputs, and controller mode outputs.

System Configuration Functionality

Process scanning and control configuration is accomplished by I/A Series Integrated Control Configurator (IACC). The configurator allows process engineers to configure I/A Series control blocks to provide equal or enhanced control to SPEC 200 control loops being integrated. Configuration requires no special software and is supported by all versions of I/A Series software from earliest to most current.

SPEC 200 Interface Kit (P0914NA)

Process measurements used for indictor or recorder purposes may not be associated with migrated control loops. Indicators and recorders connect to a 2AX+DIO, 2AX+DS1 or 2AX+DSP that is used with these process signals. The SPEC 200 Interface Kit is designed to replace 2AX+DIO, 2AX+DS1, and 2AX+DSP modules used in these applications. The kit provides one S2MM17 module, nest card guides, and a connector. The connector is wired with the indicator or recorder signals that are relocated when the corresponding 2AX+DIO, 2AX+DS1, or 2AX+DSP is removed and replaced by the interface kit. See PSS 21H-7R2 B3 for S2MM17 specifications.

S2BM04 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE
±15 V dc

CONSUMPTION
3.4 W

HEAT DISSIPATION
3.4 W

Input Channel

ANALOG INPUT
One Channel Fixed to Process Measurement (2AC Module Terminal 1)

Analog Input Range
-0.256 to +10.256 V dc

Rated Mean Accuracy
±0.15% of span

Resolution
Programmable 12 to 15 bits (see Table 1)

Output Channel

ANALOG OUTPUT
Channel Fixed to Process Output (Actuator) (2AC Module Terminal 5)

Analog Output Range
-0.256 to +10.256 V dc

Rated Mean Accuracy
±0.15% of span

Resolution
12 bits

Communication

Redundant IEEE 1118 Fieldbus

S2BM04 PHYSICAL SPECIFICATIONS

Mounting

SPEC 200 Form Factor received by SPEC 200 2AC Computational Module

Indicators

Red and Green Light-Emitting Diodes (LEDs)

Connections

DB9 9-pin redundant IEEE 1118 Fieldbus connector

Table 1. Input Resolution

Conversion Time (Seconds)	Update Time (Milliseconds)	Settling Time(a) (Seconds)	Linearity Error(b) (% of Range)	Resolution (Bits)
0.1	10	0.25	0.0125	12
0.2	10	0.50	0.0075	13
0.5	25	1.00	0.005	14
1.0	50	2.00	0.005	15

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a) Value settles within a 1% band of steady state for a 10 to 90% input step change.
(b) Monotonic; assures that the signal for Fieldbus communications either increases or remains the same for increasing analog input signals.

S2BM17 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE
±15 V dc

CONSUMPTION
6 W (maximum)

HEAT DISSIPATION
6 W (maximum)

Input Channels

ANALOG INPUT
Four Channels

Analog Input Range
-0.256 to +10.256 V dc

Rated Mean Accuracy
±0.15% of span

Resolution
Programmable 12 to 15 bits (see Table 1)

CONTACT INPUT
Two Channels

Contact Range
Open (Hi) and Closed (Ln)

Open Circuit Voltage
3.1 V dc

Short Circuit Current
0.5 mA

CONTACT INPUT (CONT.)
Two Channels

On-State Resistance
1 KΩ (maximum)

Off-State Resistance
100 KΩ (minimum)

Output Channels

ANALOG OUTPUT
Two Channels

Analog Output Range
-0.256 to +10.256 V dc

Rated Mean Accuracy
±0.15% of span

Resolution
12 bits

CONTACT OUTPUT
Two Channels

Applied Voltage
15 V dc (typical)

Load Current
0.5 A (maximum)

Off-State Leakage Current
1.0 µA (maximum)

Communication

Redundant IEEE 1118 Fieldbus

S2BM17 PHYSICAL SPECIFICATIONS

Mounting

SPEC 200 Form Factor received by SPEC 200 2AC Computational Module

Indicators

Red and Green Light-Emitting Diodes (LEDs)

Connections

DB9 9-pin male redundant Fieldbus connector

S2CM17 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE
±15 V dc

CONSUMPTION
6 W (maximum)

HEAT DISSIPATION
6 W (maximum)

Input Channels

ANALOG INPUT
Four Channels

Analog Input Range
-0.256 to +10.256 V dc

Rated Mean Accuracy
±0.15% of span

Resolution
Programmable 12 to 15 bits (see Table 1)

CONTACT INPUT
Four Channels

Contact Range
Open (Hi) and Closed (Ln)

Open Circuit Voltage
3.1 V dc

Short Circuit Current
0.5 mA

On-State Resistance
1 KΩ (maximum)

Off-State Resistance
100 KΩ (minimum)

Output Channels

ANALOG OUTPUT
Two Channels

Analog Output Range
-0.256 to +10.256 V dc

Rated Mean Accuracy
±0.15% of span

Resolution
12 bits

CONTACT OUTPUT
Four Channels

Applied Voltage
15 V dc (typical)

Load Current
0.5 A (maximum)

Off-State Leakage Current
1.0 µA (maximum)

Communication

Redundant IEEE 1118 Fieldbus

S2CM17 PHYSICAL SPECIFICATIONS

Mounting

Controller slot in CCM nest

Indicators

Red and Green Light-Emitting Diodes (LEDs)

Connections

9-pin male redundant Fieldbus connector; 14-pin male CUIC interconnection; TB1 external unselected setpoint connection

SSFBI/SDFBI FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE
±15 V dc

CONSUMPTION
2.4 W

HEAT DISSIPATION
2.4 W

Communication

SINGLE IEEE 1118 FIELDBUS

Local Fieldbus Length
10 m (30 ft) (maximum)

Fieldbus Devices
24 (maximum)

SSFBI/SDFBI PHYSICAL SPECIFICATIONS

Mounting

Mounts to face of SPEC 200 2AX+DP10 Power Distribution Module.

Indicators

Red and Green Light-Emitting Diodes (LEDs); Remote and Local Fieldbus Communication Indicators

Connections

POWER CABLE
30-pin standard SPEC 200 display connector

LOCAL FIELDBUS
DB9 9-pin male redundant IEEE 1118 Fieldbus connector

REMOTE FIELDBUS
Six terminal quick disconnect terminal block

COMMON ENVIRONMENTAL SPECIFICATIONS

Operating

TEMPERATURE
5 to 50°C (40 to 120°F)

RELATIVE HUMIDITY
5 to 95% (Noncondensing)

ALTITUDE
-300 to +3,000 m (-1,000 to +10,000 ft)

Storage

TEMPERATURE
-40 to +70°C (-40 to 158°F)

RELATIVE HUMIDITY
5 to 95% (Noncondensing)

ALTITUDE
-300 to +12,000 m (-1,000 to +40,000 ft)

Contamination

ISA Standard S74.04 Class G1 (Mild)

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