EcoStruxure™

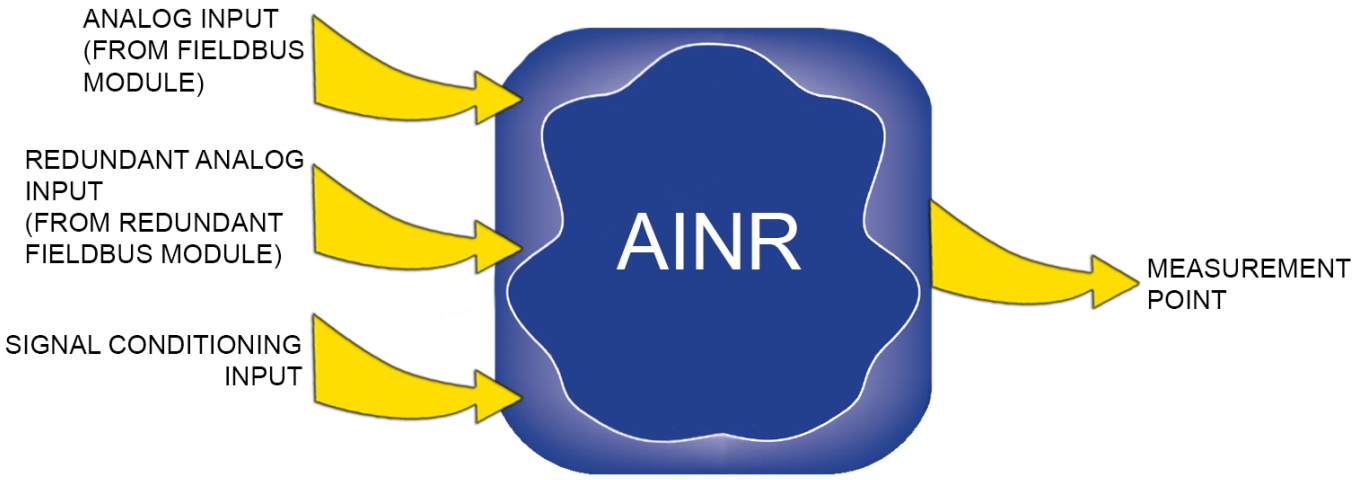
Foxboro™ DCS

Redundant Analog Input (AINR) Block

PSS 41S-3AINR

Product Specification

April 2019



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Legal Information

Overview

Redundant Analog Input (AINR) block scans and filters redundant analog inputs coming from a pair of redundant EcoStruxure™ Foxboro™ DCS Fieldbus Modules (FBMs) supporting either a single transmitter or dual (redundant) transmitters for selection of a single field measurement.

The AINR block reads the redundant analog input signals (e.g., 4 to 20 mA), in normalized counts, from each redundant FBM. Following validation of the primary signal and the secondary signal, the counts are conditioned and converted into engineering units (in floating point) according to the specified conditioning index and engineering units range. Both inputs are optionally filtered and the redundant logic of the block automatically selects the appropriate signal as the conditioned output, PNT. This measurement can be connected to the measurement parameter of a downstream control block such as a PID block.

When both signals are healthy, the primary signal is automatically selected; if the primary is unhealthy, the secondary (if healthy) is used. Both conditioned signals appear on the AINR detail display for examination. An override switch allows the operator to override automatic signal selection and manually request the desired signal.

Setting the deviation limits between the conditioned signals from redundant FBMs with dual (redundant) transmitters allows the generation of a status bit for abnormal deviations. This status can be incorporated into the alarming scheme for operator/ maintenance personnel.

A hardware occurrence in either FBM generates a system alarm to report the detected occurrence in the FBM module.

If a valid measurement is not available due to occurrences in BOTH FBMs or both signals are out-of-range as defined in the bad detection options of the block, the conditioned output signal is marked BAD. The BAD alarm option of the control block may be used to generate a process alarm to the operator.

Bad FBM channel detection is provided for each FBM input. The following bit level indicators are available for use in downstream blocks:

- primary FBM unsuccessful
- secondary FBM unsuccessful
- primary measurement bad
- secondary measurement bad

Process alarms available on the selected signal include: bad, high out-of-range, low out-of-range, hi-hi, lo-lo, high, and low. The delayed alarming feature reduces the number of nuisance alarms as a block parameter crosses over an alarm limit multiple times in a short period.

Standard Features

- An analog input from each of two redundant FBMs (FBM204s or FBM205s) each input having the same I/O channel designation.
- Selectable signal conditioning of the analog input signals (primary and secondary); normally, conditioning is on 4 to 20 mA signals.
- Operator selection of either healthy input signal when dual transmitters are in use.
- Bad-input-point detection. It provides bad-point indicators for optional connection to control blocks.
- Clamping of the block output signal when it exceeds a specifiable range.
- Deviation limit in engineering units between the primary and secondary measurements.

Extended Features

- Bad input point alarming. The output includes an alarm indicator signal and user-defined alarm message.
- Last good value retention. If both inputs are bad, the AINR block retains, on option, the last good value for the measurement output. When all detected errors are corrected, the block resumes normal operation.
- First- or second-order filtering. Filtering introduces a lag dependent on a specifiable time constant. Filtering also minimizes changes to an output signal that may be stimulating actual process changes.
- Absolute alarming (high, low, hi-hi, lo-lo) of the selected measurement output signal. The outputs include alarm indicator signals and user-defined alarm messages.
- Manual/Auto control of the point output allows the user to bypass the input value and force a manually entered value to be used for simulation and checkout purposes.
- Input parameter updates in Manual mode when connected to FBM inputs.
- Alarm detection when in Manual mode.
- Inhibiting of alarm messages or disabling of alarm detection on a per alarm type basis.
- Indication of the alarm level (1 to 5) and alarm type of the highest-priority active alarm for the block.
- Specialized applications supported by the block include:
  - External or internal temperature reference for thermocouple cold-junction compensation.
  - Conditioning of a low frequency pulse input from a digital input (16 DI only) Fieldbus Module.
  - Meter factor for converting an input pulse rate to the desired engineering units.
- Scale and bias terms for converting thermocouple and resistance thermometer outputs from degrees Celsius to another temperature scale.

Principal Parameters

Inputs

- 1 analog input point per redundant Fieldbus Module
- Signal conditioning index (integer)
- Signal selection (Boolean)
- Manual/Auto control mode switching (Boolean).

Outputs

- Conditioned measurement point output (real)
- 7 alarm indicators (Boolean)
- Deviation indicator (for both signals)
- Primary measurement bad indicator
- Secondary measurement bad indicator.

Additional Features

- Delayed alarming. A configurable timer delays alarm detection or return-to-normal messages for a specific alarm to reduce the number of alarm messages generated when a block parameter crosses back and forth over an alarm limit.
- Quality Status output parameter provides a single source for the block's value record status, block status, and alarm status.

Signal Conditioning Index Assignments

Conditioning Index	Signal Conditioning
0	No Conditioning
1	0 to 64 000 normalized counts linear (0 to 20mA)
2	1600 to 64 000 normalized counts linear (nominal 0 to 10 V dc)
3	12 800 to 64 000 normalized counts linear (4 to 20 mA)
4	0 to 64 000 normalized counts square root (0 to 20 mA)
5	12 800 to 64 000 normalized counts square root (4 to 20 mA)
6	0 to 64 000 normalized counts square root with low cutoff (3/4%) (0 to 20 mA)
7	12 800 to 64 000 normalized counts square root with low cutoff (3/4%) (4 to 20 mA)
8	Pulse rate
9	1600 to 64 000 normalized counts linear with low cutoff (nominal 0 to 10 V dc)
10	12 800 to 64 000 normalized counts linear with low cutoff (4 to 20 mA)
11	Intelligent Transmitter support
20	Type B thermocouple
21	Type E thermocouple
22	Type EA-2 thermocouple
23	Type J thermocouple
24	Type K thermocouple
25	Type N thermocouple
26	Type R thermocouple
27	Type S thermocouple
28	Type T thermocouple
40	Copper RTD
41	Nickel RTD
42	Platinum RTD (DIN)
43	Platinum RTD (IEC)
44	Platinum RTD (SAMA)

WARNING: This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.p65warnings.ca.gov/.

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