Advanced Thermal Dispersion Communications for Fan Inlet Air Monitoring

Contents

Protocol Implementation Conformance Statement – PICS

General information

Date:	07 April 2022
Vendor Name:	Ruskin
Vendor ID:	692
Product Name:	TDFi-Rt Electronic Fan Inlet Monitor
Product Model Number:	TDFi-Rt
Firmware Revision:	1.0.3
Application Software Version:	1.1.0
BACnet Protocol Revision:	14
Product Description:	Electronic Fan Inlet Monitor System
BACnet Standard Device Profile:	BACnet Application Specific Controller (B-ASC)

BACnet Interoperability Building Blocks supported:
Data Sharing - ReadProperty-B (DS-RP-B)
Data Sharing - WriteProperty-B (DS-WP-B)
Device Management - DynamicDeviceBinding-A (DM-DDB-A)
Device Management - DynamicDeviceBinding-B (DM-DDB-B)
Device Management - DynamicObjectBinding-B (DM-DOB-B)
Device Management - DeviceCommunicationControl-B (DM-DCC-B)
Alarm and Event Management - Notification - Internal-B (AE-N-I-B)
Alarm and Event Management - Information-B (AE-INFO-B)
Alarm and Event Management - Alarm Summary-A (AE-ASUM-B)

Segmentation Capability:	No
Data Link Layer Options:	MS/TP master baud rates: 9600, 19200, 38400, 76800
Device Address Binding:	No static device binding supported
Networking Options:	None
Character Sets Supported:	ISO 10646 (UTF-8)

Standard objects

The device supports the following standard object types:

- Device
- Analog Value
- Notification Class

Electronic Fan Inlet Monitor station BACnet objects

Object Name	Description	Type	Inst	Units
TDFi-Rt[1]	The Device object	DEV	XXXX[2]	See Property Table 1
Notification Class	Handles where to send events and notifications	NC	1	See Property Table 2
Fan Summary Temperature	Fan Summary Average Temperature	AV	1	See Property Table 3
Fan Summary ACT Airflow Volume[3]	Fan Summary airflow velocity or volume	AV	2	See Property Table 3
Fan 1 Temperature	Individual Fan 1 Temperature	AV	3	See Property Table 3
Fan 1 Actual Airflow Volume[3]	Individual Fan 1 airflow velocity or volume	AV	4	See Property Table 3
Fan 2 Temperature	Individual Fan 2 Temperature	AV	5	See Property Table 3
Fan 2 Actual Airflow Volume[3]	Individual Fan 2 airflow velocity or volume	AV	6	See Property Table 3
Fan 3 Temperature	Individual Fan 3 Temperature	AV	7	See Property Table 3
Fan 3 Actual Airflow Volume[3]	Individual Fan 3 airflow velocity or volume	AV	8	See Property Table 3
Fan 4 Temperature	Individual Fan 4 Temperature	AV	9	See Property Table 3
Fan 4 Actual Airflow Volume[3]	Individual Fan 4 airflow velocity or volume	AV	10	See Property Table 3
Fan 5 Temperature	Individual Fan 5 Temperature	AV	11	See Property Table 3
Fan 5 Actual Airflow Volume[3]	Individual Fan 5 airflow velocity or volume	AV	12	See Property Table 3
Fan 6 Temperature	Individual Fan 6 Temperature	AV	13	See Property Table 3
Fan 6 Actual Airflow Volume[3]	Individual Fan 6 airflow velocity or volume	AV	14	See Property Table 3
Fan 7 Temperature	Individual Fan 7 Temperature	AV	15	See Property Table 3
Fan 7 Actual Airflow Volume[3]	Individual Fan 7 airflow velocity or volume	AV	16	See Property Table 3
Fan 8 Temperature	Individual Fan 8 Temperature	AV	17	See Property Table 3
Fan 8 Actual Airflow Volume[3]	Individual Fan 8 airflow velocity or volume	AV	18	See Property Table 3
Fan 9 Temperature	Individual Fan 9 Temperature	AV	19	See Property Table 3
Fan 9 Actual Airflow Volume[3]	Individual Fan 9 airflow velocity or volume	AV	20	See Property Table 3
Fan 10 Temperature	Individual Fan 10 Temperature	AV	21	See Property Table 3
Fan 10 Actual Airflow Volume[3]	Individual Fan 10 airflow velocity or volume	AV	22	See Property Table 3
Fan 11 Temperature	Individual Fan 11 Temperature	AV	23	See Property Table 3
Fan 11 Actual Airflow Volume[3]	Individual Fan 11 airflow velocity or volume	AV	24	See Property Table 3
Fan 12 Temperature	Individual Fan 12 Temperature	AV	25	See Property Table 3
Fan 12 Actual Airflow Volume[3]	Individual Fan 12 airflow velocity or volume	AV	26	See Property Table 3
Fan 13 Temperature	Individual Fan 13 Temperature	AV	27	See Property Table 3
Fan 13 Actual Airflow Volume[3]	Individual Fan 13 airflow velocity or volume	AV	28	See Property Table 3
Fan 14 Temperature	Individual Fan 14 Temperature	AV	29	See Property Table 3
Fan 14 Actual Airflow Volume[3]	Individual Fan 14 airflow velocity or volume	AV	30	See Property Table 3
Fan 15 Temperature	Individual Fan 15 Temperature	AV	31	See Property Table 3
Fan 15 Actual Airflow Volume[3]	Individual Fan 15 airflow velocity or volume	AV	32	See Property Table 3
Fan 16 Temperature	Individual Fan 16 Temperature	AV	33	See Property Table 3
Fan 16 Actual Airflow Volume[3]	Individual Fan 16 airflow velocity or volume	AV	34	See Property Table 3

Note: AV objects 3 – 34 are only available depending on the number of fans configured. For example, if 5 fans are configured, only fans 1 thru 5 will have AV objects 3 – 12 available.

AV – Analog Value
NC – Notification Class

1 - Name is dependent on line 2 display settings configured on the device. With line 2 parameter set to custom, the device name appends the line 2 text to the BACnet device name.
2 - Configured in the device settings menu.
3 - Name is dependent on display settings configured on the device. Prefixed by “Actual” (ACT) or “Standard” (STD) and suffixed by “Velocity” or “Volume” based on settings in the display menu.

Electronic Fan Inlet Monitor station BACnet property types

Property Table 1: Device Object			
Property	**Type**	**Access**	**Description**
Object_Identifier[1]	BACnetObjectIdentifier	R	The object number (instance) for the DEV object
Object_Type	BACnetObjectType	R	The DEV object type – DEVICE
Object_Name	CharacterString	R	The DEV object name
System_Status	BACnetDeviceStatus	R	Reflects the current status of the device
Vendor_Name	CharacterString	R	Manufacturer of the device
Vendor_Identifier	Unsigned16	R	The unique vendor identification code
Model_Name	CharacterString	R	Model of the device
Firmware_Revision	CharacterString	R	Level of firmware installed on the device
Application_Software_Version	CharacterString	R	Version of the application software installed on the device
Protocol_Version	Unsigned	R	Indicates the BACnet protocol version
Protocol_Revision	Unsigned	R	Indicates the BACnet protocol revision
Max_APDU_Length_Accepted	Unsigned	R	Maximum number of octets that may be contained in a single APDU
Segmentation_Supported	BACnetSegmentation	R	Indicates if the device supports segmentation
APDU_Timeout	Unsigned	R	The time in milliseconds between retransmission of an APDU requring acknowledgment
Number_Of_APDU_Retries	Unsigned	R	Maximum number of times an APDU shall be transmitted
Protocol_Services_Supported	BACnetServicesSupported	R	Indicates which standardized protocol services are executed by the device
Protocol_Object_Types_Supported	BACnetOBjectTypesSupported	R	Indicates which standardized object types can be present in the device
Object_List	BACnetARRAY[N] of BACnetObjectIdentifier	R	Indicates the list of objects accessible on the device
Max_Master[1]	Unsigned(0..127)	R	The Max Master of the device
Max_Info_Frames	Unsigned	R	The Max Info Frames of the device
Device_Address_Binding	BACnetLIST of BACnetAddressBinding	R	List of Address Bindings
Database_Revision	Unsigned	R	Revision number for the device's database
Property_List	BACnetARRAY[N] of BACnetPropertyIdentifier	R	Array of the supported object properties

Property Table 2: Notification Class Object			
Property	**Type**	**Access**	**Description**
Object_Identifier	BACnetObjectIdentifier	R	The object number (instance) for the NC object
Object_Type	BACnetObjectType	R	The NC object type – NOTIFICATION_CLASS
Object_Name	CharacterString	R	The NC object name
Notification_Class	Unsigned	R	Indicates the Instance of the Notification_Class
Priority	BACnetARRAY[3] of Unsigned	R	Conveys the priority to be used for event notifications for TO_OFFNORMAL, TO_FAULT, and TO_NORMAL
Ack_Required	BACnetEventTransitionBits	R	Conveys whether acknowledgment shall be required for notification generated for TO_OFFNORMAL, TO_FAULTS, and TO_NORMAL event transitions.
Recipient_List	BACnetLIST of BACnetDestination	R/W	Converys a list of up to 1 recipient destinations to which destinations shall be sent. * Limited to 1 recipient with valid days set to all days, from time as 00:00:00.00, to time as 23:59:59.99 and transitions as (TRUE,TRUE,TRUE)
Property_List	BACnetARRAY[N] of BACnetPropertyIdentifier	R	Array of the supported object properties

Property Table 3: Analog Value Object			
Property	**Type**	**Access**	**Description**
Object_Identifier	BACnetObjectIdentifier	R	The object number (instance) for the AV object
Object_Type	BACnetObjectType	R	The AV object type – ANALOG_VALUE
Object_Name	CharacterString	R	The AV object name
Present_Value	Real	R	The present float value of the AV object, Temperature or Flow, in the set displayed units
Units[1]	BACnetEngineeringUnits	R	The units of the present value, limits, and deadbands: 62 – Celsius 64 – Fahrenheit 74 – Meters / Second 77 – Feet / Minute 84 – Feet^3 / Minute 87 – Liters / Second 88 – Liters / Minute 135 – Meters^3 / Hour 142 – Feet^3 / Second 191 – Feet^3 / Hour
Out_Of_Service	Boolean	R	Boolean that represents if the reported value is not valid, such as during warm up
Status_Flags	BACnetStatusFlags	R	4 bits representing if the object is: **IN_ALARM, FAULT, OVERRIDDEN, OUT_OF_SERVICE**
Event_State	BACnetEventState	R	Indicates the event state of this object
High_Limit[1]	Real	R	The device's high limit that triggers the alarm flags for this object
Low_Limit[1]	Real	R	The device's low limit that triggers the alarm flags for this object
Deadband[1]	Real	R	The device's set deadband for the object's alarm flag triggering
Time_Delay[1]	Unsigned	R	The time delay in seconds for the object's alarm flag triggering
Time_Delay_Normal	Unsigned	R	The time delay in seconds for the object's alarm flag to return to normal
Limit_Enable	BACnetLimitEnable	R	The limit enable bits that represent if the object's alarms have the high and/or low limits enabled: Low_Limit_Enable, High_Limit_Enable
Event_Enable	BACnetEventTransitionBits	R	Indicates what events are enabled: **TO_OFFNORMAL, TO_FAULT, TO_NORMAL** *All are enabled if High and/or Low Limits are enabled.
Acked_Transitions	BACnetEventTransitionBits	R	Indicates the acknowledgment state for events
Event_Detection_Enable	Boolean	R	Indicates whether or not intrinsic reporting is enabled
Notification_Class	Unsigned	R	Indicates the instance of the Norification Class to use for events
Notify_Type	BACnetNotifyType	R	Indicates the notification type – Alarm
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	R	Conveys the times of the last TO_OFFNORMAL, TO_FAULT, and TO_NORMAL events as sequence numbers
Event_Message_Texts	BACnetARRAY[3] of CharacterString	R	Conveys the message text for the last TO_OFFNORMAL, TO_FAULT, and TO_NORMAL events
Event_Message_Texts_Config	BACnetARRAY[3] of CharacterString	R	The base text that defines the message text of Event_Message_Texts
Event_Algorithm_Inhibit	Boolean	R/W	Indicates whether or not the event algorithm is disabled for the object
Event_Algorithm_Inhibit_Ref	BACnetObjectPropertyReference	R	Indicates the property that controls Event_Algorithm_Inhibit - Unintialized
Reliability	BACnetReliability	R	Indicates if the Present_Value is reliable
Reliability_Evaluation_Inhibit	Boolean	R	Indicates whether or not reliability evaluation is disabled for the object
Property_List	BACnetARRAY[N] of BACnetPropertyIdentifier	R	Array of the supported object properties
Proprietary(1110)[2]	BACnetEngineeringUnits	R	Units for proprietary properties 1112 and 1114. Shares the same enumerations as the Units property
Proprietary(1111)[2]	CharacterString	R	Fan Sensor 1 Status
Proprietary(1112)[2]	Real	R	Fan Sensor 1 Raw Value
Proprietary(1113)[2]	CharacterString	R	Fan Sensor 2 Status (Status only available depending on device settings)
Proprietary(1114)[2]	Real	R	Fan Sensor 2 Raw Value (Value only valid depending on device settings)

R – Read Access W – Write Access

1 – These properties are configured through the configuration menu on the device

2 – The proprietary properties are only available on AV objects 3-34.