

BACnet® communication with X2 devices

Features

- BACnet® MS/TP communication over RS485
- B-ASC Device Profile
- Slave type of communication
- Supports up to 128 nodes on one network
- Galvanic isolated bus connection
- Baud rates: Auto / 9600 / 19200 / 38400 / 57600 / 76800 / 115200
- LED indicators

X2-BAC Protocol Implementation Conformance Statement (PICS)

Vendor Name: Vector Controls

Product Name: X2 Controls series

X2 product description:

The X2 communicating BACnet® controllers are designed as universal controls equipment suitable for a large number of applications. They may be used in zoning and other applications which are monitored by a BACnet® MS/TP network.

Supported BACnet® Interoperability Blocks (BIBB)

The BACnet® interface conforms to the B-ASC device profile (BACnet® Application Specific Controller).

The following BACnet® Interoperability Building Blocks (BIBB) are supported.

BIBB	Type	Name
DS-RP-B	Data sharing	Read property - B
DS-RPM-B	Data sharing	Read property multiple - B
DS-WP-B	Data sharing	Write property - B
DM-DCC-B	Device management	Device communication Control - B
DM-DDB-B	Device management	Dynamic device binding - B
DM-DOB-B	Device management	Dynamic object binding - B
DM-TS-B	Device management	Time synchronization - B
DM-UTC-B	Device management	UTC Time synchronization - B
DM-RD-B	Device management	Reinitialize device - B

Supported standard BACnet® application services

- ReadProperty
- ReadPropertyMultiple
- WriteProperty
- DeviceCommunication. Needs a password which is "Vector" (case sensitive and without the quotes).
- I-Am
- I-Have
- TimeSynchronisation
- UTCTimeSynchronisation
- ReinitializeDevice ("cold" or "warm"). Needs a password which is "Vector" (case sensitive and without the quotes).

Supported standard Object types

- Device
- Analog input
- Analog value
- Binary value
- Multi-state Value

LED indicators

The BACnet® interface features a green LED and a red LED for indication of traffic on the RS-485 bus. The green LED is lit when an incoming packet is received, and the red LED is lit when an outgoing packet is transmitted to the bus. At power-up, both LED blink twice simultaneously as a sign of the boot process being completed. A constantly lit LED serves as an indication of a fault condition in the reception or sending process.

Configuration of X2-BAC devices

The communication parameters may be set via operation terminals. Login to the controller as follows:

1. Press UP/DOWN buttons simultaneously for three seconds. The display will show firmware version and revision number. Press the OPTION button to start login.
2. CODE is shown in small display.
3. Select 241 using UP/DOWN buttons.
4. Press OPTION after selecting the correct code.
5. Once logged in with 241 control modules are displayed (Lp1, Lp2, 1u, 2u, etc.) – select with UP/DOWN the communication parameters **CO** and open with OPTION. As soon as the module is open its parameters are displayed.
6. Select the parameters with the UP/DOWN buttons. Change a parameter by pressing the OPTION button. Three arrows are displayed to indicate that the parameter may be modified. Use UP/DOWN buttons to adjust the value.
7. After you are done, press OPTION to save the new value and return to the selection level (arrows disappear when selection is saved). Pressing left hand POWER button without pressing OPTION will discard the value and return without saving. For control parameters press POWER again to leave parameter selection and return to control module selection.

Press the POWER to leave the menu. The unit will return to normal operation if no button is pressed for more than 5 minutes.

COM parameters

Parameter	Description	Range	Default
CO 00	Bus plug-in hardware id (read only)	0...255	3
CO 01	Bus plug-in software version (read only)	0...255	12
CO 02	Bus plug-in software revision (read only)	0...255	13
CO 03	Communication address (must be unique in network)	1...127	1
CO 04	Baud rate: 0 = Auto-detect ¹ 1 = 9600 2 = 19200 3 = 38400 4 = 57600 5 = 76800 6 = 115200	0...6	0 (Auto-detect)
CO 05	Highest master	1...127	127
CO 06	Device object ID1 000000xx	0...99	00
CO 07	Device object ID2 0000xx00	0...99	00
CO 08	Device object ID3 00xx0000	0...99	01
CO 09	Device object ID4 0x000000	0...4	0
CO 10	Send I-am at boot	1, 0 (ON, OFF)	1 (ON)
CO 11	Not used.	0...255	255
CO 12	Not used.	0...255	255
CO 13	Not used.	0...255	255
CO 14	Not used.	0...255	255
CO 15	Auto increment ² and auto-build ³ of "device object name" flags: 0 = Auto increment and auto-build of device object name disabled 1 = Auto increment is enabled, auto-build of device object name disabled 2 = Auto increment disabled; auto-build of device object name enabled 3 = Auto increment and auto-build of device object name enabled	0...3	2

¹ "Auto-detect baud rate"-mode

When this option is selected, the AEC-BAC will detect the baud rate of the RS485 network. The AEX-BAC will stay in baud rate detection mode until it successfully decodes a package sent from device with **address = 0** with a baud rate which is supported by the AEX-BAC. The baud rate detection mode will be entered once at hardware start-up and after a prolonged communication failure.

² "Auto increment"-function

When this function is enabled and an automatic AEC-PM1 parameter load is executed at power up of the controller, the following variables will be incremented and written back to the AEC-PM1 unit:

- CO03 Communication address. This is incremented only if the value is not already 127 with respect to CO05 – the address of the highest master. If CO05 is equal or less than the newly incremented value of CO03, then CO05 is written to be 127 (the maximum value of CO05 possible).
- CO06 ... CO09 Device object ID. This is incremented only if the value is not already "4194304".

³ "Auto-build of device object name"-function

The BACnet standard requires that the each BACnet endpoint has a unique name on the network (device object name). The initial name of the AEX-BAC module is "AEX-BAC" equal for all devices. This means that device object names need to be edited manually. Using the auto-build-function the device object name can be automatically assembled using the label AEX-BAC followed by the contents of CO06 – CO09 (The device object ID). For example, AEX-BAC-01050001.

If one writes the device object name manually through BACnet, the auto-build function will automatically be disabled (CO15 set to 0 or 1). In this case, the auto increment function will not have an effect on the device object name, only on the device object ID.

Changing parameters of the controller through bus communication

It is possible to remotely changing parameters through an indirect read/write mode using objects AV12 and AV13. Find details on the procedure required and how to interpret values in the application note: Parameters access through AEX-BAC V1.2

Available objects for different X2 products

The same module for BACnet communication is used over the entire X2 product range. When the module initializes, it reads the properties from the X2 device, such as in and outputs, control loops, alarms, time schedules and so forth. It then activates and assigns its objects to the available physical points.

If an output or an input is not physical present in the scope of the product, its object will not be generated.

The available physical properties for each device may be found in its product datasheet under the scope table.

Here is a brief overview.

Available inputs

	TCX2-40863	TCX2-23343	TCX2-24273	TCX2-14050	TCI2-204.202	SxC2-201.102	SxC2-200.101	TRI2-221.202
UI1	UI-01	UI-01	UI-01	UI-01	UI-01	UI-01 (S)	UI-01 (S)	UI-01 (S)
UI2	UI-02	UI-02	UI-02	UI-02	UI-02	UI-02 (S)	UI-02 (S)	UI-02 (S)
UI3	UI-03	UI-03	UI-03	UI-03	UI-03	UI-03 (S)	UI-03 (S)	UI-03 (S)
UI4	UI-04	UI-04	UI-04	UI-04	UI-04	UI-04 (S)	UI-04 (S)	UI-04
UI5	UI-05	UI-05	UI-05	VI-01	VI-01	UI-05 (S)	UI-05 (S)	UI-05
UI6	UI-06	UI-06	UI-06	VI-02	VI-02	UI-06	VI-01	UI-06
UI7	UI-07	VI-01	VI-01	VI-03	VI-03	VI-01	VI-02	VI-01
UI8	UI-08	VI-02	VI-02	VI-04	VI-04	VI-02	VI-03	VI-02
UI9	VI-01	VI-03	VI-03			VI-03	VI-04	VI-03
UI10	VI-02	VI-04	VI-04			VI-04		VI-04
UI11	VI-03							
UI12	VI-04							

(S) = Sensor inputs

Available output modules

	TCX2-40863	TCX2-23343	TCX2-24273	TCX2-14050	TCI2-204.202	SxC2-201.102	SxC2-200.101	TRI2-221.202
AO1	AO1	AO1	AO1		AO1	AO1	AO1	AO1
AO2	AO2	AO2	AO2		AO2	AO2		AO2
AO3	AO3	AO3	AO3					
DO1	DO1	DO1	DO1	DO1	DO1	DO1	DO1	DO1
DO2	DO2	DO2	DO2	DO2	DO2			DO2
DO3	DO3	DO3	DO3	DO3				
DO4	DO4	DO4	DO4	DO4				
DO5	DO5		DO5	DO5				
DO6	DO6		DO6					
DO7			DO7					

Objects for digital outputs.

The available objects for digital outputs depend on their configuration. The reason is that an output assigned to a fan module will have different objects than if assigned to a floating or binary output.

There are 4 different object tables for digital objects:

- Digital output in fan configuration (applies to all binary outputs that are part of the fan module)
- Digital output in 3-point floating configuration (Always two binary outputs)
- Digital output in PWM configuration
- Digital output in binary configuration

Available loops

TCX2-40863	TCX2-23343	TCX2-24273	TCX2-14050	TCI2	SxC2	TRI2
LP1	LP1	LP1	LP1	LP1	LP1	LP1
LP2	LP2	LP2		LP2	LP2	LP2
LP3						
LP4						

Available alarms

All devices have 8 alarms

Object list

Device Object

Property	Description	Range/Type	R/W
APDU_Timeout	Time between retransmissions in milliseconds. This device does not support retransmissions, so this always reads as "0".	0	R
App Software Version	Controller Firmware Version (assembled by firmware) XX.XrYY ("X" = version; "Y" = revision)	String	R
Database_Revision	Increases if the settings change	16 bit	R
Daylight_Savings_Status	Daylight savings status of host controller	True/False	R
Description	Description of controller or location	32 Bytes	R/W
Device Address Binding	Address binds	List	R
Firmware_Revision	BACnet Firmware Revision	String	R
Local_Date	Date of host controller in format YYYY-MM-DD-DOW	YYYY-MM-DD-DOW	R
Local_Time	Time of host controller in format HH:MM:SS	HH:MM:SS	R
Max APDU Length Accepted	The maximum APDU length supported by this device is 480.	16 bit	R
Max Info Frames	The value specifies the maximum number of information frames the node may send before it must pass the token.	1	R/W
Max_Master	Number of the highest addressed node	1...127	R/W
Model_Name	"X2-abcde-BAC" (assembled by firmware) a = number of loops b = number of passive inputs c = number of universal inputs d = number of binary outputs e = number of analog outputs	String	R
Number_of_APDU_Retries	Number of retransmissions. This device does not support retransmissions, so this always reads as "0".	0	R
Object_Identifier	Device object identifier (CO06...CO09)	22 bit	R/W
Object_Name	Name of device	32 Bytes	R/W
Object_Type	The value is always "Device" for the device object	10 bit	R
Protocol_Objects_Supported	The enumeration of the supported object types	List	R
Protocol_Services_Supported	The enumeration of the supported services	List	R
Protocol_Version	BACnet protocol version number	1	R
Protocol_Revision	BACnet protocol revision number	14	R
Segmentation_Supported	This device does not support segmentation, so this always reads as "NO_SEGMENTATION (3)".	0...3	R
System_Status	Current physical and logical status supported: - OPERATIONAL (0) - DOWNLOAD_REQUIRED (2) (IF INT. EEPROM CONF. ERRORS) - NON_OPERATIONAL (4) (IF INT. I2C BUS ERRORS)	0...5	R
UTC_Offset	Offset to UTC time in case UTC time synchronization is used	-780...780	R/W
Vendor_Identifier	561		R
Vendor_Name	Vector Controls GmbH	String	R
Object_List	List of all objects currently implemented in the device	List	R

Analog Input Object

Property	Description / Property description	Range/Type	R/W
Object_Identifier	AI number	8bit	R
Object_Name	Name of the input, Assembled from template plus number	String	R
Description	Description of the input	16 Bytes	R/W
Preset_Value	Current value of input, writable only if out of service is set	Floating Point	R
Status_Flags	In_Alarm, Fault, Overridden, Out_Of_Service	Flags	R
Event_State	Always NORMAL	Flags	R
Reliability	NO_FAULT_DETECTED, NO_SENSOR, OVER_RANGE, UNDER_RANGE, OPEN_LOOP, SHORTED_LOOP, COMMUNICATION_FAILURE, UNRELIABLE_OTHER	List	R
Out_Of_Service	Writing to Out_Of_Service property is not supported	Flag	R
Units	Describes the units used. Degree Celsius or Fahrenheit has to be set by MV02.	8bit	R

Analog Value Object

Property	Description / Property description	Range/Type	R/W
Object_Identifier	AV number	8bit	R
Object_Name	Name of the value, Assembled from template plus number	String	R
Description	Description of the input	16 Bytes	R/W ⁽¹⁾
Preset_Value	Current value of input, writable only if out of service is set	Floating Point	R/W ⁽²⁾
Status_Flags	In_Alarm, Fault, Overridden, Out_Of_Service	Flags	R
Event_State	Always NORMAL	Flags	R
Out_Of_Service	Writing to Out_Of_Service property is not supported	Flag	R
Units	Describes the units used. Degree Celsius or Fahrenheit has to be set by MV02.	Coded Value	R

(1) Writable for objects with writable Present Value property only. (AVxx > AV11)

(2) Writable for AV indexes greater than 11.

Binary Value Object

Property	Description / Property description	Range/Type	R/W
Object_Identifier	BV number	8bit	R
Object_Name	Name of the input, Assembled from template plus number	String	R
Description	Description of the input	16 Bytes	R/W ⁽¹⁾
Preset_Value	True or False, writable only if out of service is set	ON, OFF	R/W
Status_Flags	In_Alarm, Fault, Overridden, Out_Of_Service	Flags	R
Event_State	Always NORMAL	Flags	R
Out_Of_Service	Writing to Out_Of_Service property is not supported	Flag	R

(1) Writable for objects with Instance Number greater than 100.

Multi State Value Object

Property	Description / Property description	Range/Type	R/W
Object_Identifier	MV number	8bit	R
Object_Name	Name of the input, Assembled from template plus number	String	R
Description	Description of the input	16 Bytes	R/W ⁽¹⁾
Preset_Value	Unsigned Integer	8bit	R/W
Status_Flags	In_Alarm, Fault, Overridden, Out_Of_Service	Flags	R
Event_State	Always NORMAL	Flags	R
Out_Of_Service	Writing to Out_Of_Service property is not supported	Flag	R
Number_Of_States	Unsigned Integer	8bit	R
State_Text	Array of strings	8bytes/state maximum	R

(1) Writable for objects with Instance Number greater than 100.

Description of available objects

Controller Information

Object	Name (8 Bytes)	Description	Range/Type	R/W
AV 00	#CtrlP	Number of control loops	8bit	R
AV 01	#BinIn	Number of binary inputs	8bit	R
AV 02	#uIn	Number of universal inputs	8bit	R
AV 03	#vIn	Number of virtual inputs	8bit	R
AV 04	#BinOut	Number of binary outputs	8bit	R
AV 05	#aOut	Number of analog outputs	8bit	R
AV 06	#Fan	Number of fan outputs	8bit	R
AV 07	#FIOut	Number of floating outputs	8bit	R
AV 08	#Alarm	Number of alarms	8bit	R
AV 09	#AuxFun	Number of auxiliary functions	8bit	R
AV 10	#Sched	Number of time schedules	8bit	R
AV 11	#PerSchd	Number of switching times / time schedule	8bit	R

Controller State

Object	Name (8 Bytes)	Description / Property description	Range/Type	R/W
BV 00	OpStOo	Operation state On - Off: Inactive / Active	BV	R/W
MV 00	OpStCoSt	Operation state Comfort - Standby: 1 = Comfort, 2 = Standby	MV	R/W
MV 01	OpStHeCo	Operation state Cool - Heat: 1 = Cool, 2 = Heat	MV	R/W
MV 02	Degree	Operation state Celsius - Fahrenheit: 1 = Celsius, 2 = Fahrenheit	MV	R/W
BV 01	FanOnly	Operation state Fan Only: Not implemented in this version	BV	R/W
BV 02	Schedule	Operation state Time Schedules: Inactive / Active	BV	R/W
BV 03	AccOpMod	Enable access to operation modes	BV	R/W
BV 04	AccSp	Enable access to set points	BV	R/W
BV 05	AccMan	Enable manual control in cascade and for fan speeds	BV	R/W
BV 06	AccHeCo	Enable change of heating/cooling mode for 2 pipe systems	BV	R/W
BV 07	AccSchd	Enable access to time programs	BV	R/W
MV 03	OpStOPMS	Operation State Master/Slave mode: "Master" / "Slave"	MV	R/W
MV 04	OpStWink	Operation State "Wink" function: "WinkON" / "WinkOFF"	MV	R/W
MV 05	OpStSWM	Operation State Summer/Winter mode: "Summer" / "Winter"	MV	R/W

X2-Inputs

The available input objects depend on the actual configuration of the X2 product. Sensor inputs will be treated as universal inputs in X2-BAC. Please observe the table on page 3 to see which are the available inputs for the product selected. At this stage all products have 4 virtual inputs with the objects listed below.

Universal inputs

Object	Name (8 Bytes)	Description	Description	
AI 101	UI-01	Universal Input 01	16bytes	R
AV 101	UI-01-OS	Universal Input 01 Offset (calibration = 01u6)	16bytes	R/W
AI 102	UI-02	Universal Input 02	16bytes	R
AV 102	UI-02-OS	Universal Input 02 Offset	16bytes	R/W
AI 103	UI-03	Universal Input 03	16bytes	R
AV 103	UI-03-OS	Universal Input 03 Offset	16bytes	R/W
AI 104	UI-04	Universal Input 04	16bytes	R
AV 104	UI-04-OS	Universal Input 04 Offset	16bytes	R/W
AI 105	UI-05	Universal Input 05	16bytes	R
AV 105	UI-05-OS	Universal Input 05 Offset	16bytes	R/W
AI 106	UI-06	Universal Input 06	16bytes	R
AV 106	UI-06-OS	Universal Input 06 Offset	16bytes	R/W
AI 107	UI-07	Universal Input 07	16bytes	R
AV 107	UI-07-OS	Universal Input 07 Offset	16bytes	R/W
AI 108	UI-08	Universal Input 08	16bytes	R
AV 108	UI-08-OS	Universal Input 08 Offset	16bytes	R/W

Virtual inputs

Object	Name (8 Bytes)	Description	Description	
AV 109	VI-01	Virtual Input 01	16bytes	R/W
AV 110	VI-01-OS	Virtual Input 01 Offset	16bytes	R/W
AV 111	VI-02	Virtual Input 02	16bytes	R/W
AV 112	VI-02-OS	Virtual Input 02 Offset	16bytes	R/W
AV 113	VI-03	Virtual Input 03	16bytes	R/W
AV 114	VI-03-OS	Virtual Input 03 Offset	16bytes	R/W
AV 115	VI-04	Virtual Input 04	16bytes	R/W
AV 116	VI-04-OS	Virtual Input 04 Offset	16bytes	R/W

Writing to virtual inputs

Virtual inputs may be written to. If there is a time out period specified under the settings of the X2 controller, the input will have to be written to within the delay specified, else this input will be disabled. All the connected functions and control loops will then be disabled too and Err 4 will be displayed on the operation terminals in this case.

Alarms

Object	Name	Description	Description	R / W
MV 601	AL-01	Alarm 1: Not Active, Active, Need confirmation	16 bytes	R/W*
MV 602	AL-02	Alarm 2: Not Active, Active, Need confirmation	16 bytes	R/W*
MV 603	AL-03	Alarm 3: Not Active, Active, Need confirmation	16 bytes	R/W*
MV 604	AL-04	Alarm 4: Not Active, Active, Need confirmation	16 bytes	R/W*
MV 605	AL-05	Alarm 5: Not Active, Active, Need confirmation	16 bytes	R/W*
MV 606	AL-06	Alarm 6: Not Active, Active, Need confirmation	16 bytes	R/W*
MV 607	AL-07	Alarm 7: Not Active, Active, Need confirmation	16 bytes	R/W*
MV 608	AL-08	Alarm 8: Not Active, Active, Need confirmation	16 bytes	R/W*

*) Writable to "not active" only, if state is "not active, need confirmation".

Control Loops

Object	Name	Description	Description	R/W
MV 211	LP-01-ST	State of control loop: Disabled, Heating, Cooling		R
AV 211	LP-01-SSP	Saved set point	16bytes	R/W
AV 212	LP-01-CSP	Calculated set point		R
AV 213	LP-01-PROP	Proportional output		R
MV 212	LP-01-DO	Binary output: Stage OFF, Stage 1, Stage 2,		R
MV 221	LP-02-ST	State of control loop: Disabled, Heating, Cooling		R
AV 221	LP-02-SSP	Saved set point	16bytes	R/W
AV 222	LP-02-CSP	Calculated set point		R
AV 223	LP-02-PROP	Proportional output		R
MV 222	LP-02-DO	Binary output: Stage OFF, Stage 1, Stage 2,		R
MV 231	LP-03-ST	State of control loop: Disabled, Heating, Cooling		R
AV 231	LP-03-SSP	Saved set point	16bytes	R/W
AV 232	LP-03-CSP	Calculated set point		R
AV 233	LP-03-PROP	Proportional output		R
MV 232	LP-03-DO	Binary output: Stage OFF, Stage 1, Stage 2,		R
MV 241	LP-04-ST	State of control loop: Disabled, Heating, Cooling		R
AV 241	LP-04-SSP	Saved set point	16bytes	R/W
AV 242	LP-04-CSP	Calculated set point		R
AV 243	LP-04-PROP	Proportional output		R
MV 242	LP-04-DO	Binary output: Stage OFF, Stage 1, Stage 2,		R

Analog Outputs

Object	Name	Description	Description	R/W
MV 311	AO-01-ST	Analog Output 1 state		R
AV 311	AO-01-VAL	Analog Output 1 Value	16bytes	R
AV 312	AO-01-OV	Analog Output 1 Override Value		R/W
MV 321	AO-02-ST	Analog Output 2 state		R
AV 321	AO-02-VAL	Analog Output 2 Value	16bytes	R
AV 322	AO-02-OV	Analog Output 2 Override Value		R/W
MV 331	AO-03-ST	Analog Output 3 state		R
AV 331	AO-03-VAL	Analog Output 3 Value	16bytes	R
AV 332	AO-03-OV	Analog Output 3 Override Value		R/W

Digital Outputs in fan configuration

Object	Name	Description	Description	R/W
MV 412	DO-01-FAN	Binary Output 1 in fan mode: 0 = Fan Off, 1 = Fan Low, 2 = Fan Medium, 3 = Fan High	16 bytes	R
MV 413	DO-01-FAN-OV	Binary Output 1 override value: 0 = Fan Off, 1 = Fan Low 2 = Fan Medium 3 = Fan High 4 = Fan Auto		R/W
BV 511	DO-01-ALA	Fan feedback alarm		R
MV 411	DO-01-ST	Current State for Binary Output 1 – NORMAL/OVERRIDE		R
MV 442	DO-04-FAN	Binary Output 4 in fan mode: 0...3 Fan Off, Fan Low, Fan Medium, Fan High	16 bytes	R
MV 443	DO-04-FAN-OV	Binary Output 4 override value (See MV 413)		R/W
BV 541	DO-04-ALA	Fan feedback alarm		R
MV 441	DO-04-ST	Current State for Binary Output 4 – NORMAL/OVERRIDE		R

Digital Outputs in 3-point floating configuration

Object	Name	Description	Description	R/W
AV 411	DO-01-FLT	Binary Output 1 in analog mode – FLOATING	16bytes	R
AV 412	DO-01-FLT-OV	Binary Output 1 override value		R/W
MV 411	DO-01-ST	Current State for Binary Output 1 – NORMAL/OVERRIDE		R
AV 431	DO-03-FLT	Binary Output 3 in analog mode – FLOATING	16bytes	R
AV 432	DO-03-FLT-OV	Binary Output 3 override value		R/W
MV 431	DO-03-ST	Current State for Binary Output 3 – NORMAL/OVERRIDE		R
AV 451	DO-05-FLT	Binary Output 5 in analog mode – FLOATING	16bytes	R
AV 452	DO-05-FLT-OV	Binary Output 5 override value		R/W
MV 451	DO-05-ST	Current State for Binary Output 5 – NORMAL/OVERRIDE		R

Digital Outputs in PWM configuration

Object	Name	Description	Description	R/W
AV 413	DO-01-PWM	Binary Output 1 in analog mode PWM	16bytes	R
AV 414	DO-01-PWM-OV	Binary Output 1 override value		R/W
MV 411	DO-01-ST	Current State for Binary Output 1 – NORMAL/OVERRIDE		R
AV 423	DO-02-PWM	Binary Output 2 in analog mode PWM	16bytes	R/W
AV 424	DO-02-PWM-OV	Binary Output 2 override value		R/W
MV 421	DO-02-ST	Current State for Binary Output 2 – NORMAL/OVERRIDE		R
AV 433	DO-03-PWM	Binary Output 3 in analog mode PWM	16bytes	R
AV 434	DO-03-PWM-OV	Binary Output 3 override value		R/W
MV 431	DO-03-ST	Current State for Binary Output 3 – NORMAL/OVERRIDE		R
AV 443	DO-04-PWM	Binary Output 4 in analog mode PWM	16bytes	R
AV 444	DO-04-PWM-OV	Binary Output 4 override value		R/W
MV 441	DO-04-ST	Current State for Binary Output 4 – NORMAL/OVERRIDE		R
AV 453	DO-05-PWM	Binary Output 5 in analog mode PWM	16bytes	R
AV 454	DO-05-PWM-OV	Binary Output 5 override value		R/W
MV 451	DO-05-ST	Current State for Binary Output 5 – NORMAL/OVERRIDE		R
AV 463	DO-06-PWM	Binary Output 6 in analog mode PWM	16bytes	R
AV 464	DO-06-PWM-OV	Binary Output 6 override value		R/W
MV 461	DO-06-ST	Current State for Binary Output 6 – NORMAL/OVERRIDE		R

Digital Outputs in binary configuration

Object	Name	Description	Description	R/W
BV 411	DO-01-BIN	Binary Output 1 in binary mode	16bytes	R
BV 412	DO-01-BIN-OV	Binary Output 1 override value		R/W
AV 511	DO-01-RT	Run time totalizer		R
BV 511	DO-01-ALA	Run time limit exceeded		R
MV 411	DO-01-ST	Current State for Binary Output 1 – NORMAL/OVERRIDE		R
BV 421	DO-02-BIN	Binary Output 2 in binary mode	16bytes	R
BV 422	DO-02-BIN-OV	Binary Output 2 override value		R/W
AV 521	DO-02-RT	Run time totalizer		R
BV 521	DO-02-ALA	Run time limit exceeded		R
MV 421	DO-02-ST	Current State for Binary Output 2 – NORMAL/OVERRIDE		R
BV 431	DO-03-BIN	Binary Output 3 in binary mode	16bytes	R
BV 432	DO-03-BIN-OV	Binary Output 3 override value		R/W
AV 531	DO-03-RT	Run time totalizer		R
BV 531	DO-03-ALA	Run time limit exceeded		R
MV 431	DO-03-ST	Current State for Binary Output 3 – NORMAL/OVERRIDE		R
BV 441	DO-04-BIN	Binary Output 4 in binary mode	16bytes	R
BV 442	DO-04-BIN-OV	Binary Output 4 override value		R/W
AV 541	DO-04-RT	Run time totalizer		R
BV 541	DO-04-ALA	Run time limit exceeded		R
MV 441	DO-04-ST	Current State for Binary Output 4 – NORMAL/OVERRIDE		R
BV 451	DO-05-BIN	Binary Output 5 in binary mode	16bytes	R
BV 452	DO-05-BIN-OV	Binary Output 5 override value		R/W
AV 551	DO-05-RT	Run time totalizer		R
BV 551	DO-05-ALA	Run time limit exceeded		R
MV 451	DO-05-ST	Current State for Binary Output 5 – NORMAL/OVERRIDE		R
BV 461	DO-06-BIN	Binary Output 6 in binary mode	16bytes	R
BV 462	DO-06-BIN-OV	Binary Output 6 override value		R/W
AV 561	DO-06-RT	Run time totalizer		R
BV 561	DO-06-ALA	Run time limit exceeded		R
MV 461	DO-06-ST	Current State for Binary Output 6 – NORMAL/OVERRIDE		R

**Efficient use of energy -
for a better future**

Quality - Innovation - Partnership
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