DAIKIN

Network Integration Guide

ED 15103-9

Group: **Controls**
Part Number: **ED 15103**
Date:**August 2021**

MicroTech® III Water Source Heat Pump Unit Controller Protocol Information

LonWorks® Networks
BACnet® Networks (MS/TP)

Enfinity™ Single Stage Compressor Models: MHC/MHW, CCH/CCW, VFC/VFW, LVC/LVW, and VHC/VHF

SmartSource® Single and Two Stage Compressor Models: GSH/GSV, GTH/GTV, and GCV/GTH

Enfinity™ Large Two Compressor Models: CCH/CCW and LVC/LVW

LONMARK® 3.4

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Revision History

ED 15103	Sep-08	Initial release.
ED 15103-1	Mar-10	Changed default baud rate to 38400 (BACnet MS/TP Setup). Corrected range and descriptions of setpoint shift parameters (Protocol Point Summary). Moved BACnet Configuration section (BACnet Configuration). Added references to no flow control (BACnet Configuration and BACnet Terminal Settings). Changed the Type Category for all Multistate Values from Enumerated to Unsigned (Detailed Protocol Point Information). Changed BACnet PICS Application Version to 2.6 and Firmware Revision to 2.7
ED 15103-2	Mar-11	Updated nvoBinaryIn and nvoBinaryOut status for dual compressors or dual stage capacity compressor, with automatic multiple fan speed control. New nciSetpoints heating & cooling “standby” default values. Updated nciHtgSptHiLim and nicClgSptLoLim to also limit long range setpoint adjust input. Added BACnet PIC statement for two-stage compressor control.
ED 15103-3	Jun-12	Added SmartSource variables and updated BACnet PIC statements. Range changes to: nciLowEwtSptGly, nciLowEwtSptWtr. Added new alarms. Modify low pressure alarm delay range. Added the following configuration properties: nciSptAdjMax, nciSptAdjMin, nciLowLwtDiff, nciHydroClgOnSpt. Added the humidistat variables: nviHumidistat and nvoHumidistat. Added the fan switch nviFanOnAuto variable. Deleted Dual Stage compressor references. Updated Daikin McQuay logo and associated references.
ED 15103-4	Jun-16	Modified hydronic heating range and default values. Added note to nviFanOnAuto (MSV3) to indicate auto selection forces cycling fan. Added note to Fan On/Auto Status for SmartSource v6.0 and higher. Added totalizer variables. Added Enfinity Large Two Compressor and SmartSource GCV models. Updated BACnet PIC statements. BACnet device instance updates. Daikin Applied branding, major formatting updates. Corrected MSV:2 and MSV:5 BACnet alarms #13-15.
ED 15103-5	Sep-16	Revised description to Application Mode Input. Also added note to data tables that the following variables revert to default Null after reboot: Application Mode Input, Space Temp Input, Temp Setpoint Input, Temp Setpoint Offset Input, Humidistat Remote Input, Compressor Enable Input, Occ Override Input, Occ Scheduler Input, Occ Sensor Input, Aux Heat Enable Input, Energy Hold Off Input. Changed MSV:1 from Read-only to Commandable in data tables.
ED 15103-6	Jun -17	Updates to formatting. Changed description for AV:24, AV:25, AV:27, AV:28 and nvoSetptShift to indicate the value represents the local hardwired setpoint adjustment value from the room sensor potentiometer.
ED 15103-7	Oct-20	Corrected min value to 0 for: compressor min ON timer & cooling/heating interstage timer (Tbl 17 and 20) and interstage ON/OFF timer (Tbl 21); updated PICs dates, branding and minor formatting changes.
ED 15103-8	Jul-21	Added note 8 to Table 2 for AVs:1-8, AV:31-33 and note 4 to Table 17 for nciSetpoints, removing EEPROM nuisance error alarm support for these affected setpoint parameters. Added Invalid Configuraton alarm table note to BACnet and LonWorks parameters that are affected by this change.
ED 15103-9	Aug-21	Added SmartSource model GCH to cover page and Table 8.

Notice

Limited Warranty

Consult your local Daikin Applied representative for warranty details. To find your local Daikin Applied representative, go to www.DaikinApplied.com.

Reference Documents

Number	Company	Title	Source
078-0014-01G	LonMark® Interoperability Association	LonMark® Layers 1-6 Interoperability Guidelines, Version 3.4	www.lonmark.org
078-0120-01G		LonMark Application Layer Interoperability Guidelines, Version 3.4	
8503		WSHP Functional Profile	
078-0156-01G	Echelon® Corporation	LonWorks® FTT-10A Free Topology Transceiver Users Guide	www.echelon.com
IM 927	Daikin Applied	MicroTech III Water Source Heat Pump LonWorks Communication Module Installation Manual	www.DaikinApplied.com
IM 928		MicroTech III Water Source Heat Pump BACnet Communication Module Installation Manual	
OM 931		MicroTech III Water Source Heat Pump Unit Controller Operation and Maintenance	
OM 1085		MicroTech III Water Source Heat Pump Software Downloading Procedures and Troubleshooting Guide	

Hazardous Information Messages

⚠ CAUTION

Cautions indicate potentially hazardous situations, which can result in personal injury or equipment damage if not avoided.

⚠ WARNING

Warnings indicate potentially hazardous situations, which can result in property damage, severe personal injury, or death if not avoided.

⚠ DANGER

Dangers indicate a hazardous electrical situation which will result in death or serious injury if not avoided.

⚠ NOTICE

Notices give important information concerning a process, procedure, special handling or equipment attributes.

Overview

This document provides the information you need to integrate the MicroTech® III Water Source Heat Pump (WSHP) unit controller from Daikin Applied into a building automation system (BAS). It lists all BACnet® objects and LONWORKS® variables available to the network.

The Introduction gives a basic overview of network concepts and terminology, along with parameter settings that are useful for establishing communication.

The rest of the guide provides the detailed data point tables. See BACnet Configuration and Commissioning and LonWorks Device Management for instructions on how to use configuration and system commissioning and verification tools.

Effective Occupancy Modes includes two tables for both BACnet and LONWORKS Effective Occupancy modes. This is helpful for determining the interaction among the various inputs that ultimately determine the effective occupancy mode of the unit.

The Space Temperature Setpoint Methods section provides the temperature setpoint operation details and diagram.

A separate communication module must be attached to the unit controller to so that it can be configured for network integration.

There are two communication modules: BACnet MS/TP (Master/Slave Token Passing) and LONWORKS (configured for the LonMark Heat Pump standard profile).

The communication module may ship already installed on the unit controller or added as a field-mounted accessory after the unit is on-site. See Reference Documents for the respective communication module installation manual number.

It is assumed that the user is familiar with BACnet or LONWORKS integration. Contact the Daikin Applied Controls Customer Support group at 866-462-7829 or Controls@daikinapplied.com for additional assistance, if necessary.

BACnet Networks

BACnet is a standard communication protocol for Building Automation and Control Networks developed by the American National Standards Institute (ANSI) and American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) specified in ANSI/ASHRAE standard 135-2004 (www.ashrae.org). It addresses all aspects of the various systems that are applied to building control systems. BACnet provides the communication infrastructure needed to integrate products manufactured by different vendors and to integrate building services that are now independent.

BACnet Network Compatibility

The WSHP unit controller is tested according to the BACnet Testing Laboratory (BTL) Test Plan. It is designed to meet the requirements of the BACnet Standard as stated in the Protocol Implementation and Conformance Statement (PICS). However, it is not BTL listed. The PICS are found in Appendix A: Protocol Implementation Conformance Statements (PICS) with separate documents for Enfinity Single Stage Compressor, SmartSource Single and Two Stage Compressor, and Enfinity Large Two Compressor WSHPs.

BACnet Objects

The WSHP unit controller incorporates standard BACnet object types (i.e., object types defined in the BACnet Standard) that conform to the BACnet Standard. Each object has properties that control unit variables or data points. Some object types occur more than once in the unit controller; each occurrence or instance has different properties and controls different unit variables or data points. Each instance is designated with a unique type and instance index. Some properties can be adjusted (read/write properties, e.g., setpoints) from the network and others can only be interrogated (read-only properties, e.g., status information).

Each data point accessible from a BACnet network is described with a detailed table that gives the Object Identifier, Property Identifier, and other information.

LONWORKS Networks

A control network specification for information exchange built upon the use of LonTalk® for transmitting data developed by the Echelon Corporation.

LonTalk Protocol

A protocol developed and owned by the Echelon Corporation. It describes how information is transmitted between devices on a control network.

LonMark Certification

LonMark certification is an official acknowledgement by the LonMark Interoperability Association that a product communicates using the LonTalk protocol and transmits and receives data per a standard LonMark functional profile. The LONWORKS communication module is in accordance with the LonMark Heat Pump with Temperature Control functional profile and is LonMark 3.4 certified. Refer to www.lonmark.org for certification conformance information.

BACnet Network Objects

The following section contains relevant information needed to integrate a MicroTech III WSHP into the BACnet network. The data point differences between the Enfinity™ Single Stage Compressor, and the SmartSource® Two Stage Compressor and Enfinity Large Two Compressor models are highlighted below in the following tables:

- Table 1 - Table 7: Enfinity Single Stage Compressor models MHC/MHW, CCH/CCW, VFC/VFW, LVC/LVW, VHC/VHF (notes for all tables are shown at the end of Table 7)
- Table 8 - Table 14: SmartSource Single and Two Stage Compressor models GSH/GSV, GTH/GTV, GCV/GCH; Enfinity Large Two Compressor models CCH/CCW, LVC/LVW (notes for all tables are shown at the end of Table 14)

The Selected Parameters Information section describes Binary Input Status and Binary Output Status settings in greater detail.

⚠ CAUTION

Please note that anytime a command is written to a configuration property, this information is stored in the unit controller's non-volatile memory. Writing to non-volatile memory is an operation that has a finite limit. For this reason, the number of writes made to BACnet objects linked to configuration properties must be limited to avoid damage to the hardware.

The BACnet Configuration and Commissioning, Effective Occupancy Modes, and Space Temperature Setpoint Methods sections provide supplemental configuration and temperature setpoint operation details. The BACnet PICS for each WSHP model is included at the end of the document. See Appendix A: Protocol Implementation Conformance Statements (PICS).

Refer to OM 1085 Software Downloading Procedures and Troubleshooting Guide, available on www.DaikinApplied.com, for software part number and compatibility details.

BACnet Data Points - Enfinity Single Stage Compressor

Models: MHC/MHW, CCH/CCW, VFC/VFW, LVC/LVW, VHC/VHF

Table 1: Analog Inputs - Enfinity Single Stage Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG INPUTS						
Local Space Temperature Output	AI:1	R	LocalSpaceTemp	0 to 158ºF -17.77 to 70ºC Default: 68ºF / 20ºC	N	The value of the hardwired space temperature sensor installed either in the return air or the space. Writing to Space Temp Input (AV18) does not affect Local Space Temp (AI1) but does effect Effective Space Temp (AV22).[6]
Leaving Water Temperature	AI:2	R	LWT	0 to 158°F -17.77 to 70°C Default: 32ºF / 0ºC	N	Displays the leaving water temperature sensor value.[6]
Entering Water Temperature	AI:3	R	EWT	0 to 158°F -17.77 to 70°C Default: 32ºF / 0ºC	N	Displays the entering water temperature sensor value.[6]
Discharge Air Temperature	AI:4	R	DischAirTemp	0 to 158°F -17.77 to 70°C Default: 32ºF / 0ºC	N	Displays the discharge air temperature sensor value.[6]
Local Setpoint Adjust Output	AI:5	R	LocalSetpt	55 to 95ºF 12.78 to 35ºC Default: 32ºF / 0ºC	N	The reference setpoint used to determine the Effective Heating/Cooling setpoints. It is the value of the local, hardwired space temperature setpoint. It is only valid if the unit controller JP5 configuration jumper is configured for Long Range Setpoint Adjust and is enabled by MSV14.[6] See Effective Occupancy Modes.
Compressor #1 Suction Temperature	AI:6	R	SuctionTemp[1]	0 to 158°F -17.77 to 70°C Default: 32ºF / 0ºC	N	The compressor #1 suction line temperature sensor value.[6]
Compressor #2 Suction Temperature	AI:7	R	SuctionTemp[2]	0 to 158°F -17.77 to 70°C Default: 32ºF / 0ºC	N	The compressor #2 suction line temperature sensor value.[6]
Brownout Voltage Reading	AI:8	R	Brownout	0 to 1023 counts Default: 0	N	The Brownout Voltage Reading is compared to the reference setpoint to determine if the brownout condition exists.

NOTE: Changing a temperature setpoint's minimum or maximum value (as defined in the "Range/Default" column in Table 2 below) may result in an "Out of Range" error. This is due to internal Fahrenheit to Celsius conversions. To prevent this error from occurring, use an offset of 0.1º when writing to a minimum or maximum temperature setpoint value.

Table 2: Analog Values - Enfinity Single Stage Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Occupancy Temperature Setpoint (AV1 to AV6) General Interaction Rules						Defines the Space Temperature Heating and Cooling Setpoints for different occupancy modes. See Effective Occupancy Modes and Space Temperature Setpoint Methods. The Occupancy Temperature Setpoints must be kept in ascending order as follows: AV6 <= AV5 <= AV4 <= AV1 <= AV2 <= AV3
Occupied Cooling Setpoint	AV:1	W	cpOccupied_ Cool_Setpt	50 to 95ºF 10 to 35ºC Default: 75ºF / 23.88ºC	Y	Defines the Space Temperature Setpoint for the Occupied Cooling Setpoint. Interaction Rules[3] • AV1 > (AV4 + AV10) **Unit controller software v3.2 (PN 2506900) and older** • AV1 <= AV30 • AV1 >= AV31
Standby Cool Setpoint	AV:2	W	cpStandby_ Cool_Setpt	50 to 95ºF 10 to 35ºC Default: 77ºF / 25ºC	Y	Defines the Space Temperature Setpoint for the Standby Cool Setpoint. Interaction Rules[3] • AV2 > (AV5 + AV10) • AV1 > (AV4 + AV10) **Unit controller software v3.2 (PN 2506900) and older** • AV1 <= AV30 • AV1 >= AV31
Unoccupied Cool Setpoint	AV:3	W	cpUnoccupied_ Cool_Setpt	50 to 95ºF 10 to 35ºC Default: 85ºF / 29.44ºC	Y	Defines the Space Temperature Setpoint for the Unoccupied Cool Setpoint. Interaction Rules[3]: • AV3 > (AV6 + AV17) • AV1 > (AV4 + AV10) **Unit controller software v3.2 (PN 2506900) and older** • AV1 <= AV30 • AV1 >= AV31
Occupied Heat Setpoint	AV:4	W	cpOccupied_ Heat_Setpt	50 to 95ºF 10 to 35ºC Default: 70ºF / 21.11ºC	Y	Defines the Space Temperature Setpoint for the Occupied Heat Setpoint. Interaction Rules[3] • AV4 < (AV1 – AV10) **Unit controller software v3.2 (PN 2506900) and older** • AV4 <= AV32 • AV4 >= AV33
Standby Heat Setpoint	AV:5	W	cpStandby_	50 to 95ºF 10 to 35ºC Default: 66ºF / 18.88ºC	Y	Defines the Space Temperature Setpoint for the Standby Heat Setpoint. Interaction Rules[3] • AV5 < (AV2 – AV10) **Unit controller software v3.2 (PN 2506900) and older** • AV5 <= AV32 • AV5 >= AV33
Unoccupied Heat Setpoint	AV:6	W	cpUnoccupied_ Heat_Setpt	50 to 95ºF 10 to 35ºC Default: 60ºF / 15.55ºC	Y	Defines the Space Temperature Setpoint for the Unoccupied Heat Setpoint. Interaction Rules[3]: • AV6 < (AV3 – AV17) **Unit controller software v3.2 (PN 2506900) and older** • AV6 <= AV32 • AV6 >= AV33
Local Bypass Time Setpoint	AV:7	W	cpBypassTime	0, 30 to 120 min Default: 120 min	Y	Defines the amount of time that the unit can be in the bypass mode initiated by the Timed Override button. Pressing the Timed Override button 4-9 seconds sets the bypass timer to the maximum AV7 value. The value of 0 disables this feature.
Cooling Interstage Timer	AV:8	W	cpCoolIntStgTmr	0 to 1200 sec Default: 300 sec	Y	A countdown timer that defines the minimum period of time between turn on of the cooling stages.
Brownout Reference Setpoint	AV:9	W	cpBrownoutRef	25 to 1023 counts Default: 400	Y	AV9 is used to detect a unit controller brownout condition. Brownout condition occurs when AI8 < 80% of AV9, and clears when AI8 > 90% of AV9. Note: Only perform the calibration procedure if the unit controller 24VAC voltage is within normal operating parameters. A password of 1023 is required.

Table 2: Analog Values - Enfinity Single Stage Compressor, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Occupied Setpoint Differential	AV:10	W	cpOccDiff	1 to 5°F 0.55 to 2.78°C Default: 1ºF / 0.55ºC	Y	This value represents the Occupied and Standby Setpoint hysteresis to determine the Effective OFF setpoints.
Compressor Low Suction Temp Protection SP for Glycol	AV:11	W	cpLowTempProtGL	0 to 50°F -17.78 to 10°C Default: 6.5ºF/-14.16ºC	Y	AV11 is enabled by the unit controller JP3 jumper in the shorted position, which selects glycol loop fluid. **Unit controller software v3.1 and newer** • Temperature at which a Compressor Low Suction alarm occurs in the Heating mode when the loop fluid is glycol. • AV11 does not apply to the Dehumidification and Cooling modes, which use a fixed 28ºF low temp threshold regardless of the loop fluid type. **Unit controller software v3.0 and older** • Temperature at which a compressor low suction alarm occurs when the loop fluid is glycol.
Compressor Low Suction Temp Protection SP for Water	AV:12	W	cpLowTempProt	0 to 50°F -17.78 to 10°C Default: 28ºF / -2.22ºC	Y	AV12 is enabled by the unit controller JP3 jumper in the open position, which selects water loop fluid. **Unit controller software v3.1 and newer** • Temperature at which a Compressor Low Suction alarm occurs in the Heating mode when the loop fluid is water. • AV12 does not apply to the Dehumidification and Cooling modes, which use a fixed 28ºF low temp threshold regardless of the loop fluid type. **Unit controller software v3.0 and older** • Temperature at which a Compressor Low Suction alarm occurs when the loop fluid is water.
Compressor Low Suction Temp Protection Differential	AV:13	W	cpLowTmpProtDif	2 to 15°F 1.11 to 8.34°C Default: 8°F / 4.44°C	Y	AV13 is added to the selected Compressor Low Suction Temperature SP (AV11 or AV12) to determine the setting at which the alarm clears.
Heating Interstage Timer	AV:14	W	cpHeatIntStgTmr	0 to 1200 sec Default: 300 sec	Y	A countdown timer that defines the minimum period of time between turn on of the heating stages.
Compressor Minimum OFF Timer	AV:15	W	cpMinCompOffTmr	0 to 1200 sec Default: 360 sec (Unit Control v3.1 & Newer) Default: 180 sec (Unit Control v3.0 & Older)	Y	A countdown timer that defines the minimum period of time compressors must remain OFF before it is allowed to turn ON again.
Compressor Minimum ON Timer	AV:16	W	cpMinCompOnTmr	0 to 1200 sec Default: 180 sec	Y	A countdown timer that defines the minimum period of time compressors must remain ON before it is allowed to turn OFF again.
Unoccupied Setpoint Differential	AV:17	W	cpUnoccDiff	2 to 10°F 1.11 to 5.56°C Default: 2ºF / 1.11ºC	Y	Sets the Unoccupied hysteresis to determine the Effective OFF setpoints.
Space Temperature Input	AV:18	C	Network SpaceTemp	14 to 122°F -10 to 50°C Default[6] 621.806ºF 327.67ºC	N	Provides a space temperature value from the network instead of using the local temperature sensor.[6,7] The network override will revert back to its default value upon unit controller reboot.
Temperature Setpoint Input	AV:19	C	Setpoint	50 to 95ºF 10 to 35ºC Default[6] 621.806ºF 327.67ºC	N	Allows the network to set the Reference Setpoint in the Occupied and Standby Occupancy modes. Local setpoint operation must be disabled by MSV14. AV19 always retains the last valid value after power-up.[6] The network override will revert back to its default value upon unit controller reboot. See Space Temperature Setpoint Methods.

Table 2: Analog Values - Enfinity Single Stage Compressor, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Receive Heartbeat	AV:20	W	cpRcvHrtBt	0 to 6553.4 sec Default: 0 (Disabled)	Y	Specifies the maximum amount of time the supported overrides must be refreshed (i.e. written) before the unit reverts back to the default value. Each point supported by Receive Heartbeat has a separate timer associated with it. Only use this feature in BACnet v3.3 software and newer. The value of 0 disables this feature. **Supported Receive Heartbeat points:** • AV 18 • AV 35 • MSV 1 • MSV 8 • MSV 9 • MSV 10 • MSV 11 • MSV 12
Send Heartbeat	AV:21	W	cpSndHrtBt	0 to 6553.4 sec Default: 0 (Disabled)	Y	The Send Heartbeat function is not supported by the BACnet communication module. Use the Change of Value (COV) feature as an alternative.
Effective Space Temperature Output	AV:22	R	EffectSpaceTemp	0 to 158°F -17.78 to 70°C Default[6]: 621.806ºF 327.67ºC	N	Monitors the space temperature that the unit controller uses for control. AV22 uses the AI1 local sensor unless the AV18 network override is a valid value.[6]
Effective Setpoint Output	AV:23	R	EffectSetpt	50 to 95ºF 10 to 35ºC Default[6]: 621.806ºF 327.67ºC	N	Effective Heating or Cooling Setpoint the unit controller is attempting to maintain, which is dependent upon Effective Occupancy (MSV6).[6] See Space Temperature Setpoint Methods.
Occupied Cooling Setpoint Shift Output	AV:24	R	Occupied_CoolShift	-3 to 3ºF -1.67 to 1.67ºC Default: 0ºF	N	Represents the local hardwired setpoint adjustment value from the room sensor potentiometer. It is valid when configured for Short Range Setpoint Adjust.
Standby Cooling Setpoint Shift Output	AV:25	R	Standby _CoolShift	-3 to 3ºF -1.67 to 1.67ºC Default: 0ºF	N	Represents the local hardwired setpoint adjustment value from the room sensor potentiometer. It is valid when configured for Short Range Setpoint Adjust.
Unoccupied Cooling Setpoint Shift Output	AV:26	R	Unoccupied _CoolShift	Default: 0ºF	N	This value represents the Unoccupied Cooling Setpoint Offset that is always 0°F.
Occupied Heating Setpoint Shift Output	AV:27	R	Occupied_HeatShift	-3 to 3ºF -1.67 to 1.67ºC Default: 0ºF	N	Represents the local hardwired setpoint adjustment value from the room sensor potentiometer. It is valid when configured for Short Range Setpoint Adjust.
Standby Heating Setpoint Shift Output	AV:28	R	Standby _HeatShift	-3 to 3ºF -1.67 to 1.67ºC Default: 0ºF	N	Represents the local hardwired setpoint adjustment value from the room sensor potentiometer. It is valid when configured for Short Range Setpoint Adjust.
Unoccupied Heating Setpoint Shift Output	AV:29	R	Unoccupied _HeatShift	Default: 0ºF	N	This value represents the Unoccupied Heating Setpoint offset that is always 0°F.
Cooling Setpoint High Limit	AV:30	W	cpClgSptHiLim[8]	50 to 95ºF 10 to 35ºC Default: 90ºF / 32.22ºC	Y	Maximum value of all the Occupancy Cooling Setpoints. AV30 must be greater than AV31. Applies only to unit controller software v3.2 (PN 2506900) and older.
Cooling Setpoint Low Limit	AV:31	W	cpClgSptLoLim	50 to 95ºF 10 to 35ºC Default: 55ºF / 12.78ºC	Y	Specifies the minimum allowed AI5 Long Range Setpoint adjustment value. **Unit controller software v3.2 (PN 2506900) and older** • Minimum value of all the Occupancy Cooling Setpoints. AV31 must be less than AV30.
Heating Setpoint High Limit	AV:32	W	cpHtgSptHiLim	50 to 95ºF 10 to 35ºC Default: 95ºF / 35ºC	Y	Specifies the maximum allowed AI5 Long Range Setpoint adjustment value. **Unit controller software v3.2 (PN 2506900) and older** • Maximum value of all the Occupancy Heating Setpoints. AV32 must be greater than AV33.
Heating Setpoint Low Limit	AV:33	W	cpHtgSptLoLim[8]	50 to 95ºF 10 to 35ºC Default: 50ºF / 10ºC	Y	Minimum value of all the Occupancy Heating Setpoints. AV33 must be less than AV32. Applies only to unit controller software v3.2 (PN 2506900) and older.
Compressor Low Pressure Alarm Delay	AV:34	W	cpLowPresAlmDly	0 to 120 sec* Default: 30 sec	Y	Specifies the time delay between the Low Pressure Input and alarm generation for compressors.*The range for unit controller software v2.9 and older is 0 to 99 seconds.

Table 2: Analog Values - Enfinity Single Stage Compressor, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Temperature Setpoint Offset Input	AV:35	C	SetptOffset	-18 to +18ºF -10 to +10ºC Default: 0º	N	Shifts the Occupied and Standby Effective Setpoints via the network. The Unoccupied Effective Setpoints are not affected. This is the Short Range Setpoint used when a remote room sensor setpoint adjust is disabled.[7] The network override will revert back to its default value upon unit controller reboot. See Space Temperature Setpoint Methods.
MAC Address / Address Switch	AV:411	W	MacAddress (S3 Address Switch set to 255 - factory default setting)	1 to 127	Y	The function of AV411 depends on the setting of the BACnet communication module physical Address Switch (S3). When the physical address switch is set to a value of 255, the dynamic MAC addressing algorithm is used to commission the BACnet communication module. This variable represents the unit's MAC Address that can be written through the network or through the configuration serial port. When the physical address switch is not set to a value of 255, this network variable represents the setting of the physical address switch, and is read-only.
		R	MacAddressSwitch (S3 Address Switch not physically set to 255)			
System Minimum Instance[4,5]	AV:412	W	SystemMinInstance	0 to 4194302 Default: 3101000	Y	Value of this setting is added to the MAC Address to determine the final BACnet Device Name and Instance Number. Ex: by default, the instance number = 3101007 when the MAC = 7.

Table 3: Binary Inputs - Enfinity Single Stage Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
BINARY INPUTS						
Binary Input Status	BI:1	R	BinaryIn (Description Property)	32 bits	N	Monitors the digital inputs of the unit controller for diagnostic purposes. Each item is reported as a bit so that multiple inputs can be viewed simultaneously. The Present_Value reflects the first status bit (b0), which is the "Normal / Service-Test Mode Jumper" state. All the status bits are returned in the BI1.description property, high bit on the left and low bit on the right. Example: 00000000000000000000000000000001 shows the Normal / Service-Test jumper input is true. See Selected Parameters Information for bit descriptions.

Table 4: Binary Values - Enfinity Single Stage Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
BINARY VALUES						
Clear Alarm	BV:1	W	ClearAlarm	0 to 1 Default: 0	N	Clears the Current Alarm. The alarm that is cleared moves to the Previous Alarm buffer. Value automatically clears after a clear alarm command is issued. 0 = Normal 1 = Clear Alarm
Binary Output Status	BV:2	R	BinaryOut (Description Property)	16 bits	N	Monitors the digital outputs of the unit controller for diagnostic purposes. Each item is reported as a bit so that multiple outputs can be viewed simultaneously. The Present_Value reflects the first status bit (b0), which is the "Compressor #1" state. All the status bits are returned in the BV2.description property, high bit on the left and low bit on the right. Example: 0000000000000001 indicates that the compressor #1 output is active. Array index NULL returns Bit Number 0. See Selected Parameters Information for bit descriptions.

Table 5: Multi-State Inputs - Enfinity Single Stage Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
MULTI-STATE INPUTS						
Condensate Overflow Status	MSI:1	R	CondOverFlow	1 to 3	N	Monitors the Condensate Overflow sensor input. 1 = Dry 2 = Wet 3 = Null (no sensor present)
Fan ON/Auto Switch Status (Room Sensor)	MSI:2	R	FanOnAuto	1 to 3	N	Displays the room sensor fan On/Auto switch position. 1 = On 2 = Auto 3 = Null (no switch present)
System Mode Switch (Heat/Cool/Auto) Status	MSI:3	R	HeatCoolAuto	1 to 5	N	Displays the room sensor System Mode switch (Heat/Cool/Auto) position. 1 = Off 2 = Heat 3 = Cool 4 = Auto 5 = Null (no switch present)

Table 6: Multi-State Values - Enfinity Single Stage Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
MULTI-STATE VALUES						
Compressor Enable Input	MSV:1	C	ComprEnable	1 to 3 Default: 3	N	Specifies if the compressor(s) are allowed to operate, which can be based on proof of loop fluid flow. The loop pump must be running to provide adequate flow through the WSHP. The network override will revert back to its default value upon unit controller reboot. 1 = Disabled 2 = Enabled 3 = Null (compressors are enabled)
Current Alarm	MSV:2	R	CurrentAlarm	1 to 16	N	Displays the current highest priority active alarm. 1 = No Alarms 2 = Low Voltage Brownout 3 = Comp #1 High Pressure 4 = Comp #2 High Pressure 5 = Comp #1 Low Pressure 6 = Comp #2 Low Pressure 7 = Comp #1 Suctn Temp Snsr Fail 8 = Comp #2 Suctn Temp Snsr Fail 9 = Comp #1 Low Suction Temp 10 = Comp #2 Low Suction Temp 11= Room Temp Sensor Fail 12 = Entering Water Temp Sensor Fail 13 = Condensate Overflow 14 = Serial EEPROM Corrupted 15 = Invalid Configuration[9] 16 = Low Entering Water Temp
Fan Speed Output	MSV:3	R	Fan Speed	1 to 5	N	Displays the commanded fan speed. 1 = Off 2 = Low 3 = Medium 4 = High 5 = On
McQuay WSHP Status	MSV:4	R	McQWSHPStatus	1 to 10	N	Indicates the unit's operating state. 1 = Off Alarm 2 = Off* 3 = Start 4 = Fan Only* (fan is allowed to operate) 5 = Prepare to Heat 6 = Heating 7 = Prepare to Cool 8 = Cooling 9 = Prepare to Dehumidify 10 = Dehumidification *State Indications: • **Unit controller software v3.0 and newer:** MSV-4 always matches unit controller state • **Unit controller software v2.9 and older**: When fan is off, MSV-4 indicates Off state, but unit controller is actually in Fan Only mode

Table 6: Multi-State Values - Enfinity Single Stage Compressor, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
MULTI-STATE VALUES						
Previous Alarm	MSV:5	R	PreviousAlarm	1 to 16	N	Indicates the previous unit fault. 1 = No Alarms 2 = Low Voltage Brownout 3 = Comp #1 High Pressure 4 = Comp #2 High Pressure 5 = Comp #1 Low Pressure 6 = Comp #2 Low Pressure 7 = Comp #1 Suctn Temp Snsr Fail 8 = Comp #2 Suctn Temp Snsr Fail 9 = Comp #1 Low Suction Temp 10 = Comp #2 Low Suction Temp 11= Room Temp Sensor Fail 12 = Entering Water Temp Sensor Fail 13 = Condensate Overflow 14 = Serial EEPROM Corrupted 15 = Invalid Configuration[9] 16 = Low Entering Water Temp
Effective Occupancy Output	MSV:6	R	EffectOccup	1 to 5	N	The Occupancy mode being used by the unit controller. The mode depends on Occupancy Schedule, Occupancy Schedule Override, and/or an Occupancy Sensor. MSV6 uses the local sensor unless the MSV7, MSV8, or MSV9 network overrides are not in a Null state. See Effective Occupancy Modes. 1 = Occupied 2 = Unoccupied 3 = Bypass 4 = Standby 5 = Null
Occupancy Override Input	MSV:7	C	OccManCmd	1 to 5 Default: 5	N	Overrides the Occupancy Schedule. Occupancy Schedule Override has priority over the Occupancy Schedule and Remote Occupancy Sensor. It is also where a local timed override hardwired input is monitored and used to place the unit in the Occupied mode during the amount of time declared in Timed Override Setpoint. Schedule Override and/or an Occupancy Sensor. The network override will revert back to its default value upon unit controller reboot. See Effective Occupancy Modes. 1 = Occupied 2 = Unoccupied 3 = Bypass 4 = Standby 5 = Null
Occupancy Scheduler Input	MSV:8	C	OccSchedule	1 to 4 Default: 4	N	Commands the WSHP into different occupancy modes. A scheduler or a supervisory controller typically sends the command using Schedule Override.[7] The network override will revert back to its default value upon unit controller reboot. See Effective Occupancy Modes. 1 = Occupied 2 = Unoccupied 3 = Standby 4 = Null
Occupancy Sensor Input	MSV:9	C	OccSensor	1 to 3 Default: 3	N	Indicates the presence of occupants in the space (motion detection.)[7] The network override will revert back to its default value upon unit controller reboot. See Effective Occupancy Modes. 1 = Occupied 2 = Unoccupied 3 = Null
Application Mode Input	MSV:10	C	ApplicMode	1 to 7 Default: 7 (Null)	N	Sets the unit in an application mode (Auto, Off, Heat, Cool, Dehumidification, or Fan Only). Application Mode does not “force” the unit into any state. However, it does disable certain unit operations. Examples: 1) Application Mode of Cool disables heating, 2) Heat disables cooling and dehumidification, and 3) Fan Only disables heating, cooling, and dehumidification.[7] MSV:10 overrides the local room sensor’s System Mode Switch (Heat/Cool/Auto). The local System Mode Switch is only used when MSV:10 is set to 7 (Null). The network override will revert back to its default value upon unit controller reboot. 1 = Auto 2 = Heat 3 = Cool 4 = Off 5 = Fan Only 6 = Dehumid 7 = Null

Table 6: Multi-State Values - Enfinity Single Stage Compressor, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
MULTI-STATE VALUES						
Auxiliary Heat Enable Input	MSV:11	C	AuxHeatEnable	1 to 3 Default: 3	N	Enables or disables auxiliary heat for units with electric heat. Electric heat is always enabled when it is the only source of heating, and is unaffected by this variable. The default state is Null, in which case auxiliary heat is enabled. The network override will revert back to its default value upon unit controller reboot. 1 = Disabled 2 = Enabled 3 = Null
Energy Hold Off Input	MSV:12	C	EnergyHoldOff	1 to 3 Default: 3	N	When the unit is in the Energy Hold Off mode, the unit uses Standby Setpoints. This command has priority over Effective Occupancy.[7] The network override will revert back to its default value upon unit controller reboot. 1 = Normal 2 = Energy Hold Off 3 = Null
Pump Request Output	MSV:13	R	PumpRequest	1 to 3	N	Indicates when the unit is requesting flow from the loop water controller. The loop pump must be running to provide adequate flow through the unit so the compressor(s) can operate safely. MSV1 can be used by the BAS to indicate if proper loop fluid flow is occurring. 1 = No Request for Flow 2 = Request for Flow 3 = Null
Room Sensor Setpoint Adjust Enable/Disable	MSV:14	W	cpLocSpEnable	1 to 2 Default: 2	Y	Enables or disables the Local Hardwired Setpoint Adjustment. If the value of MSV14 is set to 1, this disables the setpoint control from a room sensor and enables the setpoint control from the BACnet network. 1 = Disabled 2 = Enabled
Units (English/Metric)	MSV:15	W	Units	1 to 2 Default: 1	Y	Both English and Metric units of measure for temperature conversion are supported. This menu selection changes the units for all the appropriate properties in the device. From the network MSV15.Present_Value changes it. Select either “E” for English; or “M” for Metric units from the BACnet configuration menu. See BACnet Configuration and Commissioning. 1 = English (E) 2 = Metric (M)

Table 7: Device Objects - Enfinity Single Stage Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
DEVICE						
Description	Device	W	Description	32 Characters	Y	Text string. Property can be changed through the BACnet configuration menu or BAS. See BACnet Configuration and Commissioning.
Instance	Device	W	Object_Identifier	1 to 4194302	Y	Unique instance number or object-identifier assigned by integrator. See BACnet Configuration and Commissioning.
Location	Device	W	Location	32 Characters	Y	Text string that can be changed through the BACnet configuration menu or BAS. See BACnet Configuration and Commissioning.
Name	Device	W	Object_Name	32 Characters	Y	The following applies when changes are made through the BACnet configuration menu: If a period "." is entered as the first character then the name is set to "MTIIIUC_WSHP_0000000" and the zeros are set to the device instance. If a space character is entered as the first character, then the Device Instance is automatically filled in at the first 0 (zero) character in the name. For example: Assume the Instance has been changed to 321. If the name was previously "WSHP_0000300" and a space is entered at the name prompt, the new name automatically fills in as "WSHP_0000321". If a period is entered at the name prompt, the new name changes to "MTIIIUC_WSHP_0000321".
Software Identification	Device	R	Firmware_Revision	32 Characters	N	The software version of the communication module firmware.
Unit Application Version	Device	R	Application_ Software_Version	32 Characters	N	The software version of the unit controller.
MaxMasters	Device	W	Max_Master	1 to 127 Default: 127	Y	MaxMasters should be set to the highest address of a MS/TP master on the network segment. The default value is 127 for maximum compatibility. Setting this to the highest address of an MS/TP master device on the network reduces the MS/TP token traffic and decreases the response time of the unit controller. MaxMasters can be set from the BAS or from the BACnet configuration menu. See BACnet Configuration and Commissioning.
MS/TP Baud Rate	NA	NA	NA	9600, 19200, 38400, 76800 Default: 38400	Y	Set the baud rate to match the speed of the BACnet network. Speeds above 38400 should be avoided unless the network wiring has been tested and verified to meet the required speed. The baud rate must be set using the BACnet configuration menu. See BACnet Configuration and Commissioning.

1. Parameter is stored in FLASH/EEPROM (non-volatile memory) in either the communication module or in the unit controller. If Non-volatile Memory = Y, then the value is saved through a power cycle. Writes to this parameter must be limited. If Non-volatile Memory = N, the value is not saved through a power cycle.

2. R = Read Only, W = Writeable, C = Commandable

3. The values of the individual Occupancy Temperature Setpoints (AV1 to AV6) must be kept in ascending order as follows:
AV6 <= AV5 <= AV4 <= AV1 <= AV2 <= AV3

4. AV412 has an ObjectName of SystemMinInstance, the Present Value is writeable, and it has a default value of 3101000. During the commissioning process, the present value of AV412 is added to the MAC Address to determine the Device Instance Number. In order to change the value of AV412 on the BACnet communication module in the unconfigured state, the BAS must broadcast a new present value to AV412 using the BACnet service (BIBB – BACnet Interface Building Block) called "Unconfirmed COV" with a ProcessID value of 1. This prevents unauthorized unconfirmed writes, or changes, to AV412. Note that this change affects the AV412 present value for every MicroTech III WSHP BACnet communication module on the trunk.

5. The auto-addressing feature was designed for units communicating to a Daikin System Manager for use with Intelligent Systems™ (IS). However, any BAS can configure a MicroTech III WSHP unit controller with BACnet communication module for auto-addressing. AV412 can be set via the BAS using auto-addressing, but this feature is intended primarily for the MIS controller. See the Daikin System Manager (IS) Operation Manual, OM 1254, and the MicroTech III BACnet MS/TP Communication Module Installation Manual, IM 928, both available on www.DaikinApplied.com, for complete details on using auto-addressing with the System Manager (IS) controller.

6. Analog Null is a discrete temperature value of 621.806ºF/327.67ºC. Its purpose is to indicate a sensor failure condition or when the unit controller is not using that temperature value.

7. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. BACnet device communication control = disable).

8. Applies only to Enfinity Single Stage Compressor software v3.2 (PN 2506900) and older.

9. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

BACnet Data Points - SmartSource Single and Two Stage Compressor, Enfinity Large Two Compressor

SmartSource (Series2) Models: GSH/GSV, GTH/GTV and GCV/GCH
Enfinity Models: (SS2C) CCH/CCW, and LVC/LVW

Table 8: Analog Inputs - SmartSource Single and Two Stage, Enfinity Large Two Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG INPUTS						
Local Space Temperature Output	AI:1	R	LocalSpaceTemp	0 to 158ºF -17.77 to 70ºC Default: 68ºF / 20ºC	N	The value of the hardwired space temperature sensor installed either in the return air or the space. Writing to Space Temp Input (AV18) does not affect Local Space Temp (AI1) but does affect Effective Space Temp (AV22).[6]
Leaving Water Temperature	AI:2	R	LWT	0 to 158°F -17.77 to 70°C Default: 32ºF / 0ºC	N	Indicates the Leaving Water Temperature sensor value.[6]
Entering Water Temperature	AI:3	R	EWT	0 to 158°F -17.77 to 70°C Default: 32ºF / 0ºC	N	Indicates the Entering Water Temperature sensor value.[6]
Discharge Air Temperature	AI:4	R	DischAirTemp	0 to 158°F -17.77 to 70°C Default: 32ºF / 0ºC	N	Indicates the discharge air temperature sensor value.[6]
Local Setpoint Adjust Output	AI:5	R	LocalSetpt	55 to 95ºF 12.78 to 35ºC Default: 32ºF / 0ºC	N	The reference setpoint used to determine the Effective Heating/Cooling setpoints. It is the value of the local, hardwired space temperature setpoint. It is only valid if the unit controller JP5 configuration jumper is configured for Long Range Setpoint Adjust and is enabled by MSV14.[6] See Effective Occupancy Modes.
Compressor #1 Suction Temperature	AI:6	R	CompSuctionTemp (SmartSource) Comp1 SuctionTemp (SS2C)	0 to 158°F -17.77 to 70°C Default: 32ºF / 0ºC	N	Indicates the compressor #1 suction line temperature sensor value.[6]
Compressor #2 Suction Temperature	AI:7	R	CompDischTemp (SmartSource) Comp2 SuctionTemp (SS2C)	0 to 158°F -17.77 to 70°C Default: 32ºF / 0ºC	N	Indicates the compressor #2 suction line temperature sensor value for Enfinity Large Two Compressor (SSC2) units.[6] This variable is not supported by SmartSource unit controllers.
Brownout Voltage Reading	AI:8	R	Brownout	0 to 1023 counts Default: 0	N	The Brownout Voltage Reading is compared to the reference setpoint to determine if the brownout condition exists.

NOTE: Changing a temperature setpoint's minimum or maximum value (as defined in the "Range/Default" column in Table 9 below) may result in an "Out of Range" error. This is due to internal Fahrenheit to Celsius conversions. To prevent this error from occurring, use an offset of 0.1º when writing to a minimum or maximum temperature setpoint value.

Table 9: Analog Values - SmartSource Single and Two Stage, Enfinity Large Two Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Occupancy Temperature Setpoints (AV1 to AV6)						Defines the space temperature heating and cooling setpoints for different occupancy modes. See Effective Occupancy Modes and Space Temperature Setpoint Methods. The Occupancy Temperature setpoints must be kept in ascending order as follows: AV6 <= AV5 <= AV4 <= AV1 <= AV2 <= AV3
Occupied Cooling Setpoint	AV:1	W	cpOccupied_ Cool_Setpt	50 to 95ºF 10 to 35ºC Default: 75ºF / 23.88ºC	Y	Defines the Space Temperature Setpoint for the Occupied Cooling Setpoint. Interaction Rule[3]: AV1 > (AV4 + AV10)
Standby Cool Setpoint	AV:2	W	cpStandby_ Cool_Setpt	50 to 95ºF 10 to 35ºC Default: 77ºF / 25ºC	Y	Defines the Space Temperature Setpoint for the Standby Cool Setpoint. Interaction Rule[3]: AV2 > (AV5 + AV10)
Unoccupied Cool Setpoint	AV:3	W	cpUnoccupied_ Cool_Setpt	50 to 95ºF 10 to 35ºC Default: 85ºF / 29.44ºC	Y	Defines the Space Temperature Setpoint for the Unoccupied Cool Setpoint. Interaction Rule[3]: AV3 > (AV6 + AV17)
Occupied Heat Setpoint	AV:4	W	cpOccupied_ Heat_Setpt	50 to 95ºF 10 to 35ºC Default: 70ºF / 21.11ºC	Y	Defines the Space Temperature Setpoint for the Occupied Heat Setpoint. Interaction Rule[3]: AV4 > (AV1 – AV10)
Standby Heat Setpoint	AV:5	W	cpStandby_ Heat_Setpt	50 to 95ºF 10 to 35ºC Default: 66ºF / 18.88ºC	Y	Defines the Space Temperature Setpoint for the Standby Heat Setpoint. Interaction Rule[3]: AV5 > (AV2 – AV10)
Unoccupied Heat Setpoint	AV:6	W	cpUnoccupied_ Heat_Setpt	50 to 95ºF 10 to 35ºC Default: 60ºF / 15.55ºC	Y	Defines the Space Temperature Setpoint for the Unoccupied Heat Setpoint. Interaction Rule[3]: AV6 > (AV3 – AV17)
Local Bypass Time Setpoint	AV:7	W	cpBypassTime	0, 30 to 120 min Default:120 min	Y	Defines the amount of time that the unit can be in the Bypass mode initiated by the Timed Override button. Pressing the Timed Override button 4-9 seconds sets the bypass timer to the maximum AV7 value. A value of 0 disables this feature.
Interstage OFF Timer	AV:8	W	cpIntStgOffTmr	0 to 1200 sec Default: 0	Y	A countdown timer that defines the minimum period of time between turn-off of the subsequent heating and cooling stages. The Interstage OFF Timer is not supported by unit controller software.
Brownout Reference Setpoint	AV:9	W	cpBrownoutRef	25 to 1023 counts Default: 400	Y	AV9 is used to detect a unit controller brownout condition. Brownout condition occurs when AI8 < 80% of AV9, and clears when AI8 > 90% of AV9. *Only perform the calibration procedure if the unit controller 24VAC voltage is within normal operating parameters. A password of 1023 is required.*
Occupied Setpoint Differential	AV:10	W	cpOccDiff	1 to 5°F 0.55 to 2.78°C Default: 1ºF / 0.55ºC	Y	Configures the Occupied and Standby setpoint hysteresis that determines the Effective OFF setpoints.
Compressor Low Suction Temp Protection Setpoint - Glycol	AV:11	W	cpLowTempProtGL	0 to 50°F -17.78 to 10°C Default: 6.5ºF/-14.16ºC	Y	Temperature at which a Compressor Low Suction alarm occurs in heating mode when the loop fluid is glycol. AV11 is enabled by the unit controller JP3 jumper in the shorted position, which selects glycol. AV11 does not apply to the dehumidification and cooling modes, which use a fixed 28ºF low temp threshold regardless of the loop fluid type.
Compressor Low Suction Temp Protection Setpoint - Water	AV:12	W	cpLowTempProt	0 to 50°F -17.78 to 10°C Default: 28ºF / -2.22ºC	Y	Temperature at which a Compressor Low Suction alarm occurs in the heating mode when the loop fluid is water. AV12 is enabled by the unit controller JP3 jumper in the open position, which selects water. AV12 does not apply to the dehumidification and cooling modes, which use a fixed 28ºF low temp threshold regardless of the loop fluid type.
Compressor Low Suction Temp Protection Differential	AV:13	W	cpLowTmpProtDif	2 to 15°F 1.11 to 8.34°C Default: 8°F / 4.44°C	Y	AV13 is added to the selected Compressor Low Suction Temperature Setpoint (AV11 or AV12) to determine the setting at which the alarm clears.

Table 9: Analog Values - SmartSource Single and Two Stage, Enfinity Large Two Compressor, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Interstage ON Timer	AV:14	W	cpIntStgOnTmr	0 to 1200 sec Default: 300 sec	Y	A countdown timer that defines the minimum period of time between turn-on of the subsequent heating and cooling stages.
Compressor Minimum OFF Timer	AV:15	W	cpMinCompOffTmr	0 to 1200 sec Default: 360 sec*	Y	A countdown timer that defines the minimum period of time a compressor must remain OFF before it is allowed to turn ON again. *A default value of 180 sec applies to the following: • SmartSource (Series2) v5.0 • Enfinity Large Two Compressor (SS2C) v1.0
Compressor Minimum ON Timer	AV:16	W	cpMinCompOnTmr	0 to 1200 sec Default: 180 sec	Y	A countdown timer that defines the minimum period of time a compressor must remain ON before it is allowed to turn OFF again.
Unoccupied Setpoint Differential	AV:17	W	cpUnoccDiff	2 to 10°F 1.11 to 5.56°C Default: 2ºF / 1.11ºC	Y	Sets the Unoccupied hysteresis to determine the Effective OFF setpoints.
Space Temperature Input	AV:18	C	Network SpaceTemp	14 to 122°F -10 to 50°C Default[6]: 621.806ºF 327.67ºC	N	Provides the space temperature value from the network instead of using the local temperature sensor.[6,7] The network override will revert back to its default value upon unit controller reboot.
Temperature Setpoint Input	AV:19	C	Setpoint	50 to 95ºF 10 to 35ºC Default[6]: 621.806ºF 327.67ºC	N	Allows the network to set the reference setpoint in the Occupied and Standby Occupancy modes. Local setpoint operation must be disabled by MSV14. AV19 always retains the last valid value after power-up.[6] The network override will revert back to its default value upon unit controller reboot. See Space Temperature Setpoint Methods.
Receive Heartbeat	AV:20	W	cpRcvHrtBt	0 to 6553.4 sec Default: 0 (Disabled)	Y	Specifies the maximum amount of time the supported overrides must be refreshed (i.e. written) before the unit reverts back to the default value. Each point supported by Receive Heartbeat has a separate timer associated with it. Only use this feature in BACnet v6.2 software and newer. The value of 0 disables this feature. **Supported Receive Heartbeat points** • AV 18 • AV 35 • MSV 1 • MSV 8 • MSV 9 • MSV 10 • MSV 11 • MSV 12
Send Heartbeat	AV:21	W	cpSndHrtBt	0 to 6553.4 sec Default: 0 (Disabled)	Y	Send Heartbeat is not supported by the BACnet communication module. Use the Change of Value (COV) feature as an alternative.
Effective Space Temperature Output	AV:22	R	EffectSpaceTemp	0 to 158°F -17.78 to 70°C Default[6]: 621.806ºF 327.67ºC	N	Monitors the space temperature that the unit uses for control. AV22 uses the AI1 local sensor unless the AV18 network override is a valid value.[6]
Effective Setpoint Output	AV:23	R	EffectSetpt	50 to 95ºF 10 to 35ºC Default[6]: 621.806ºF 327.67ºC	N	Effective Heating or Cooling setpoint the unit is attempting to maintain, which depends on Effective Occupancy (MSV6).[6] See Space Temperature Setpoint Methods.
Setpoint Shift Output	AV:24	R	SetptShift	-5 to 5ºF -2.78 to 2.78ºC Default: 0ºF	N	Represents the local hardwired setpoint adjustment value from the room sensor potentiometer. It is valid when configured for Short Range Setpoint Adjust.
Long Range Setpoint Adjust Maximum	AV:25	W	cpSptAdjMax	55 to 95ºF 12.78 to 35ºC Default: 95ºF / 35ºC	Y	Maximum allowed value of the AI5 Long Range Setpoint Adjust. AV25 must be greater than or equal to AV26.
Long Range Setpoint Adjust Minimum	AV:26	W	cpSptAdjMin	55 to 95ºF 12.78 to 35ºC Default: 55ºF / 12.78ºC	Y	Minimum allowed value of the AI5 Long Range Setpoint Adjust. AV26 must be less than or equal to AV25.

Table 9: Analog Values - SmartSource Single and Two Stage, Enfinity Large Two Compressor, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Hydronic Cooling ON Setpoint	AV:27	W	cpHydroClgOnSpt	50 to 70ºF 10 to 21.12ºC Default: 55ºF / 12.78ºC	Y	Specifies the Entering Water Temperature (EWT) Hydronic Cooling setpoint for units with a waterside economizer. Hydronic cooling is enabled if the EWT is below the value of AV27. It is allowed to operate in conjunction with compressor cooling. If the EWT drops below the fixed value of 35ºF, hydronic cooling is disabled.
Hydronic Setpoint Differential	AV:28	W	cpHydronicDiff	2 to 10ºF 1.11 to 5.56ºC Default: 5ºF / 2.78ºC	Y	Sets the hydronic heating and cooling hysteresis that determines the Effective OFF setpoints.
Low Leaving Water Temp Differential	AV:29	W	cpLowLwtDiff	2 to 15ºF 1.11 to 8.34ºC Default: 7ºF / 3.89ºC	Y	The Low Leaving Water Temperature Differential setpoint is used to calculate the Freeze Fault setpoint. AV29 is added to the selected Compressor Low Suction Temp Protection SP (AV11 or AV12) to then determine the Freeze Fault temperature, which is based on LWT. After the Freeze Fault condition has been activated, the Freeze Fault alarm must be manually reset when the LWT is above the lockout temp for the alarm to clear.
Low EWT Setpoint for Glycol	AV:30	W	cpLowEwtSptGly	15 to 40ºF -9.44 to 4.45ºC Default: 28ºF / -2.22ºC	Y	Value of the Low Entering Water Temperature (EWT) setpoint when using a glycol loop fluid. The compressor(s) are disabled in the heating mode when the low EWT condition exists. Unit controller configuration jumper JP3 must be shorted in order to select glycol as the loop fluid type. The hysteresis differential is fixed at 2ºF.
Low EWT Setpoint for Water	AV:31	W	cpLowEwtSptWtr	40 to 65ºF 4.44 to 18.34ºC Default: 55ºF / 12.78ºC	Y	Value of the Low Entering Water Temperature (EWT) setpoint when using water loop fluid. The compressor(s) are disabled in the heating mode when the low EWT condition exists. Unit controller configuration jumper JP3 must be open in order to select water as the loop fluid type. The hysteresis differential is fixed at 2ºF.
Hydronic Heating ON Setpoint	AV:32	W	cpHydroHtgOnSpt	70 to 158ºF 21.11 to 70ºC Default:* 90ºF / 32.22ºC	Y	Specifies the Entering Water Temperature Hydronic Heating setpoint for units with a hydronic heating coil. Hydronic heating is not allowed to operate in conjunction with compressor heating. *A default value of 70ºF / 21.12ºC applies to the following: • SmartSource (Series2) v6.1 and older • Enfinity Large Two Compressor (SS2C) v1.1 and older
Second Stage Setpoint Differential	AV:33	W	cpStg2SptDiff	1 to 5ºF 0.55 to 2.78ºC Default: 2ºF / 1.11ºC	Y	Determines the Second Stage Heating and Cooling ON setpoints from the First Stage ON setpoints for units controlled by room sensors.
Compressor Low Pressure Alarm Delay	AV:34	W	cpLowPresAlmDly	0 to 120 sec Default: 30 sec	Y	Specifies the time delay between the low pressure input and alarm generation for compressor(s).
Temperature Setpoint Offset Input	AV:35	C	SetptOffset	-18 to +18ºF -10 to +10ºC Default: 0º	N	Shifts the Occupied and Standby Effective Setpoints via the network. The Unoccupied Effective Setpoints are not affected. This is the Short Range Setpoint used when a remote room sensor setpoint adjust is disabled.[7] The network override will revert back to its default value upon unit controller reboot. See Space Temperature Setpoint Methods.
Third Stage Heating Setpoint Differential	AV:36	W	cpStg3SptDiff	1 to 10ºF 0.55 to 5.56ºC Default: 6ºF / 3.33ºC	Y	Determines the Third Stage Heating ON setpoints from the Second Stage ON setpoints for units controlled by room sensors.
Fourth Stage Heating Setpoint Differential	AV:37	W	cpStg4SptDiff	1 to 10ºF 0.55 to 5.56ºC Default: 6ºF / 3.33ºC	Y	Determines the Fourth Stage Heating ON setpoints from the Third Stage ON setpoints for SmartSource (Series2) units controlled by room sensors.
Fan Speed Output	AV:38	R	FanSpeedCmd	0 to 100%	N	Commanded fan speed percentage. AV38 is used in conjunction with MSI-5 to indicate the Fan Runtime and Fan Speed status.
Fan Runtime Totalizer	AV:39	W	FanRunHours	0 to 65535 Hours Default: 0	Y	Total fan runtime hours.[8]

Table 9: Analog Values - SmartSource Single and Two Stage, Enfinity Large Two Compressor, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Compressor #1 Runtime Totalizer	AV:40	W	CompRunHours SmartSource (Series2) Comp1RunHours Enfinity Large Two Compressor (SS2C)	0 to 65535 Hours Default: 0	Y	Total compressor (Series2) or compressor #1 (SS2C) runtime hours.[8]
Compressor #1 Starts Totalizer	AV:41	W	CompStarts SmartSource (Series2) Comp1Starts Enfinity Large Two Compressor (SS2C)	0 to 65535 Starts Default: 0	Y	Total compressor (Series2) or compressor #1 (SS2C) starts.[8]
Compressor #2 Runtime Totalizer	AV:42	W	CompHiCap RunHours SmartSource (Series2) Comp2RunHours Enfinity Large Two Compressor (SS2C)	0 to 65535 Hours Default: 0	Y	Total compressor high capacity (Series2) or compressor #2 (SS2C) runtime hours.[8]
Compressor #2 Starts Totalizer	AV:43	W	CompHiCapStarts SmartSource (Series2) Comp2Starts Enfinity Large Two Compressor (SS2C)	0 to 65535 Starts Default: 0	Y	Total compressor high capacity (Series2) or compressor #2 (SS2C) starts.[8]
MAC Address / Address Switch	AV:411	W	MacAddress (S3 Address Switch set to 255 - factory default setting)	1 to 127	Y	The function of AV411 depends on the setting of the BACnet communication module physical Address Switch (S3). When the physical address switch is set to a value of 255, the dynamic MAC addressing algorithm is used to commission the BACnet communication module. This variable represents the unit's MAC Address that can be written through the network or through the configuration serial port. When the physical address switch is not set to a value of 255, it represents the setting of the physical address switch and is read-only.
		R	MacAddressSwitch (S3 Address Switch not physically set to 255)			
System Minimum Instance[4,5]	AV:412	W	SystemMinInstance	0 to 4194302 Default: 3101000	Y	This value is added to the MAC Address to determine the final BACnet Device Name and Device Instance Number. Example: the default Device Instance Number = 3101007 when the MAC = 7.

Table 10: Binary Inputs - SmartSource Single and Two Stage, Enfinity Large Two Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Binary Input Status	BI:1	R	BinaryIn (Description Property)	32 bits	N	Monitors the digital inputs of the unit controller for diagnostic purposes. Each item is reported as a bit so that multiple inputs can be viewed simultaneously. The Present_Value reflects the first status bit (b0), which is the "Normal / Service-Test Mode Jumper" state. All the status bits are returned in the BI1.description property, high bit on the left and low bit on the right. Example: 00000000000000000000000000000001 indicates that the Normal / Service-Test jumper input is true. See Selected Parameters Information for bit descriptions.

Table 11: Binary Values - SmartSource Single and Two Stage, Enfinity Large Two Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
BINARY VALUES						
Clear Alarm	BV:1	W	ClearAlarm	0 to 1 Default: 0	N	Clears the Current Alarm. The alarm that is cleared moves to the Previous Alarm buffer. Value automatically clears after a clear alarm command is issued. 0 = Normal 1 = Clear Alarm
Binary Output Status	BV:2	R	BinaryOut (Description Property)	16 bits	N	Monitors the digital outputs of the unit controller for diagnostic purposes. Each item is reported as a bit so that multiple outputs can be viewed simultaneously. The Present_Value reflects the first status bit (b0), which is the "Compressor #1" state. All the status bits are returned in the BV2.description property, high bit on the left and low bit on the right. Example: 0000000000000001 indicates that the compressor #1 output is active. Array index NULL returns Bit Number 0. See Selected Parameters Information for bit descriptions.

Table 12: Multi-State Inputs - SmartSource Single and Two Stage, Enfinity Large Two Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
MULTI-STATE INPUTS						
Condensate Overflow Status	MSI:1	R	CondOverFlow	1 to 3	N	Monitors the condensate overflow sensor input. 1 = Dry 2 = Wet 3 = Null (no sensor present)
Fan ON/Auto Switch Status (Room Sensor)	MSI:2	R	FanOnAuto	1 to 3	N	Displays the room sensor fan On/Auto switch position. 1 = On 2 = Auto 3 = Null (no switch present)
System Mode Switch (Heat/Cool/Auto) Status	MSI:3	R	HeatCoolAuto	1 to 5	N	Displays the room sensor System Mode switch (Heat/Cool/Auto) position. 1 = Off 2 = Heat 3 = Cool 4 = Auto 5 = Null (no switch present)
Humidistat Sensor Status	MSI:4	R	Humidistat	1 to 3	N	Status of the Humidistat/Cooling Stage #1 sensor input. Signal input represents "Humidistat" for units with the HGR option. Otherwise, this value represents the thermostat "Cooling Stage #1" request. 1 = Not Humid (Inactive 24VAC Input) 2 = Is Humid (Active 24VAC Input) 3 = Null
Fan Running Output	MSI:5	R	FanRunStatus	1 to 2	N	Commanded fan run status. MSI-5 is used in conjunction with AV38 to indicate the Fan Runtime and Fan Speed status. Fan OFF/ON Command: 1 = Fan is off 2 = Fan is running

Table 13: Multi-State Values - SmartSource Single and Two Stage, Enfinity Large Two Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
MULTI-STATE VALUES						
Compressor Enable Input	MSV:1	C	ComprEnable	1 to 3 Default: 3	N	Specifies if the compressor(s) are allowed to operate, which can be based on proof of loop fluid flow. The loop pump must be running to provide adequate flow through the unit so the compressor(s) can operate safely. The network override will revert back to its default value upon unit controller reboot. 1 = Disabled 2 = Enabled 3 = Null (compressors are enabled)
Current Alarm	MSV:2	R	CurrentAlarm	SmartSource (Series2) 1 to 16 Enfinity Large Two Compressor (SS2C) 1 to 20	N	Displays the current highest priority active alarm **SmartSource (Series2) Alarms** 1 = No Alarms 2 = IO Exp Communication Fail 3 = Invalid Configuration[9] 4 = Low Voltage Brownout 5 = Comp High Pressure 6 = Comp Low Pressure 7 = Comp Suction Temp Snsr Fail 8 = Comp Low Suction Temp 9 = Freeze Fault Detect 10 = Room Temp Sensor Fail 11 = Enter Water Temp Snsr Fail 12 = Leaving Water Temp Snsr Fail 13 = Condensate Overflow 14 = Low Entering Water Temp 15 = Serial EEPROM Corrupted 16 = Wtrside Econ Low Temp Cutout **Enfinity Large Two Compressor (SS2C) Alarms** 1 = No Alarms 2 = IO Exp Communication Fail 3 = Invalid Configuration[9] 4 = Low Voltage Brownout 5 = Comp #1 High Pressure 6 = Comp #2 High Pressure 7 = Comp #1 Low Pressure 8 = Comp #2 Low Pressure 9 = Comp #1 Suctn Temp Snsr Fail 10 = Comp #2 Suctn Temp Snsr Fail 11 = Comp #1 Low Suction Temp 12 = Comp #2 Low Suction Temp 13 = Freeze Fault Detect 14 = Room Temp Sensor Fail 15 = Entering Water Temp Sensor Fail 16 = Leaving Water Temp Snsr Fail 17 = Condensate Overflow 18 = Low Entering Water Temp 19 = Serial EEPROM Corrupted 20 = Wtrside Econ Low Temp Cutout
Fan ON/Auto Remote Input	MSV:3	C	RemoteFanOnAuto	1 to 3 Default: 3	N	Overrides the local fan ON/Auto room sensor and thermostat switch inputs, and the JP2 configuration jumper. The local Fan ON/Auto Switch is only used when MSV:3 is set to 3 (Null). The network override will revert back to its default value upon unit controller reboot. 1 = Fan Auto 2 = Fan On (forces fan on) 3 = Null (no override)
McQuay WSHP Status	MSV:4	R	McQWSHPStatus	1 to 10	N	Indicates the unit's operating state. 1 = Off Alarm 2 = Off 3 = Start 4 = Fan Only (fan is allowed to operate) 5 = Prepare to Heat 6 = Heating 7 = Prepare to Cool 8 = Cooling 9 = Prepare to Dehumidify 10 = Dehumidification

Table 13: Multi-State Values - SmartSource Single and Two Stage, Enfinity Large Two Compressor, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
MULTI-STATE VALUES						
Previous Alarm	MSV:5	R	PreviousAlarm	SmartSource (Series2) 1 to 16 Enfinity Large Two Compressor (SS2C) 1 to 20	N	Indicates the previous unit fault. **SmartSource (Series2) Alarms** 1 = No Alarms 2 = IO Exp Communication Fail 3 = Invalid Configuration[9] 4 = Low Voltage Brownout 5 = Comp High Pressure 6 = Comp Low Pressure 7 = Comp Suction Temp Snsr Fail 8 = Comp Low Suction Temp 9 = Freeze Fault Detect 10 = Room Temp Sensor Fail 11 = Enter Water Temp Snsr Fail 12 = Leaving Water Temp Snsr Fail 13 = Condensate Overflow 14 = Low Entering Water Temp 15 = Serial EEPROM Corrupted 16 = Wtrside Econ Low Temp Cutout **Enfinity Large Two Compressor (SS2C) Alarms** 1 = No Alarms 2 = IO Exp Communication Fail 3 = Invalid Configuration[9] 4 = Low Voltage Brownout 5 = Comp #1 High Pressure 6 = Comp #2 High Pressure 7 = Comp #1 Low Pressure 8 = Comp #2 Low Pressure 9 = Comp #1 Suctn Temp Snsr Fail 10 = Comp #2 Suctn Temp Snsr Fail 11 = Comp #1 Low Suction Temp 12 = Comp #2 Low Suction Temp 13 = Freeze Fault Detect 14 = Room Temp Sensor Fail 15 = Entering Water Temp Sensor Fail 16 = Leaving Water Temp Snsr Fail 17 = Condensate Overflow 18 = Low Entering Water Temp 19 = Serial EEPROM Corrupted 20 = Wtrside Econ Low Temp Cutout
Effective Occupancy Output	MSV:6	R	EffectOccup	1 to 5	N	Indicates the unit's current occupancy mode. The mode tin which the unit operates depends on Occupancy Schedule, Occupancy Schedule Override, and/or an Occupancy Sensor. MSV6 uses the local sensor unless the MSV7, MSV8, or MSV9 network overrides are not in a Null state. See Effective Occupancy Modes. 1 = Occupied 2 = Unoccupied 3 = Bypass 4 = Standby 5 = Null
Occupancy Override Input	MSV:7	C	OccManCmd	1 to 5 Default: 5	N	Overrides the Occupancy Schedule. Occupancy Schedule Override has priority over the Occupancy Schedule and Remote Occupancy Sensor. It also monitors the Local Timed Override hardwired input that places the unit in the Occupied mode during the amount of time declared in Timed Override Setpoint. Schedule Override and/or an Occupancy Sensor. The network override will revert back to its default value upon unit controller reboot. See Effective Occupancy Modes. 1 = Occupied 2 = Unoccupied 3 = Bypass 4 = Standby 5 = Null
Occupancy Scheduler Input	MSV:8	C	OccSchedule	1 to 4 Default: 4	N	Commands the WSHP into different occupancy modes. A scheduler or a supervisory controller typically sends the command using Schedule Override.[7] The network override will revert back to its default value upon unit controller reboot. See Effective Occupancy Modes. 1 = Occupied 2 = Unoccupied 3 = Standby 4 = Null

Table 13: Multi-State Values - SmartSource Single and Two Stage, Enfinity Large Two Compressor, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
MULTI-STATE VALUES						
Occupancy Sensor Input	MSV:9	C	OccSensor	1 to 3 Default: 3	N	Indicates the presence of occupants in the space (motion detection).[7] The network override will revert back to its default value upon unit controller reboot. See Effective Occupancy Modes. 1 = Occupied 2 = Unoccupied 3 = Null
Application Mode Input	MSV:10	C	ApplicMode	1 to 7 Default: 7 (Null)	N	Sets the unit in an application mode (Auto, Off, Heat, Cool, Dehumidification, or Fan Only). Application Mode does not "force" the unit into any state. However, it does disable certain unit operations. Examples: 1) Application Mode of Cool disables heating, 2) Heat disables cooling and dehumidification, and 3) Fan Only disables heating, cooling, and dehumidification.[7] MSV:10 overrides the local room sensor's System Mode Switch (Heat/Cool/Auto). The local System Mode Switch is only used when MSV:10 is set to 7 (Null). The network override will revert back to its default value upon unit controller reboot. 1 = Auto 2 = Heat 3 = Cool 4 = Off 5 = Fan Only 6 = Dehumid 7 = Null
Auxiliary Heat Enable Input	MSV:11	C	AuxHeatEnable	1 to 3 Default: 3	N	Enables or disables auxiliary heat for units with electric heat. Electric heat is always enabled when it is the only source of heating, and is unaffected by this variable. The default state is Null, in which case auxiliary heat is enabled.[7] The network override will revert back to its default value upon unit controller reboot. 1 = Disabled 2 = Enabled 3 = Null
Energy Hold Off Input	MSV:12	C	EnergyHoldOff	1 to 3 Default: 3	N	When the unit is in the Energy Hold Off mode, the unit uses Standby setpoints. This command has priority over Effective Occupancy.[7] The network override will revert back to its default value upon unit controller reboot. 1 = Normal 2 = Energy Hold Off 3 = Null
Pump Request Output	MSV:13	R	PumpRequest	1 to 3	N	Indicates when the unit is requesting flow from the loop water controller. The loop pump must be running to provide adequate flow through the unit so the compressor(s) can operate safely. MSV1 can be used by the BAS to indicate if proper loop fluid flow is occurring. 1 = No Request for Flow 2 = Request for Flow 3 = Null
Room Sensor Setpoint Adjust Enable/Disable	MSV:14	W	cpLocSpEnable	1 to 2 Default: 2	Y	Enables or disables the local hardwired setpoint adjustment. If the value of MSV14 is set to 1, this disables the setpoint control from a room sensor and enables the setpoint control from the network. 1 = Disabled 2 = Enabled
Units (English/Metric)	MSV:15	W	Units	1 to 2 Default: 1	Y	Both English and Metric units of measure for temperature conversion are supported. This menu selection changes the units for all the appropriate properties in the device. From the network MSV15.Present_Value changes it. Select either "E" for English; or "M" for Metric units from the BACnet configuration menu. See BACnet Configuration and Commissioning. 1 = English (E) 2 = Metric (M)
Humidistat Remote Input	MSV:16	C	RemoteHumidistat	1 to 3 Default: 3	N	Overrides the Local Humidistat/Stage #1 Cooling thermostat input. The network override will revert back to its default value upon unit controller reboot. 1 = No Dehumid Request 2 = Request Dehumidification 3 = Null

Table 14: Device Objects - SmartSource Single and Two Stage, Enfinity Large Two Compressor

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
DEVICE						
Description	Device	W	Description	32 Characters	Y	Text string. Property can be changed through the BACnet configuration menu or the BAS. See BACnet Configuration and Commissioning.
Instance	Device	W	Object_Identifier	1 to 4194302	Y	Unique Instance Number or object-identifier assigned by integrator. See BACnet Configuration and Commissioning.
Location	Device	W	Location	32 Characters	Y	Text string that can be changed through the BACnet configuration menu or the BAS. See BACnet Configuration and Commissioning.
Name	Device	W	Object_Name	32 Characters	Y	The following applies when changes are made through the BACnet configuration menu: If a period "." is entered as the first character, then the name is set to "MTIIIUC_WSHP_Ser2_0000000" and the zeros are set to the Device Instance. If a space character is entered as the first character, then the Device Instance is automatically filled in at the first 0 (zero) character in the name. Example: the Device Instance has been changed to 321. If the name was previously "WSHP_Ser2_0000300" and a space is entered at the name prompt, the new name automatically fills in as "WSHP_Ser2_0000321". If a period is entered at the name prompt, the new name changes to "MTIIIUC_WSHP_Ser2_0000321". **Device Prefixes** • SmartSource (Series2): "MTIIIUC_WSHP_Ser2_" • Enfinity Large Two Compressor (SS2C): "MTIIIUC_WSHP_SS2C_"
Software Identification	Device	R	Firmware_Revision	32 Characters	N	The software version of the communication module firmware.
Unit Application Version	Device	R	Application_ Software_Version	32 Characters	N	The software version of the unit controller.
MaxMasters	Device	W	Max_Master	1 to 127 Default: 127	Y	MaxMasters should be set to highest address of a MS/TP master on the network segment. The default value is 127 for maximum compatibility. Setting this to the highest address of an MS/TP master device on the network reduces the MS/TP token traffic and decreases the response time of the unit controller. MaxMasters can be set from the BAS or from the BACnet configuration menu. See BACnet Configuration and Commissioning.
MS/TP Baud Rate	NA	NA	NA	9600, 19200, 38400, 76800 Default: 38400	Y	Set the baud rate to match the speed of the network. Speeds above 38400 should be avoided unless the network wiring has been tested and verified to meet the required speed. The baud rate must be set using the BACnet configuration menu. See BACnet Configuration and Commissioning.

1. Parameter is stored in FLASH/EEPROM (non-volatile memory) in either the communication module or in the unit controller. If Non-volatile Memory = Y, then the value is saved through a power cycle. Writes to this parameter must be limited. If Non-volatile Memory = N, the value is not saved through a power cycle.

2. R = Read Only, W = Writeable, C = Commandable

3. The values of the individual Occupancy Temperature Setpoints (AV1 to AV6) must be kept in ascending order as follows:
AV6 <= AV5 <= AV4 <= AV1 <= AV2 <= AV3

4. AV412 has an ObjectName of SystemMinInstance, the Present Value is writeable, and it has a default value of 3101000. During the commissioning process, the present value of AV412 is added to the MAC Address to determine the Device Instance Number. In order to change the value of AV412 on the BACnet communication module in the unconfigured state, the BAS must broadcast a new present value to AV412 using the BACnet service (BIBB – BACnet Interface Building Block) called "Unconfirmed COV" with a ProcessID value of 1. This prevents unauthorized unconfirmed writes, or changes, to AV412. Note that this change affects the AV412 present value for every water source heat pump BACnet communication module on the trunk.

5. The auto-addressing feature was designed for units communicating to a Daikin System Manager for use with Intelligent Systems™ (IS). However, any BAS can configure a MicroTech III WSHP unit controller with BACnet communication module for auto-addressing. AV412 can be set via the BAS using auto-addressing, but this feature is intended primarily for the MIS controller. See the Daikin System Manager (IS) Operation Manual, OM 1254, and the MicroTech III BACnet MS/TP Communication Module Installation Manual, IM 928, both available on www.DaikinApplied.com, for complete details on using auto-addressing with the System Manager (IS) controller.

6. Analog Null is a discrete temperature value of 621.806ºF/327.67ºC. Its purpose is to indicate a sensor failure condition or when the unit controller is not using that particular temperature value.

7. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. BACnet device communication control = disable).

8. The totalizer continues to increment until the maximum count is reached, at which point the BAS must reset the value by issuing a write command. Variable is saved in nonvolatile memory every 24 hours. If power is lost, that day's totalizer information is not stored.

9. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

LonWorks Network Variables

The following section contains relevant information needed to integrate a MicroTech III WSHP into the LonWorks network. Refer to the appropriate data table based on the WSHP model. The data point differences between the Enfinity Single Stage Compressor and the SmartSource Two Stage Compressor/ Enfinity Large Two Compressor models are highlighted below in the following tables.

⚠ CAUTION

Please note that anytime a command is written to a configuration property input (nci), this information is stored in the unit controller's non-volatile memory. Writing to non-volatile memory is an operation that has a finite limit. For this reason, the number of writes made to configuration properties must be limited in order to avoid damage to the hardware.

Refer to the Selected Parameters Information section that follows these tables for the LonWorks parameters that require additional explanation. Also see LonWorks Device Management and Space Temperature Setpoint Methods.

Enfinity Single Stage Compressor

Models: MHC/MHW, CCH/CCW, VFC/VFW, LVC/ LVW, and VHC/VHF models

- Table 15: Network variable inputs (NVIs)
- Table 16: Network variable outputs (NVOs)
- Table 17: Configuration properties (NCIs)

SmartSource Single and Two Stage and Enfinity Large Two Compressor

SmartSource Models: GSH/GSV, GTH/GTV, GCV Enfinity Models: CCH/CCW and LVC/LVW

- Table 18: Network variable inputs (NVIs)
- Table 19: Network variable outputs (NVOs)
- Table 20: Configuration properties (NCIs)

Table 15: Network Variable Inputs (NVIs) - Enfinity Single Stage Compressor

Point Name	LonWorks Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Inputs (NVIs)					
Application Mode Input	nviApplicMode (4)	SNVT_hvac_mode (108)	Default: HVAC_NUL	Recv	Sets the unit in an application mode (Auto, Off, Heat, Cool, Dehumidification, or Fan Only). Application Mode does not "force" the unit into any state. However, it does disable certain unit operations. Examples: 1) Application Mode of Cool disables heating, 2) Heat disables cooling and dehumidification, and 3) Fan Only disables heating, cooling, and dehumidification.[3] nviApplicMode overrides the local room sensor's System Mode Switch (Heat/Cool/Auto). The local System Mode Switch is only used when nviApplicMode is set to HVAC_NUL. The network override will revert back to its default value upon unit controller reboot. **Supported Values** 0 = HVAC_AUTO 1 = HVAC_HEAT 3 = HVAC_COOL 6 = HVAC_OFF 9 = HVAC_FAN_ONLY 14 = HVAC_DEHUMID -1 (0xFF) = HVAC_NUL
Auxiliary Heat Enable Input	nviAuxHeatEnable (5)	SNVT_switch (95)	Default: Null	Recv	Enables or disables auxiliary heat units with electric heat. Electric heat is always enabled when it is the only source of heating, and is unaffected by this variable. The default state is Null, in which case auxiliary heat is enabled.[3] The network override will revert back to its default value upon unit controller reboot. **Selection / State / Value** Disabled / 0 / 0 to 100% Disabled / 1 / 0% Enabled / 1 / 0.5 to 100% Null / -1 / 0 to 100% (Enabled)

1. Analog Null (0x7FFF) is a discrete temperature value of 621.806ºF/327.67ºC. Its purpose is to indicate a sensor failure condition or when the unit controller is not using that temperature value.
2. The Network Variable (NV) index number is a unique identifier for certain LonWorks variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.
3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

Table 15: Network Variable Inputs (NVIs) - Enfinity Single Stage Compressor, Continued

Point Name	LONWORKS Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Inputs (NVIs)					
Clear Alarm	nviClearAlarm (9)	SNVT_switch (95)	Default: Normal	No	Clears the Current Alarm. The alarm that is cleared moves to the Previous Alarm buffer. Value automatically clears after a clear alarm command is issued. The unit controller automatically returns both the state and value parameters to 0 once the alarm is cleared. **Selection State Value** Normal 0 0% Clear Alarm 1 0.5 to 100%
Compressor Enable	nviComprEnable (6)	SNVT_switch (95)	Default: Null	Recv	Specifies if the compressors are allowed to operate, which can be based on proof of loop fluid flow. The loop pump must be running to provide adequate flow through the unit so the compressors can operate safely. The network override will revert back to its default value upon unit controller reboot. **Selection State Value** Disabled 0 or 1 0% Enabled 0 or 1 0.5 to 100% Null -1 0 to 100% (Enabled)
Energy Hold Off Input	nviEnergyHoldOff (97)	SNVT_switch (95)	Default: Null	Recv	When the unit is in the Energy Hold Off mode, the Standby setpoints are used. This command has priority over Effective Occupancy.[3] The network override will revert back to its default value upon unit controller reboot. **Selection State Value** Normal 0 0 to 100% Normal 1 0% HoldOff 1 0.5 to 100% Null -1 0 to 100% (Normal)
Occupancy Override Input	nviOccManCmd (8)	SNVT_occupancy (109)	Default: OC_NUL	No	Overrides the Occupancy Schedule. Occupancy Schedule Override has priority over the Occupancy Schedule and Remote Occupancy Sensor. It is also where a local timed override hardwired input is monitored and used to place the unit in the Occupied mode during the amount of time declared in Timed Override setpoint using Schedule Override or an occupancy sensor. The network override will revert back to its default value upon unit controller reboot. See Effective Occupancy Modes. **Supported Values** 0 = OC_OCCUPIED 1 = OC_UNOCCUPIED 2 = OC_BYPASS 3 = OC_STANDBY -1 (0xFF) = OC_NUL
Occupancy Scheduler Input	nviOccSchedule (10)	SNVT_tod_event (128)	Default: OC_NUL	Recv	Commands the WSHP into different occupancy modes. A scheduler or a supervisory controller typically sends the command using Schedule Override.[3] The network override will revert back to its default value upon unit controller reboot. See Effective Occupancy Modes. **Supported Current_state Values** 0 = OC_OCCUPIED 1 = OC_UNOCCUPIED 3 = OC_STANDBY -1 (0xFF) = OC_NUL • Next_state is not used • Time_to_next_state is not used
Occupancy Sensor Input	nviOccSensor (11)	SNVT_occupancy (109)	Default: OC_NUL	Recv	Indicates the presence of occupants in the space (motion detection.)[3] The network override will revert back to its default value upon unit controller reboot. See Effective Occupancy Modes. **Supported Values** 0 = OC_OCCUPIED 1 = OC_UNOCCUPIED -1 (0xFF) = OC_NUL

1. Analog Null (0x7FFF) is a discrete temperature value of 621.806ºF/327.67ºC. Its purpose is to indicate a sensor failure condition or when the unit controller is not using that temperature value.

2. The Network Variable (NV) index number is a unique identifier for certain LONWORKS variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

Table 15: Network Variable Inputs (NVIs) - Enfinity Single Stage Compressor, Continued

Point Name	LonWorks Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Inputs (NVIs)					
Request	nviRequest (0)	SNVT_obj_request	Default: 0, RQ_NORMAL	No	Requests mode status information or sets operating mode for a specific function block. The response is indicated in nvoStatus. **Fields** • object_id: 0=Node Obj, 1=McQuaySCC_WSHP • object_request: (See Supported Requests) **Supported Requests** 0 = RQ_NORMAL 2 = RQ_UPDATE_STATUS 5 = RQ_REPORT_MASK
Space Temperature Input	nviSpaceTemp (3)	SNVT_temp_p (105)	14 to 122°F -10 to 50ºC Default[1]: 621.806ºF 327.67ºC	Recv	Provides space temperature from the network as an option instead of using the local temperature sensor.[1,3] The network override will revert back to its default value upon unit controller reboot.
Temperature Setpoint Input	nviSetpoint (13)	SNVT_temp_p (105)	50 to 95ºF 10 to 35ºC Default[1]: 621.806ºF 327.67ºC	No	Allows the network to set the reference setpoint in the Occupied and Standby Occupancy modes. Local setpoint operation must be disabled by nciLocSptEnable. nviSetpoint always retains the last valid value after power-up.[1] The network override will revert back to its default value upon unit controller reboot. See Space Temperature Setpoint Methods.
Temperature Setpoint Offset Input	nviSetptOffset (12)	SNVT_temp_p (105)	-18 to +18ºF -10 to +10ºC Default: 0ºF	Recv	Shifts the Occupied and Standby Effective Setpoints via the network. The Unoccupied Effective Setpoints are not affected. This is the Short Range Setpoint used when a remote room sensor setpoint adjust is disabled.[3] The network override will revert back to its default value upon unit controller reboot See Space Temperature Setpoint Methods. LonMark requires nviSetptOffset to be a SNVT_temp_p type, which includes the 32°F offset. The network usable range is 14 to 50°F, which is converted to a differential temperature (SNVT_temp_p_diff) by subtracting 32°F in the communication module, resulting in an Effective Offset range of -18 to +18°F.

1. Analog Null (0x7FFF) is a discrete temperature value of 621.806ºF/327.67ºC. Its purpose is to indicate a sensor failure condition or when the unit controller is not using that temperature value.

2. The Network Variable (NV) index number is a unique identifier for certain LonWorks variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

Table 16: Network Variable Outputs (NVOs) - Enfinity Single Stage Compressor

Point Name	LONWORKS Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Outputs (NVOs)					
Binary Input Status	nvoBinaryIn (16)	SNVT_state (83)	32 bits Init: All bits = 0	No	Monitors the digital inputs of the unit controller for diagnostic purposes. Each item is reported as a bit so that multiple inputs can be viewed simultaneously. Physical input status bits. See Selected Parameters Information for bit descriptions.
Binary Output Status	nvoBinaryOut (17)	SNVT_state (83)	16 bits Init: All bits = 0	No	Monitors the digital outputs of the unit controller for diagnostic purposes. Each item is reported as a bit so that multiple outputs can be viewed simultaneously. Physical output status bits. See Selected Parameters Information for bit description and output settings for valves and electric heat options.
Brownout Voltage Reading	nvoBrownout (34)	SNVT_count (8)	0 to 1023 counts Default: 500	No	The Brownout Voltage Reading is compared to the reference setpoint in order to determine if a brownout condition exists.
Compressor #1 Suction Temperature	nvoSuctionTemp1 (29)	SNVT_temp_p (105)	0 to 158ºF 17.77 to 70ºC Default[1]: 621.806ºF 327.67ºC	No	Indicates the compressor #1 suction line temperature sensor value.[1]
Compressor #2 Suction Temperature	nvoSuctionTemp2 (30)	SNVT_temp_p (105)	0 to 158ºF 17.77 to 70ºC Default[1]: 621.806ºF 327.67ºC	No	Indicates the compressor #2 suction line temperature sensor value.[1]
Condensate Overflow Status	nvoCondOverflow (18)	SNVT_switch (95)	Default: Null	No	Monitors the condensate overflow sensor input. **Selection / State / Value** Dry 0 0% Wet 1 100% Null -1 0%
Current Alarm	nvoCurrentAlarm (19)	SNVT_str_asc (36)	Init: No Alarms	No	Displays the current highest active alarm. **Alarm Strings** • No Alarms • Low Voltage Brownout • Comp #1 High Pressure • Comp #2 High Pressure • Comp #1 Low Pressure • Comp #2 Low Pressure • Comp #1 Suctn Temp Snsr Fail • Comp #2 Suctn Temp Snsr Fail • Comp #1 Low Suction Temp • Comp #2 Low Suction Temp • Room Temp Sensor Fail • Entering Water Temp Snsr Fail • Condensate Overflow • Serial EEPROM Corrupted • Invalid Configuration[4] • Low Entering Water Temp
Discharge Air Temperature	nvoDischAirTemp (20)	SNVT_temp_p (105)	0 to 158ºF 17.77 to 70ºC Default[1]: 621.806ºF 327.67ºC	Send	Indicates the discharge air temperature sensor value.[1]
Effective Occupancy Output	nvoEffectOccup (21)	SNVT_occupancy (109)	Init: OC_NUL	Send	Indicates which occupancy mode is being used by the unit. The mode that the unit operates depends on Occupancy Schedule, Occupancy Schedule Override and/or an Occupancy Sensor. nvoEffectOccup uses the local sensor unless nviOccManCmd, nviOccSchedule or nviOccSensor network overrides are not in a "OC_NUL" state. See Effective Occupancy Modes. **Supported Values** 0 = OC_OCCUPIED 1 = OC_UNOCCUPIED 2 = OC_BYPASS 3 = OC_STANDBY -1 (0xFF) = OC_NUL

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2. The Network Variable (NV) index number is a unique identifier for certain LONWORKS variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 16: Network Variable Outputs (NVOs) - Enfinity Single Stage Compressor, Continued

Point Name	LONWORKS Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Outputs (NVOs)					
Effective Setpoint Output	nvoEffectSetpt (36)	SNVT_temp_p (105)	50 to 95ºF 10 to 35ºC Default[1]: 621.806ºF 327.67ºC	Send	Effective Heating or Effective Cooling Setpoint the unit is attempting to maintain, which depends upon Effective Occupancy (nvoEffectOccup).[1] See Space Temperature Setpoint Methods.
Effective Space Temperature Output	nvoSpaceTemp (14)	SNVT_temp_p (105)	0 to 158°F -17.77 to 70°C Default[1]: 621.806ºF 327.67ºC	Send	Monitors the space temperature that the unit uses for control. nvoSpaceTemp uses the nvoLocalSpaceTmp local sensor unless the nviSpaceTemp network override is a valid value.[1]
Entering Water Temperature	nvoEWT (22)	SNVT_temp_p (105)	0 to 158ºF 17.77 to 70ºC Default[1]: 621.806ºF 327.67ºC	Send	Indicates the Entering Water Temperature sensor value.[1]
Fan ON/Auto Switch Status (Room Sensor)	nvoFanOnAuto (23)	SNVT_switch (95)	Init: Null	No	Displays the room sensor Fan ON/Auto switch position. **Selection** **State** **Value** Fan On 0 0% Fan Auto 1 100% Null -1 0%
Fan Speed Output	nvoFanSpeed (35)	SNVT_switch (95)	Init: OFF	Send	Displays the commanded fan speed. **Fan Speed** **State** **Value** OFF 0 0% Low 1 33% Medium 1 66% High 1 95% ON 1 100%
System Mode Switch (Heat/Cool/Auto) Status	nvoHeatCoolAuto (32)	UNVTheatCoolAuto	Init: HCA_NUL	No	Displays the room sensor System Mode switch (Heat/Cool/Auto) position. **Supported Values** 0 = HCA_OFF 1 = HCA_HEAT 2 = HCA_COOL 3 = HCA_AUTO -1 (0xFF) = HCA_NUL (no switch present)
Leaving Water Temperature Output	nvoLWT (24)	SNVT_temp_p (105)	0 to 158°F -17.77 to 70°C Default[1]: 621.806ºF 327.67ºC	Send	Indicates the Leaving Water Temperature sensor value.[1]
Local Setpoint Adjust Output	nvoSetpoint (33)	SNVT_temp_p (105)	55 to 95ºF 12.78 to 35ºC Default[1]: 621.806ºF 327.67ºC	Send	The reference setpoint used to determine the Effective Heating/Cooling setpoints. It is the value of the local, hardwired Space Temperature setpoint. Only valid if the unit controller JP5 configuration jumper is configured for Long Range Setpoint Adjust and is enabled by nciLocSptEnable.[1] See Effective Occupancy Modes.
Local Space Temperature Output	nvoLocalSpaceTmp (26)	SNVT_temp_p (105)	0 to 158°F -17.77 to 70°C Default[1]: 621.806ºF 327.67ºC	Send	The value of the hardwired space temperature sensor installed either in the return air or the space. Writing to Space Temp Input (nviSpaceTemp) does not affect Local Space Temp (nvoLocalSpaceTmp) but does affect Effective Space Temp (nvoSpaceTemp).[1]

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3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 16: Network Variable Outputs (NVOs) - Enfinity Single Stage Compressor, Continued

Point Name	LonWorks Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Outputs (NVOs)					
McQuay WSHP Status	nvoMcQHPUnitStat (31)	UNVTmcqHPUnitStat	Init: MUS_NULL	No	Indicates the unit's operating state. **Supported Values** 0 = MUS_OFF_ALARM 1 = MUS_OFF* 2 = MUS_START 3 = MUS_FAN ONLY* (fan is allowed to operate) 4 = MUS_PREPARE_TO_HEAT 5 = MUS_HEATING 6 = MUS_PREPATE_TO_COOL 7 = MUS_COOLING 8 = MUS_PREPATE_TO_DEHUMIDIFY 9 = MUS_DEHUMIDIFICATION -1 (0xFF) = MUS_NULL ***Unit controller software v3.0 and newer** • nvoMcQHPUnitStat always matches unit controller state. ***Unit controller software v2.9 and older** • When the fan is off, nvoMcQHPUnitStat indicates an OFF state, but the unit controller is actually in Fan Only mode.
Previous Alarm	nvoPreviousAlarm (27)	SNVT_str_asc (36)	Init: No Alarms	No	Indicates the previous unit fault. **Alarm Strings** • No Alarms • Low Voltage Brownout • Comp #1 High Pressure • Comp #2 High Pressure • Comp #1 Low Pressure • Comp #2 Low Pressure • Comp #1 Suctn Temp Snsr Fail • Comp #2 Suctn Temp Snsr Fail • Comp #1 Low Suction Temp • Comp #2 Low Suction Temp • Room Temp Sensor Fail • Entering Water Temp Snsr Fail • Condensate Overflow • Serial EEPROM Corrupted • Invalid Configuration[4] • Low Entering Water Temp
Pump Request Output	nvoPumpRequest (28)	SNVT_switch (95)	Default: Null	No	Indicates when the unit is requesting flow from the loop water controller. The loop pump must be running to provide adequate flow through the unit so the compressor(s) can operate safely. nviComprEnable can be used by the BAS to indicate if proper loop fluid flow is occurring. **Selection / State / Value** No Flow Req 0 0% Flow Req 1 100% Null -1 0%
Setpoint Shift Output	nvoSetptShift (25)	SNVT_temp_setpt (106)	-3 to 3ºF -1.67 to 1.67ºC Init: All Setpts 0ºF	Send	Represents the local hardwired setpoint adjustment value from the room sensor potentiometer. It is valid when configured for Short Range Setpoint Adjust. **Supported Fields** • occupied_cool • standby_cool • unoccupied_cool (always 0) • occupied_heat • standby_heat • unoccupied_heat (always 0)
Status	nvoStatus	SNVT_obj_status (93)	Init: All structure elements = 0	No	Reports the status of the requested functional block in the device as commanded from nviRequest. **Supported Fields** • object_id: 0=Node Obj, 1=McQuaySCC_WSHP • invalid_id: 0=Normal ID, 1=Invalid ID • invalid_request: 0=Valid Req, 1=Invalid Req • report_mask: 0=Not Supported, 1=Supported

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2. The Network Variable (NV) index number is a unique identifier for certain LonWorks variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 16: Network Variable Outputs (NVOs) - Enfinity Single Stage Compressor, Continued

Point Name	LonWorks Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Outputs (NVOs)					
Unit Status Output	nvoUnitStatus (15)	SNVT_hvac_status (112)		No	Reports the unit status. It combines the operating mode, the capacity of heating and cooling, and any alarms that are present in the object. The in_alarm member reports the highest priority current alarm identifier. **Unit Status Fields** • mode: (see supported modes below) • heat_output_primary: 0 to 100% • heat_output_secondary: 0 to 100% • cool_output: 0 to 100% • econ_output: 0 to 100% • fan_output: 0 to 100% • in_alarm: (see alarm identifiers below) **Supported Modes** 1 = HVAC_HEAT (Heating Mode) 3 = HVAC_COOL (Cooling Mode) 6 = HVAC_OFF (Inactive Control) 9 = HVAC_FAN_ONLY (Fan Only Mode) 14 = HVAC_DEHUMID (Dehumidification Mode) **Alarm Identifiers** 0 = No Alarms 1 = Low Voltage Brownout 2 = Comp #1 High Pressure 3 = Comp #2 High Pressure 4 = Comp #1 Low Pressure 5 = Comp #2 Low Pressure 6 = Comp #1 Suctn Temp Snsr Fail 7 = Comp #2 Suctn Temp Snsr Fail 8 = Comp #1 Low Suction Temp 9 = Comp #2 Low Suction Temp 10 = Room Temp Sensor Fail 11 = Entering Water Temp Snsr Fail 12 = Condensate Overflow 13 = Serial EEPROM Corrupted 14 = Invalid Configuration[4] 15 = Low Entering Water Temp

1. Analog Null (0x7FFF) is a discrete temperature value of 621.806ºF/327.67ºC. Its purpose is to indicate a sensor failure condition or when the unit controller is not using that temperature value.

2. The Network Variable (NV) index number is a unique identifier for certain LonWorks variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 17: Network Configuration Properties Inputs (NCIs) - Enfinity Single Stage Compressor

Point Name	LONWORKS Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Configuration Property Inputs (NCIs)					
Brownout Reference Setpoint	nciBrownoutRef	UCPTbrownoutRef	25 to 1023 counts Default: 400 500 (v2.5* and older)	No	Detects a unit controller brownout condition. Brownout condition occurs when nvoBrownout < 80% of nciBrownoutRef, and clears when nvoBrownout > 90% of nciBrownoutRef. *Unit controller application version. *Only perform the calibration procedure if the unit controller 24VAC voltage is within normal operating parameters. A password of 1023 is required.*
Compressor Low Pressure Alarm Delay	nciLowPresAlmDly	UCPTlowPresAlmDly	0 to 120 sec Default: 30 sec 0 to 99 sec (v2.9* and older)	No	Specifies the time delay between the compressor(s) low pressure input and alarm generation. *Unit controller application version.
Compressor Low Suction Temperature Protection Differential	nciLowTmpProtDif	UCPTlowTmpProtDif	2 to 15°F 1.11 to 8.34°C Default: 8°F / 4.44°C	No	nciLowTmpProtDif is added to the selected Compressor Low Suction Temperature SP (nciLowTempProt or nciLowTempProtGL) to determine the setting at which the alarm clears.
Compressor Low Suction Temp Protection SP for Glycol	nciLowTempProtGL	UCPTlowTempProtGL	0 to 50°F -17.78 to 10°C Default: 6.5ºF/-14.16ºC	No	nciLowTempProtGL is enabled by the unit controller JP3 jumper in the shorted position, which selects glycol as the loop fluid. **Unit controller software v3.1 and newer** • Temperature at which a Compressor Low Suction alarm occurs in Heating mode when the loop fluid is glycol. • nciLowTempProtGL does not apply to the Dehumidification and Cooling modes, which use a fixed 28ºF low temp threshold regardless of the loop fluid type. **Unit controller software v3.0 and older** • Temperature at which a Compressor Low Suction alarm occurs when the loop fluid is glycol.
Compressor Low Suction Temp Protection SP for Water	nciLowTempProt	UCPTlowTempProt	0 to 50°F -17.78 to 10°C Default: 28ºF / -2.22ºC	No	nciLowTempProt is enabled by the unit controller JP3 jumper in the open position, which selects water as the loop fluid. **Unit controller software v3.1 and newer** • Temperature at which a compressor Low Suction alarm occurs in the Heating mode when the loop fluid is water. • nciLowTempProt does not apply to the Dehumidification and Cooling modes, which use a fixed 28ºF low temp threshold regardless of the loop fluid type. **Unit controller software v3.0 and older** • Temperature at which a Compressor Low Suction alarm occurs when the loop fluid is water.
Compressor Minimum OFF Timer	nciMinCompOffTmr	UCPTminCompOffTmr	0 to 1200 sec Default: 360 sec or 180 sec*	No	A countdown timer that defines the minimum period of time a compressor must remain OFF before it is allowed to turn ON again. *A default of 360 sec applies to unit controller v3.1 and newer and a default of 180 sec applies to unit controller v3.0 and older.
Compressor Minimum ON Timer	nciMinCompOnTmr	UCPTminCompOnTmr	0 to 1200 sec Default: 180 sec	No	A countdown timer that defines the minimum period of time a compressor must remain ON before it is allowed to turn OFF again.
Cooling Interstage Timer	nciCoolIntStgTmr	UCPTcoolIntStgTmr	0 to 1200 sec Default: 300 sec	No	A countdown timer that defines the minimum period of time between turn-on of the cooling stages.
Cooling Setpoint High Limit	nciClgSptHiLim[4]	UCPTclgSptHiLim	50 to 95ºF 10 to 35ºC Default: 90ºF / 32.22ºC	No	The maximum value of all the Occupancy Cooling setpoints. The nciClgSptHiLim must be greater than nciClgSptLoLim. Applies only to unit controller software v3.2 (PN 2506900) and older.
Cooling Setpoint Low Limit	nciClgSptLoLim	UCPTclgSptLoLim	50 to 95ºF 10 to 35ºC Default: 55ºF / 12.78ºC	No	Specifies the minimum allowed value of the nvoSetpoint Long Range Setpoint Adjust. **Unit controller software v3.2 (PN 2506900) and older** • The minimum value of all Occupancy Cooling setpoints. The nciClgSptLoLim must be less than nciClgSptHiLim.

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2. The Network Variable (NV) index number is a unique identifier for certain LONWORKS variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. Applies only to Enfinity Single Stage Compressor software v3.2 (PN 2506900) and older.

Table 17: Network Configuration Properties Inputs (NCIs) - Enfinity Single Stage Compressor, Continued

Point Name	LonWorks Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Configuration Property Inputs (NCIs)					
Heating Interstage Timer	nciHeatIntStgTmr	UCPTheatIntStgTmr	0 to 1200 sec Default: 300 sec	No	A countdown timer that defines the minimum period of time between turn-on of the heating stages.
Heating Setpoint High Limit	nciHtgSptHiLim[4]	UCPThtgSptHiLim	50 to 95ºF 10 to 35ºC Default: 95ºF / 35ºC	No	The maximum value of all Occupancy Heating setpoints. The nciHtgSptHiLim must be greater than nciHtgSptLoLim. Applies only to unit controller software v3.2 (PN 2506900) and older.
Heating Setpoint Low Limit	nciHtgSptLoLim	UCPThtgSptLoLim	50 to 95ºF 10 to 35ºC Default: 50ºF / 10ºC	No	Minimum value of all the Occupancy Heating setpoints. The nciHtgSptLoLim must be less than nciHtgSptHiLim.
HVAC Unit Type Identifier	nciHVACType	SCPThvacType	0 to 9 Default: 3	No	Defines the primary application and equipment type for the unit controller. *Do not modify this configuration property.* **Supported Values** 0 = HVT_GENERIC 1 = HVT_FAN_COIL 2 = HVT_VAV 3 = HVT_HEAT_PUMP (Default) 4 = HVT_ROOFTOP 5 = HVT_UNIT_VENT 6 = HVT_CHILL_CEIL 7 = HVT_RADIATOR 8 = HVT_AHU 9 = HVT_SELF_CONT
Local Bypass Time Setpoint	nciBypassTime	SCPTbypassTime	0, 30 to 120 min Default: 120 min	No	Defines the amount of time that the unit can be in the Bypass mode initiated by the Timed Override button. Pressing the Timed Override button 4-9 seconds sets the bypass timer to the maximum nciBypassTime value. The value of 0 disables this feature.
Location	nciLocation	SCPTlocation	30 Characters	No	Provides descriptive physical location information for the unit.
Minimum Send Time	nciMinOutTm	SCPTminSendTime	0 to 6553.4 sec Default:0 (Disabled)	No	Minimum period of time between automatic network variable output transmissions. It limits network traffic when output network variables are frequently changing. The value of 0 disables the timer. **Supported Variables** • nvoBrownout • nvoDischAirTemp • nvoEWT • nvoLocalSpaceTmp • nvoLWT • nvoSpaceTemp • nvoSuctionTemp1 • nvoSuctionTemp2
Occupied Setpoint Differential	nciOccDiff	UCPToccDiff	1 to 5°F 0.55 to 2.78°C Default: 1ºF / 0.55ºC	No	Sets the Occupied and Standby Setpoint hysteresis to then determine the Effective OFF setpoints. **Interaction Rules** • nciOccDiff < (occupied_cool – occupied_heat) • nciOccDiff < (standby_cool – standby_heat)

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2. The Network Variable (NV) index number is a unique identifier for certain LonWorks variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. Applies only to Enfinity Single Stage Compressor software v3.2 (PN 2506900) and older.

Table 17: Network Configuration Properties Inputs (NCIs) - Enfinity Single Stage Compressor, Continued

Point Name	LonWorks Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Configuration Property Inputs (NCIs)					
Occupancy Temperature Setpoints	nciSetpoints	SCPTsetPnts	50 to 95ºF 10 to 35ºC Defaults: See Description*	No	Defines the space temperature heating and cooling setpoints for different occupancy modes. See Effective Occupancy Modes. The Occupancy Temperature Setpoints must be kept in ascending order as follows: unoccupied_heat <= standby_heat <= occupied_heat <= occupied_cool <= standby_cool <= unoccupied_cool **Additional interaction rules** • occupied_cool > (occupied_heat + nciOccDiff) • occupied_cool <= nciClgSptHiLim[4] • occupied_cool >= nciClgSptLoLim[4] • standby_cool > (standby_heat + nciOccDiff) • standby_cool <= nciClgSptHiLim[4] • standby_cool >= nciClgSptLoLim[4] • unoccupied_cool>(unoccupied_heat+nciUnoccDiff) • unoccupied_cool <= nciClgSptHiLim[4] • unoccupied_cool >= nciClgSptLoLim[4] • occupied_heat < (occupied_cool – nciOccDiff) • occupied_heat <= nciHtgSptHiLim[4] • occupied_heat >= nciHtgSptLoLim[4] • standby_heat < (standby_cool – nciOccDiff) • standby_heat <= nciHtgSptHiLim[4] • standby_heat >= nciHtgSptLoLim[4] • unoccupied_heat<(unoccupied_cool–nciUnoccDiff) • unoccupied_heat <= nciHtgSptHiLim[4] • unoccupied_heat >= nciHtgSptLoLim[4] *Default Values • Occupied_cool = 75ºF, 23.88ºC • Standby_cool = 77ºF, 25.00ºC • Unoccupied_cool = 85ºF, 29.44ºC • Occupied_heat = 70ºF, 21.11ºC • Standby_heat = 66ºF, 18.88ºC • Unoccupied_heat = 60ºF, 15.55ºC
Receive Heartbeat	nciRcvHrtBt	SCPTmaxRcvTime	0 to 6553.4 sec Default: 0 sec (Disabled)	No	Specifies the maximum amount of time the supported overrides must be refreshed (i.e. written) before the unit reverts back to the default value. Each point supported by Receive Heartbeat has a separate timer associated with it. The value of 0 disables this feature. **Supported Variables** • nviApplicMode • nviAuxHeatEnable • nviComprEnable • nviEnergyHoldOff • nviOccSchedule • nviOccSensor • nviSetptOffset • nvoSpaceTemp
Room Sensor Setpoint Adjust Enable/Disable	nciLocSptEnable	UCPTlocSptEnable	0 to 1 Default: Enabled	No	Enables or disables the local hardwired setpoint adjustment. If the value of nciLocSptEnable is set to 0, this disables the setpoint control from a room sensor and enables the setpoint control from the network. **Supported Values** 0 = Disabled 1 = Enabled

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3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. Applies only to Enfinity Single Stage Compressor software v3.2 (PN 2506900) and older.

Table 17: Network Configuration Properties Inputs (NCIs) - Enfinity Single Stage Compressor, Continued

Point Name	LonWorks Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Configuration Property Inputs (NCIs)					
Send Heartbeat	nciSndHrtBt	SCPTmaxSendTime	0 to 6553.4 sec Default: 0 (Disabled)	No	Defines the maximum period of time that elapses before the network variable outputs (NVOs) shown below are automatically updated. Each NVO supported has a separate timer associated with it. The BAS may be able to detect a missing heartbeat from the unit controller to determine that communication is lost and take corrective action. The value of 0 disables the auto update feature. **Supported Variables** • nvoDischAirTemp • nvoEffectOccup • nvoEffectSetpt • nvoFanSpeed • nvoLocalSpaceTmp • nvoSetpoint • nvoSetptShift • nvoSpaceTemp • nvoUnitStatus
Device Software Identification (Major Version)	nciDevMajVer	SCPTdevMajVer	0 to 255	No	The software major version of the communication module firmware. *Do not modify this configuration property.*
Device Software Identification (Minor Version)	nciDevMinVer	SCPTdevMinVer	0 to 255	No	The software minor version of the communication module firmware. *Do not modify this configuration property.*
Software Jumpers	nciSoftJumpers	UCPTsoftJumpers	16 Characters	No	Sets the software jumper configuration. This property is not implemented in unit controller software.
Unit Application Identification (Major Version)	nciUnitAppMajVer	UCPTunitAppMajVer	0 to 255	No	The major version of the unit controller software. *Do not modify this configuration property.*
Unit Application Identification (Minor Version)	nciUnitAppMinVer	UCPTunitAppMinVer	0 to 255	No	The minor version of the unit controller software.
Unoccupied Setpoint Differential	nciUnoccDiff	UCPTunOccDiff	2 to 10ºF 1.11 to 5.56ºC Default: 2ºF / 1.11ºC	No	Sets the Unoccupied hysteresis that determines the Effective OFF setpoints. **Interaction Rule** nciUnoccDiff < (unoccupied_cool – unoccupied_heat)

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2. The Network Variable (NV) index number is a unique identifier for certain LonWorks variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. Applies only to Enfinity Single Stage Compressor software v3.2 (PN 2506900) and older.

Table 18: Network Variable Inputs (NVIs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor

Point Name	LONWORKS Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Inputs (NVIs)					
Application Mode Input	nviApplicMode (9)	SNVT_hvac_mode (108)	Default: HVAC_NUL	Recv	Sets the unit in an application mode (Auto, Off, Heat, Cool, Dehumidification, or Fan Only). Application Mode does not "force" the unit into any state. However, it disables certain unit operation. For example, an Application Mode of Cool disables heating; Heat disables cooling and dehumidification; Fan Only disables heating, cooling, and dehumidification. nviApplicMode overrides the local room sensor's System Mode Switch (Heat/Cool/Auto). The local System Mode Switch is only used when nviApplicMode is set to HVAC_NUL. The network override will revert back to its default value upon unit controller reboot. **Supported Values** 0 = HVAC_AUTO 1 = HVAC_HEAT 3 = HVAC_COOL 6 = HVAC_OFF 9 = HVAC_FAN_ONLY 14 = HVAC_DEHUMID -1 (0xFF) = HVAC_NUL
Auxiliary Heat Enable Input	nviAuxHeatEnable (10)	SNVT_switch (95)	Default: Null	Recv	Enables or disables auxiliary heat units with electric heat. Electric heat is always enabled when it is the only source of heating, and is unaffected by this variable. The default state is Null, in which case auxiliary heat is enabled.[3] The network override will revert back to its default value upon unit controller reboot. **Selection / State / Value** Disabled / 0 / 0 to 100% Disabled / 1 / 0% Enabled / 1 / 0.5 to 100% Null / -1 / 0 to 100% (Enabled)
Clear Alarm	nviClearAlarm (14)	SNVT_switch (95)	Default: Normal	No	Clears the Current Alarm. The alarm that is cleared moves to the Previous Alarm buffer. The value automatically clears after a Clear Alarm command is issued. The unit controller automatically returns both the state and value parameters to 0 once the alarm is cleared. **Selection / State / Value** Normal / 0 / 0% Clear Alarm / 1 / 0.5 to 100%
Compressor Enable	nviComprEnable (11)	SNVT_switch (95)	Default: Null	Recv	Specifies if the compressor(s) are allowed to operate, which can be based on proof of loop fluid flow. The loop pump must be running to provide adequate flow through the unit so the compressor(s) can operate safely. The network override will revert back to its default value upon unit controller reboot. **Selection / State / Value** Disabled / 0 or 1 / 0% Enabled / 0 or 1 / 0.5 to 100% Null / -1 / 0 to 100% (Enabled)
Compressor #1 Runtime Totalizer	nviComp1Hours (22)	SNVT_count (8)	0 to 65535 counts Default: 0	No	Total compressor (SmartSource, Series2) or compressor #1 (Enfinity Large Two Compressor, SS2C) runtime hours.[4]
Compressor #1 Starts Totalizer	nviComp1Starts (23)	SNVT_count (8)	0 to 65535 counts Default: 0	No	Total compressor (SmartSource, Series2) or compressor #1 (Enfinity Large Two Compressor, SS2C) starts.[4]
Compressor #2 Runtime Totalizer	nviComp2Hours (24)	SNVT_count (8)	0 to 65535 counts Default: 0	No	Total compressor high capacity (SmartSource, Series2) (Series2) or compressor #2 (Enfinity Large Two Compressor, SS2C) runtime hours.[4]
Compressor #2 Starts Totalizer	nviComp2Starts (25)	SNVT_count (8)	0 to 65535 counts Default: 0	No	Total compressor high capacity (SmartSource, Series2) or compressor #2 (Enfinity Large Two Compressor, SS2C) starts.[4]

1. Analog Null (0x7FFF) is a discrete temperature value of 621.806ºF/327.67ºC. Its purpose is to indicate a sensor failure condition or when the unit controller is not using that temperature value.

2. The Network Variable index number is a unique identifier for certain LONWORKS variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. The totalizer continues to increment until the maximum count is reached, at which point the BAS must reset the value by issuing a write command. The variable is saved in nonvolatile memory every 24 hours. If power is lost, that day's totalizer information is not stored.

5. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 18: Network Variable Inputs (NVIs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor, Continued

Point Name	LonWorks Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Inputs (NVIs)					
Energy Hold Off Input	nviEnergyHoldOff (12)	SNVT_switch (95)	Default: Null	Recv	When the unit is in the Energy Hold Off mode, it uses Standby setpoints. This command has priority over Effective Occupancy.[3] The network override will revert back to its default value upon unit controller reboot. **Selection / State / Value** Normal / 0 / 0 to 100% Normal / 1 / 0% HoldOff / 1 / 0.5 to 100% Null / -1 / 0 to 100% (Normal)
Fan ON/Auto Remote Input	nviFanOnAuto (15)	SNVT_switch (95)	Default: Null	No	Overrides the local fan ON/Auto room sensor and thermostat switch inputs, and the JP2 configuration jumper. Fan On forces the fan ON. The network override will revert back to its default value upon unit controller reboot. **Selection / State / Value** Force Auto / 0 / 0 to 100% Force Auto / 1 / 0% Force On / 1 / 0.5 to 100% Null / -1 / 0 to 100% (Normal)
Fan Runtime Totalizer	nviFanHours (21)	SNVT_count (8)	0 to 65535 counts Default: 0	No	Total fan runtime hours.[4]
Humidistat Remote Input	nviHumidistat (16)	SNVT_switch (95)	Default: Null	No	Overrides the local humidistat/Stage #1 Cooling thermostat input. The network override will revert back to its default value upon unit controller reboot. **Selection / State / Value** Force Dehumid Req Off / 0 / 0 to 100% Force Dehumid Req Off / 1 / 0% Force Dehumid Req On / 1 / 0.5 to 100% Null / -1 / 0 to 100% (Normal)
Occupancy Override Input	nviOccManCmd (13)	SNVT_occupancy (109)	Default: OC_NUL	No	Overrides the occupancy schedule. Occupancy Schedule Override has priority over the Occupancy Schedule and remote occupancy sensor. It is also allows a local timed override hardwired to place the unit in the Occupied mode during the amount of time declared in Timed Override Setpoint using Schedule Override and/or an occupancy sensor. The network override will revert back to its default value upon unit controller reboot. See Effective Occupancy Modes. **Supported Values** 0 = OC_OCCUPIED 1 = OC_UNOCCUPIED 2 = OC_BYPASS 3 = OC_STANDBY -1 (0xFF) = OC_NUL
Occupancy Scheduler Input	nviOccSchedule (17)	SNVT_tod_event (128)	Default: OC_NUL	Recv	Commands the WSHP into different occupancy modes. A scheduler or a supervisory controller typically sends the command using Schedule Override.[3] The network override will revert back to its default value upon unit controller reboot. See Effective Occupancy Modes. **Supported Current_state Values** 0 = OC_OCCUPIED 1 = OC_UNOCCUPIED 3 = OC_STANDBY -1 (0xFF) = OC_NUL • Next_state is not used • Time_to_next_state is not used

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2. The Network Variable index number is a unique identifier for certain LonWorks variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. The totalizer continues to increment until the maximum count is reached, at which point the BAS must reset the value by issuing a write command. The variable is saved in nonvolatile memory every 24 hours. If power is lost, that day's totalizer information is not stored.

5. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 18: Network Variable Inputs (NVIs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor, Continued

Point Name	LONWORKS Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Inputs (NVIs)					
Occupancy Sensor Input	nviOccSensor (18)	SNVT_occupancy (109)	Default: OC_NUL	Recv	Indicates the presence of occupants in the space (motion detection.)[3] The network override will revert back to its default value upon unit controller reboot. See Effective Occupancy Modes. **Supported Values** 0 = OC_OCCUPIED 1 = OC_UNOCCUPIED -1 (0xFF) = OC_NUL
Request	nviRequest (0)	SNVT_obj_request	Default: 0, RQ_NORMAL	No	Requests mode status information or sets operating mode for a specific functional block. The response is indicated in nvoStatus. **Fields** • object_id: 0=Node Obj, 1=McQuaySCC_WSHP • object_request: (See Supported Requests) **Supported Requests** 0 = RQ_NORMAL 2 = RQ_UPDATE_STATUS 5 = RQ_REPORT_MASK
Space Temperature Input	nviSpaceTemp (8)	SNVT_temp_p (105)	14 to 122°F -10 to 50ºC Default[1]: 621.806ºF 327.67ºC	Recv	Provides space temperature from the network instead of using the local temperature sensor.[1,3] The network override will revert back to its default value upon unit controller reboot.
Temperature Setpoint Input	nviSetpoint (20)	SNVT_temp_p (105)	50 to 95ºF 10 to 35ºC Default[1]: 621.806ºF 327.67ºC	No	Allows the network to set the reference setpoint in the Occupied and Standby Occupancy modes. Local setpoint operation must be disabled by nciLocSptEnable. nviSetpoint always retains the last valid value after power-up.[1] The network override will revert back to its default value upon unit controller reboot. See Space Temperature Setpoint Methods.

1. Analog Null (0x7FFF) is a discrete temperature value of 621.806ºF/327.67ºC. Its purpose is to indicate a sensor failure condition or when the unit controller is not using that temperature value.
2. The Network Variable index number is a unique identifier for certain LONWORKS variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.
3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).
4. The totalizer continues to increment until the maximum count is reached, at which point the BAS must reset the value by issuing a write command. The variable is saved in nonvolatile memory every 24 hours. If power is lost, that day's totalizer information is not stored.
5. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 19: Network Variable Outputs (NVOs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor

Point Name	LONWORKS Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Outputs (NVOs)					
Binary Input Status	nvoBinaryIn (28)	SNVT_state (83)	32 bits Init: All bits = 0	No	Monitors the digital inputs of the unit controller for diagnostic purposes. Each item is reported as a bit so that multiple inputs can be viewed simultaneously. See Selected Parameters Information for bit descriptions.
Binary Output Status	nvoBinaryOut (29)	SNVT_state (83)	16 bits Init: All bits = 0	No	Monitors the digital outputs of the unit controller for diagnostic purposes. Each item is reported as a bit so that multiple outputs can be viewed simultaneously. See Selected Parameters Information for bit description and output settings for valves and electric heat options.
Brownout Voltage Reading	nvoBrownout (SmartSource: 45) (SS2C: 46)	SNVT_count (8)	0 to 1023 counts Default: 500	No	Indicates the Brownout Voltage Reading that is compared to the Reference Setpoint to then determine if a brownout condition exists.

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2. The Network Variable index number is a unique identifier for certain LONWORKS variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.
3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).
4. The totalizer continues to increment until the maximum count is reached, at which point the BAS must reset the value by issuing a write command. The variable is saved in nonvolatile memory every 24 hours. If power is lost, that day's totalizer information is not stored.
5. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 19: Network Variable Outputs (NVOs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor, Continued

Point Name	LONWORKS Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Outputs (NVOs)					
Compressor #1 Suction Temperature	nvoSuctionTemp1 (41)	SNVT_temp_p (105)	0 to 158ºF 17.77 to 70ºC Default[1]: 621.806ºF 327.67ºC	No	Indicates the compressor #1 suction line temperature sensor value.[1]
Compressor #2 Suction Temperature	nvoSuctionTemp2 (SS2C: 42)	SNVT_temp_p (105)	0 to 158ºF 17.77 to 70ºC Default[1]: 621.806ºF 327.67ºC	No	Indicates the compressor #2 suction line temperature sensor value.[1] Applies only to Enfinity Large Two Compressor (SS2C) units.
Condensate Overflow Status	nvoCondOverflow (30)	SNVT_switch (95)	Default: Null	No	Monitors the Condensate Overflow sensor input. **Selection / State / Value** Dry 0 0% Wet 1 100% Null -1 0%
Current Alarm	nvoCurrentAlarm (31)	SNVT_str_asc (36)	Init: No Alarms	No	Displays the current highest active alarm. **SmartSource (Series2) Alarm Strings** • No Alarms • IO Exp Communication Fail • Invalid Configuration[5] • Low Voltage Brownout • Comp High Pressure • Comp Low Pressure • Comp Suctn Temp Snsr Fail • Comp Low Suction Temp • Freeze Fault Detect • Room Temp Sensor Fail • Entering Water Temp Snsr Fail • Leaving Water Temp Snsr Fail • Condensate Overflow • Low Entering Water Temp • Serial EEPROM Corrupted • Wtrside Econ Low Temp Cutout **Enfinity Large Two Comp (SS2C) Alarm Strings** • No Alarms • IO Exp Communication Fail • Invalid Configuration[5] • Low Voltage Brownout • Comp #1 High Pressure • Comp #2 High Pressure • Comp #1 Low Pressure • Comp #2 Low Pressure • Comp #1 Suctn Temp Snsr Fail • Comp #2 Suctn Temp Snsr Fail • Comp #1 Low Suction Temp • Comp #2 Low Suction Temp • Freeze Fault Detect • Room Temp Sensor Fail • Entering Water Temp Snsr Fail • Leaving Water Temp Snsr Fail • Condensate Overflow • Low Entering Water Temp • Serial EEPROM Corrupted • Wtrside Econ Low Temp Cutout

1. Analog Null (0x7FFF) is a discrete temperature value of 621.806ºF/327.67ºC. Its purpose is to indicate a sensor failure condition or when the unit controller is not using that temperature value.

2. The Network Variable index number is a unique identifier for certain LONWORKS variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. The totalizer continues to increment until the maximum count is reached, at which point the BAS must reset the value by issuing a write command. The variable is saved in nonvolatile memory every 24 hours. If power is lost, that day's totalizer information is not stored.

5. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 19: Network Variable Outputs (NVOs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor, Continued

Point Name	LonWorks Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Outputs (NVOs)					
Discharge Air Temperature	nvoDischAirTemp (32)	SNVT_temp_p (105)	0 to 158ºF 17.77 to 70ºC Default[1]: 621.806ºF 327.67ºC	Send	Indicates the Discharge Air Temperature sensor value.[1]
Effective Occupancy Output	nvoEffectOccup (33)	SNVT_occupancy (109)	Init: OC_NUL	Send	Indicates the unit's current occupancy mode. The mode in which the unit operates depends on Occupancy Schedule, Occupancy Schedule Override or an occupancy sensor. nvoEffectOccup uses the local sensor unless nviOccManCmd, nviOccSchedule or nviOccSensor network overrides are not in a "OC_NUL" state. See Effective Occupancy Modes. **Supported Values** 0 = OC_OCCUPIED 1 = OC_UNOCCUPIED 2 = OC_BYPASS 3 = OC_STANDBY -1 (0xFF) = OC_NUL
Effective Setpoint Output	nvoEffectSetpt (SmartSource: 47) (SS2C: 48)	SNVT_temp_p (105)	50 to 95ºF 10 to 35ºC Default[1]: 621.806ºF 327.67ºC	Send	Effective Heating or Cooling setpoint the unit is attempting to maintain, which depends on Effective Occupancy (nvoEffectOccup).[1] See Effective Occupancy Modes.
Effective Space Temperature Output	nvoSpaceTemp (26)	SNVT_temp_p (105)	0 to 158°F -17.77 to 70°C Default[1]: 621.806ºF 327.67ºC	Send	Monitors the space temperature used by the unit. nvoSpaceTemp uses the nvoLocalSpaceTmp local sensor unless the nviSpaceTemp network override is a valid value.[1]
Entering Water Temperature	nvoEWT (34)	SNVT_temp_p (105)	0 to 158ºF 17.77 to 70ºC Default[1]: 621.806ºF 327.67ºC	No	Indicates the Entering Water Temperature sensor value.[1]
Fan ON/Auto Switch Status (Room Sensor)	nvoFanOnAuto (35)	SNVT_switch (95)	Init: Null	No	Displays the room sensor fan ON/Auto switch position. **Selection / State / Value** Fan On / 0 / 0% Fan Auto / 1 / 100% Null / -1 / 0%
Fan Speed Output	nvoFanSpeed SmartSource (46) Enfinity SS2C (47)	SNVT_switch (95)	Init: OFF	Send	Displays the commanded fan speed. **SmartSource (Series2)** **Fan Speed / State / Value** OFF / 0 / 0% Running / 1 / 0 to 100% **Enfinity Large Two Compressor (SS2C)** **Fan Speed / State / Value** OFF / 0 / 0% ON / 1 / 100%
System Mode Switch (Heat/Cool/Auto) Status	nvoHeatCoolAuto SmartSource (43) Enfinity SS2C (44)	UNVTheatCoolAuto	Init: HCA_NUL	No	Displays the room sensor System Mode switch (Heat/Cool/Auto) position. **Supported Values** 0 = HCA_OFF 1 = HCA_HEAT 2 = HCA_COOL 3 = HCA_AUTO -1 (0xFF) = HCA_NUL (no switch present)

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2. The Network Variable index number is a unique identifier for certain LonWorks variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. The totalizer continues to increment until the maximum count is reached, at which point the BAS must reset the value by issuing a write command. The variable is saved in nonvolatile memory every 24 hours. If power is lost, that day's totalizer information is not stored.

5. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 19: Network Variable Outputs (NVOs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor, Continued

Point Name	LONWORKS Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Outputs (NVOs)					
Humidistat Sensor Status	nvoHumidistat SmartSource (48) Enfinity SS2C (49)	SNVT_switch (95)	Default: Null	No	Status of the Humidistat/Cooling Stage #1 sensor input. Signal input represents Humidistat for units with the HGR option. For all other units, it is the thermostat Cooling Stage #1 request. Input is active (Is Humid) when 24VAC is applied. **Selection** **State** **Value** Not Humid 0 0% Is Humid 1 100% Null -1 0%
Leaving Water Temperature Output	nvoLWT (36)	SNVT_temp_p (105)	0 to 158°F -17.77 to 70°C Default[1]: 621.806ºF 327.67ºC	No	Indicates the Leaving Water Temperature sensor value.[1]
Local Setpoint Adjust Output	nvoSetpoint SmartSource (44) Enfinity SS2C (45)	SNVT_temp_p (105)	55 to 95ºF 12.78 to 35ºC Default[1]: 621.806ºF 327.67ºC	Send	The reference setpoint used to determine the Effective Heating/Cooling setpoints. It is the value of the local, hardwired space temperature setpoint. It is only valid if the unit controller JP5 configuration jumper is configured for Long Range Setpoint Adjust and is enabled by nciLocSptEnable.[1] See Effective Occupancy Modes.
Local Space Temperature Output	nvoLocalSpaceTmp (38)	SNVT_temp_p (105)	0 to 158°F -17.77 to 70°C Default[1]: 621.806ºF 327.67ºC	Send	The value of the hardwired space temperature sensor installed either in the return air or in the space. Writing to Space Temp Input (nviSpaceTemp) does not affect Local Space Temp (nvoLocalSpaceTmp) but does affect Effective Space Temp (nvoSpaceTemp).[1]
McQuay WSHP Status	nvoMcQHPUnitStat (SmartSource: 42) (SS2C: 43)	UNVTmcqHPUnitStat	Init: MUS_NULL	No	Indicates the unit's operating state. **Supported Values** 0 = MUS_OFF_ALARM 1 = MUS_OFF 2 = MUS_START 3 = MUS_FAN ONLY (fan is allowed to operate) 4 = MUS_PREPARE_TO_HEAT 5 = MUS_HEATING 6 = MUS_PREPATE_TO_COOL 7 = MUS_COOLING 8 = MUS_PREPATE_TO_DEHUMIDIFY 9 = MUS_DEHUMIDIFICATION -1 (0xFF) = MUS_NULL

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2. The Network Variable index number is a unique identifier for certain LONWORKS variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. The totalizer continues to increment until the maximum count is reached, at which point the BAS must reset the value by issuing a write command. The variable is saved in nonvolatile memory every 24 hours. If power is lost, that day's totalizer information is not stored.

5. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 19: Network Variable Outputs (NVOs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor, Continued

Point Name	LONWORKS Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Outputs (NVOs)					
Previous Alarm	nvoPreviousAlarm (39)	SNVT_str_asc (36)	Init: No Alarms	No	Indicates the previous unit fault. **SmartSource (Series2) Alarm Strings** • No Alarms • IO Exp Communication Fail • Invalid Configuration[5] • Low Voltage Brownout • Comp High Pressure • Comp Low Pressure • Comp Suctn Temp Snsr Fail • Comp Low Suction Temp • Freeze Fault Detect • Room Temp Sensor Fail • Entering Water Temp Snsr Fail • Leaving Water Temp Snsr Fail • Condensate Overflow • Low Entering Water Temp • Serial EEPROM Corrupted • Wtrside Econ Low Temp Cutout **Enfinity Large Two Compressor (SS2C) Alarm Strings** • No Alarms • IO Exp Communication Fail • Invalid Configuration[5] • Low Voltage Brownout • Comp #1 High Pressure • Comp #2 High Pressure • Comp #1 Low Pressure • Comp #2 Low Pressure • Comp #1 Suctn Temp Snsr Fail • Comp #2 Suctn Temp Snsr Fail • Comp #1 Low Suction Temp • Comp #2 Low Suction Temp • Freeze Fault Detect • Room Temp Sensor Fail • Entering Water Temp Snsr Fail • Leaving Water Temp Snsr Fail • Condensate Overflow • Low Entering Water Temp • Serial EEPROM Corrupted • Wtrside Econ Low Temp Cutout
Pump Request Output	nvoPumpRequest (40)	SNVT_switch (95)	Default: Null	No	Indicates when the unit is requesting flow from the loop water controller. The loop pump must be running to provide adequate flow through the unit so the compressor(s) can operate safely. nviComprEnable can be used by the BAS to indicate if proper loop fluid flow is occurring. **Selection / State / Value** No Flow Req / 0 / 0% Flow Req / 1 / 100% Null / -1 / 0%
Setpoint Shift Output	nvoSetptShift (37)	SNVT_temp_setpt (106)	-5 to 5ºF -2.78 to 2.78ºC Init: All Setpts 0ºF	Send	Represents the local hardwired setpoint adjustment value from the room sensor potentiometer. It is valid when configured for Short Range Setpoint Adjust. **Supported Fields** • occupied_cool • standby_cool • unoccupied_cool (always 0) • occupied_heat • standby_heat • unoccupied_heat (always 0)
Status	nvoStatus	SNVT_obj_status (93)	Init: All structure elements = 0	No	Reports the status of the requested functional block as commanded from nviRequest. **Supported Fields** • object_id: 0=Node Obj, 1=McQuaySCC_WSHP • invalid_id: 0=Normal ID, 1=Invalid ID • invalid_request: 0=Valid Req, 1=Invalid Req • report_mask: 0=Not Supported, 1=Supported

1. Analog Null (0x7FFF) is a discrete temperature value of 621.806ºF/327.67ºC. Its purpose is to indicate a sensor failure condition or when the unit controller is not using that temperature value.

2. The Network Variable index number is a unique identifier for certain LONWORKS variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. The totalizer continues to increment until the maximum count is reached, at which point the BAS must reset the value by issuing a write command. The variable is saved in nonvolatile memory every 24 hours. If power is lost, that day's totalizer information is not stored.

5. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 19: Network Variable Outputs (NVOs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor, Continued

Point Name	LONWORKS Variable (NV Index[2])	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Variable Outputs (NVOs)					
Unit Status Output	nvoUnitStatus (27)	SNVT_hvac_status (112)		Send	Indicates the unit status. It combines the operating mode, the capacity of heating and cooling, and any alarms that are present in the object. The in_alarm status indicates the highest priority current alarm identifier. **Unit Status Fields** • mode: (see supported modes below) • heat_output_primary: 0 to 100% • heat_output_secondary: 0 to 100% • cool_output: 0 to 100% • econ_output: 0 to 100% • fan_output: 0 to 100% • in_alarm: (see alarm identifiers below) **Supported Modes** 1 = HVAC_HEAT (Heating Mode) 3 = HVAC_COOL (Cooling Mode) 6 = HVAC_OFF (Inactive Control) 9 = HVAC_FAN_ONLY (Fan Only Mode) 14 = HVAC_DEHUMID (Dehumidification Mode) **SmartSource (Series2) Alarm Identifiers** 0 = No Alarms 1 = IO Exp Communication Fail 2 = Invalid Configuration[5] 3 = Low Voltage Brownout 4 = Comp High Pressure 5 = Comp Low Pressure 6 = Comp Suctn Temp Snsr Fail 7 = Comp Low Suction Temp 8 = Freeze Fault Detect 9 = Room Temp Sensor Fail 10 = Entering Water Temp Snsr Fail 11 = Leaving Water Temp Snsr Fail 12 = Condensate Overflow 13 = Low Entering Water Temp 14 = Serial EEPROM Corrupted 15 = Wtrside Econ Low Temp Cutout **Enfinity Large Two Compressor (SS2C) Alarm Identifiers** 0 = No Alarms 1 = IO Exp Communication Fail 2 = Invalid Configuration[5] 3 = Low Voltage Brownout 4 = Comp #1 High Pressure 5 = Comp #2 High Pressure 6 = Comp #1 Low Pressure 7 = Comp #2 Low Pressure 8 = Comp #1 Suctn Temp Snsr Fail 9 = Comp #2 Suctn Temp Snsr Fail 10 = Comp #1 Low Suction Temp 11 = Comp #2 Low Suction Temp 12 = Freeze Fault Detect 13 = Room Temp Sensor Fail 14 = Entering Water Temp Snsr Fail 15 = Leaving Water Temp Snsr Fail 16 = Condensate Overflow 17 = Low Entering Water Temp 18 = Serial EEPROM Corrupted 19 = Wtrside Econ Low Temp Cutout

1. Analog Null (0x7FFF) is a discrete temperature value of 621.806ºF/327.67ºC. Its purpose is to indicate a sensor failure condition or when the unit controller is not using that temperature value.

2. The Network Variable index number is a unique identifier for certain LONWORKS variables. Some BAS companies use this numeric value instead of text to reference these variables. The NV index number can also be found in the XIF file.

3. After Receive Heartbeat is enabled, this variable reverts to the default (non-override) value if it is not refreshed often enough through a network command or if communication is disabled (i.e. the device is disabled or is offline).

4. The totalizer continues to increment until the maximum count is reached, at which point the BAS must reset the value by issuing a write command. The variable is saved in nonvolatile memory every 24 hours. If power is lost, that day's totalizer information is not stored.

5. The Invalid Configuration alarm occurs if software incompatibility has been detected or the hardware configuration jumpers are not selecting a valid model type.

Table 20: Network Configuration Properties Inputs (NCIs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor

Point Name	LonWorks Variable (NV Index)	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Configuration Property Inputs (NCIs)					
Brownout Reference Setpoint	nciBrownoutRef	UCPTbrownoutRef	25 to 1023 counts Default: 400	No	Detects a unit controller brownout condition. A brownout condition occurs when nvoBrownout < 80% of nciBrownoutRef, and clears when nvoBrownout > 90% of nciBrownoutRef. *Only perform the calibration procedure if the unit controller 24VAC voltage is within normal operating parameters. A password of 1023 is required.*
Compressor Low Pressure Alarm Delay	nciLowPresAlmDly	UCPTlowPresAlmDly	0 to 120 sec Default: 30 sec	No	Specifies the time delay between the Low Pressure input and compressor(s) alarm generation.
Compressor Low Suction Temperature Protection Differential	nciLowTmpProtDif	UCPTlowTmpProtDif	2 to 15°F 1.11 to 8.34°C Default: 8°F / 4.44°C	No	nciLowTmpProtDif is added to the selected Compressor Low suction Tdemperature SP (nciLowTempProt or nciLowTempProtGL) to determine the setting at which the alarm clears.
Compressor Low Suction Temp Protection SP for Glycol	nciLowTempProtGL	UCPTlowTempProtGL	0 to 50°F -17.78 to 10°C Default: 6.5ºF/-14.16ºC	No	Temperature at which a Compressor Low Suction alarm occurs in the Heating mode when the loop fluid is glycol. nciLowTempProtGL is enabled by the unit controller JP3 jumper in the shorted position, which selects glycol. nciLowTempProtGL does not apply to the dehumidification and cooling modes, which use a fixed 28ºF low temp threshold regardless of the loop fluid type.
Compressor Low Suction Temp Protection SP for Water	nciLowTempProt	UCPTlowTempProt	0 to 50°F -17.78 to 10°C Default: 28ºF/-2.22ºC	No	Temperature at which a Compressor Low Suction alarm occurs in the Heating mode when the loop fluid is water. nciLowTempProt is enabled by the unit controller JP3 jumper in the open position, which selects water. nciLowTempProt does not apply to the dehumidification and cooling modes, which use a fixed 28ºF low temp threshold regardless of the loop fluid type.
Compressor Minimum OFF Timer	nciMinCompOffTmr	UCPT minCompOffTmr	0 to 1200 sec Default: 360 sec*	No	A countdown timer that defines the minimum period of time a compressor must remain OFF before it is allowed to turn ON again. *A default value of 180 sec applies to the following: • SmartSource (Series2) v5.0 • Enfinity Large Two Compressor (SS2C) v1.0
Compressor Minimum ON Timer	nciMinCompOnTmr	UCPT minCompOnTmr	0 to 1200 sec Default: 180 sec	No	A countdown timer that defines the minimum period of time a compressor must remain ON before it is allowed to turn OFF again.
Fourth Stage Heating Setpoint Differential	nciStg4SptDiff	UCPTstg4SptDiff	1 to 10°F 0.55 to 5.56°C Default: 6ºF / 3.33ºC	No	Determines the Fourth Stage Heating ON setpoints from the Third Stage ON setpoints for SmartSource (Series2) units controlled by room sensors.
HVAC Unit Type Identifier	nciHVACType	SCPThvacType	0 to 9 Default: 3	No	Defines the primary application and equipment type for the unit controller. *Do not modify this configuration property.* **Supported Values** 0 = HVT_GENERIC 1 = HVT_FAN_COIL 2 = HVT_VAV 3 = HVT_HEAT_PUMP (Default) 4 = HVT_ROOFTOP 5 = HVT_UNIT_VENT 6 = HVT_CHILL_CEIL 7 = HVT_RADIATOR 8 = HVT_AHU 9 = HVT_SELF_CONT
Hydronic Cooling ON Setpoint	nciHydroClgOnSpt	UCPThydroClgOnSpt	50 to 70ºF 10 to 21.12ºC Default: 55ºF / 12.78ºC	No	Specifies the Entering Water Temperature (EWT) Hydronic Cooling setpoint for units with a waterside economizer. Hydronic cooling is enabled if the EWT is below the value of nciHydroClgOnSpt. It is allowed to operate in conjunction with compressor cooling. If the EWT drops below the fixed value of 35ºF, hydronic cooling is disabled.
Hydronic Heating ON Setpoint	nciHydroHtgOnSpt	UCPThydroHtgOnSpt	70 to 158ºF 21.11 to 70ºC Default:* 90ºF / 32.22ºC	No	Specifies the Entering Water Temperature (EWT) Hydronic Heating setpoint for units with a hydronic heating coil. Hydronic heating is not allowed to operate in conjunction with compressor heating. *A default value of 70ºF / 21.12ºC applies to the following: • SmartSource (Series2) v6.1 and older • Enfinity Large Two Compressor (SS2C) v1.1 and older

Table 20: Network Configuration Properties Inputs (NCIs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor, Continued

Point Name	LonWorks Variable (NV Index)	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Configuration Property Inputs (NCIs)					
Hydronic Setpoint Differential	nciHydronicDiff	UCPThydronicDiff	2 to 10ºF 1.11 to 5.56ºC Default: 5ºF / 2.78ºC	No	Sets the hydronic heating and cooling hysteresis that determines the Effective OFF setpoints.
Interstage OFF Timer	nciIntStgOffTmr	UCPTintStgOffTmr	0 to 1200 sec Default: 0	No	A countdown timer that defines the minimum period of time between turn-off of the subsequent heating and cooling stages. Presently the Interstage OFF timer is not supported by the unit controller.
Interstage ON Timer	nciIntStgOnTmr	UCPTintStgOnTmr	0 to 1200 sec Default: 300 sec	No	A countdown timer that defines the minimum period of time between turn-on of the subsequent heating and cooling stages.
Local Bypass Time Setpoint	nciBypassTime (4)	SCPTbypassTime	0, 30 to 120 min Default: 120 min	No	Defines the amount of time that the unit can be in the Bypass mode, which is initiated by the Timed Override button. Pressing the Timed Override button 4-9 seconds sets the bypass timer to the maximum nciBypassTime value. The value of 0 disables this feature.
Location	nciLocation	SCPTlocation	30 Characters	No	Provides descriptive physical location information for the unit.
Long Range Setpoint Adjust Maximum	nciSptAdjMax (5)	UCPTsptAdjMax	55 to 95ºF 12.77 to 35ºC Default: 95°F / 35°C	No	Specifies the maximum allowed value of the nvoSetpoint Long Range Setpoint Adjust. The nciSptAdjMax must be greater or equal to the nciSptAdjMin value.
Long Range Setpoint Adjust Minimum	nciSptAdjMin (6)	UCPTsptAdjMin	55 to 95ºF 12.77 to 35ºC Default: 55°F / 12.78°C	No	Specifies the minimum allowed value of the nvoSetpoint Long Range Setpoint Adjust. The nciSptAdjMin must be less than or equal to the nciSptAdjMax value.
Low Leaving Water Temp Differential	nciLowLwtDiff	UCPTlowLwtDiff	2 to 15ºF 1.11 to 8.34ºC Default: 7°F / 3.89°C	No	Specifies the Low Leaving Water Temperature (LWT) Differential setpoint used to calculate the Freeze Fault setpoint. nciLowLwtDiff is added to the selected Compressor Low Suction Temp Protection SP (nciLowTempProt or nciLowTempProtGL).This determines the Freeze Fault temperature, which is based on LWT. After the Freeze Fault condition has been activated, the Freeze Fault alarm must be manually reset when the LWT is above the lockout temperature for the alarm to clear.
Low EWT Setpoint for Glycol	nciLowEwtSptGly	UCPTlowEwtSptGly	15 to 40ºF -9.44 to 4.45ºC Default: 28°F / -2.22°C	No	Value of the Low Entering Water Temperature (EWT) setpoint when using glycol loop fluid. The compressor(s) are disabled in Heating mode when the low EWT condition exists. Unit controller configuration jumper JP3 must be shorted to select glycol as the loop fluid type. The hysteresis differential is fixed at 2ºF.
Low EWT Setpoint for Water	nciLowEwtSptWtr	UCPTlowEwtSptWtr	40 to 65ºF 4.44 to 18.34ºC Default: 55°F / 12.78°C	No	Value of the low entering water temperature setpoint when using water loop fluid. The compressor(s) are disabled in the heating mode when the low EWT condition exists. Unit controller configuration jumper JP3 must be open to select Water as the loop fluid type. The hysteresis differential is fixed at 2ºF.
Minimum Send Time	nciMinOutTm	SCPTminSendTime	0 to 6553.4 sec Default: 0 (Disabled)	No	Defines the minimum period of time between automatic network variable output transmissions. It limits network traffic when output network variables are frequently changing. The value of 0 disables the timer. **Supported Variables** • nvoBrownout • nvoDischAirTemp • nvoEWT • nvoLocalSpaceTmp • nvoLWT • nvoSpaceTemp • nvoSuctionTemp1 • nvoSuctionTemp2 (SS2C software only)
Occupied Setpoint Differential	nciOccDiff	UCPToccDiff	1 to 5°F 0.55 to 2.78°C Default: 1ºF / 0.55ºC	No	Used to set the Occupied and Standby setpoint hysteresis that determine the Effective OFF setpoints. **Interaction Rules** • nciOccDiff < (occupied_cool – occupied_heat) • nciOccDiff < (standby_cool – standby_heat)

Table 20: Network Configuration Properties Inputs (NCIs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor, Continued

Point Name	LonWorks Variable (NV Index)	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Configuration Property Inputs (NCIs)					
Occupancy Temperature Setpoints	nciSetpoints (3)	SCPTsetPnts	50 to 95ºF 10 to 35ºC Defaults: See Description*	No	Defines the space temperature heating and cooling setpoints for different occupancy modes. See Effective Occupancy Modes. The Occupancy Temperature Setpoints must be kept in ascending order as follows: unoccupied_heat <= standby_heat <= occupied_heat <= occupied_cool <= standby_cool <= unoccupied_cool **Additional interaction rules** • occupied_cool > (occupied_heat + nciOccDiff) • standby_cool > (standby_heat + nciOccDiff) • unoccupied_cool>(unoccupied_heat+nciUnoccDiff) • occupied_heat < (occupied_cool – nciOccDiff) • standby_heat < (standby_cool – nciOccDiff) • unoccupied_heat<(unoccupied_cool–nciUnoccDiff) ***Default Values** • Occupied_cool = 75ºF, 23.88ºC • Standby_cool = 77ºF, 25.00ºC • Unoccupied_cool = 85ºF, 29.44ºC • Occupied_heat = 70ºF, 21.11ºC • Standby_heat = 66ºF, 18.88ºC • Unoccupied_heat = 60ºF, 15.55ºC
Receive Heartbeat	nciRcvHrtBt	SCPTmaxRcvTime	0 to 6553.4 sec Default: 0 sec (Disabled)	No	Specifies the maximum amount of time the supported overrides must be refreshed (i.e. written) before the unit reverts back to the default value. Each variable supported by Receive Heartbeat has a separate timer associated with it. The value of 0 disables this feature. **Supported Variables** • nviApplicMode • nviAuxHeatEnable • nviComprEnable • nviEnergyHoldOff • nviFanOnAuto • nviHumidistat • nviOccSchedule • nviOccSensor • nviSetptOffset • nviSpaceTemp
Room Sensor Setpoint Adjust Enable/Disable	nciLocSptEnable (7)	UCPTlocSptEnable	0 to 1 Default: Enabled	No	Enables or disables the local hardwired setpoint adjustment. If the value of nciLocSptEnable is set to 0, this disables setpoint control from a room sensor and enables setpoint control from the network. **Supported Values** 0 = Disabled 1 = Enabled
Second Stage Setpoint Differential	nciStg2SptDiff	UCPTstg2SptDiff	1 to 5°F 0.55 to 2.78°C Default: 2ºF / 1.11ºC	No	Used to determine the Second Stage Heating and Cooling ON setpoints from the First Stage ON setpoints for units controlled by room sensors.
Send Heartbeat	nciSndHrtBt	SCPTmaxSendTime	0 to 6553.4 sec Default: 0 (Disabled)	No	Defines the maximum period of time that elapses before the network variable outputs (NVOs) shown below are automatically updated. Each NVO supported has a separate timer associated with it. The BAS may be able to detect a missing heartbeat from the unit controller to determine that communication is lost and take corrective action. The value of 0 disables the auto update feature. **Supported Variables** • nvoDischAirTemp • nvoEffectOccup • nvoEffectSetpt • nvoFanSpeed • nvoLocalSpaceTmp • nvoSetpoint • nvoSetptShift • nvoSpaceTemp • nvoUnitStatus
Device Software Identification (Major Version)	nciDevMajVer	SCPTdevMajVer	0 to 255	No	The software major version of the communication module firmware. *Do not modify this configuration property.*

Table 20: Network Configuration Properties Inputs (NCIs) - SmartSource Single and Two Stage Compressor and Enfinity Large Two Compressor, Continued

Point Name	LonWorks Variable (NV Index)	SNVT Type (SNVT Index)	Range/ Default (in Units)	Heart-beat	Description
Network Configuration Property Inputs (NCIs)					
Device Software Identification (Minor Version)	nciDevMinVer	SCPTdevMinVer	0 to 255	No	The software minor version of the communication module firmware. *Do not modify this configuration property.*
Software Jumpers	nciSoftJumpers	UCPTsoftJumpers	16 Characters	No	Sets the software jumper configuration. This property is not implemented in unit controller software.
Third Stage Heating Setpoint Differential	nciStg3SptDiff	UCPTstg3SptDiff	1 to 10°F 0.55 to 5.56°C Default: 6ºF / 3.33ºC	No	Used to determine the Third Stage Heating ON setpoints from the Second Stage ON setpoints for units controlled by room sensors.
Unit Application Identification (Major Version)	nciUnitAppMajVer	UCPTunitAppMajVer	0 to 255	No	The major version of the unit controller software. *Do not modify this configuration property.*
Unit Application Identification (Minor Version)	nciUnitAppMinVer	UCPTunitAppMinVer	0 to 255	No	The minor version of the unit controller software. *Do not modify this configuration property.*
Unoccupied Setpoint Differential	nciUnoccDiff	UCPTunOccDiff	2 to 10ºF 1.11 to 5.56ºC Default: 2ºF / 1.11ºC	No	Sets the Unoccupied hysteresis that determines the Effective OFF setpoints. **Interaction Rule** nciUnoccDiff < (unoccupied_cool – unoccupied_heat)

The following section provides greater detail for the Binary Input Status and Binary Output parameters noted in the BACnet Network Objects and LonWorks Data Tables summary tables.

Binary Input Status

Table 21: Binary Input Status Bit Descriptions - Enfinity Single Stage Compressor (Models MHC/MHW, CCH/CCW, VFC/VFW, LVC/LVW, VHC/VHF)

Bit Number	Bit Description	Setting	Description
Unit Controller Jumpers			
0	Normal/Test Mode	Jumper 1 = Open (0)	Normal operation
		Jumper 1 = Shorted (1)	Service/Test mode operation
1	Fan Operation (Jumper applies to unit controller v3.1 and newer and also for v3.0 and older using room sensor control without a fan On/Auto switch)	Jumper 2 = Open (0)	Continuous fan operation
		Jumper 2 = Shorted (1)	Cycling fan operation
2	Loop Fluid	Jumper 3 = Open (0)	Water loop fluid
		Jumper 3 = Shorted (1)	Glycol loop fluid
3	Alarm 'A' Terminal Polarity Select (Unit controller v3.1 and newer)	Jumper 4 = Open (0)	Fault de-energizes alarm output to 0VAC
		Jumper 4 = Shorted (1)	Fault energizes alarm output to 24VAC
4	Room Sensor Setpoint Adjust Range	Jumper 5 = Open (0)	Short range: -3º to +3º F (-1.67º to +1.67º C)
		Jumper 5 = Shorted (1)	Long range: 55º to 95º F (12.78º to 35ºC)
5	Thermostat/Room Sensor	Jumper 6 = Open (0)	Thermostat control
		Jumper 6 = Shorted (1)	Room sensor control
6	Not used	Jumper 7 = Open (0)	
7	Not used	Jumper 8 = Open (0)	
Unit Controller Inputs			
8	Compressor #1 Low Pressure Switch	Switch Closed (1)	Low Pressure Switch for compressor #1 is normal
		Switch Open (0)	Low Pressure Switch for compressor #1 is in alarm
9	Compressor #1 High Pressure Switch	Switch Closed (1)	High Pressure Switch for compressor #1 is normal
		Switch Open (0)	High Pressure Switch for compressor #1 is in alarm
10	Emergency Shutdown	Open (0)	Unit shuts down
11	Local Occupancy Switch[1]	Switch Open (0)	Unoccupied
		Switch Closed (1)	Occupied
12	Thermostat Timed Override (O – Terminal)	Switch Closed (1)	If the Timed Override switch is pressed for more than 3 seconds but less than 10 seconds while in the Unoccupied mode, the unit goes into the Timed Override mode (the thermostat has a pushbutton for Timed Override)
13	Thermostat Fan Request (G – Terminal)	Switch Closed (1)	Thermostat fan operation is requested
14	Thermostat Cool Stage #1 (Y1 – Terminal)	Switch Closed (1)	First stage of thermostat cooling is requested
15	Thermostat Cool Stage #2 (Y2 – Terminal)	Switch Closed (1)	Second stage of thermostat cooling is requested
16	Thermostat Heat Stage #1 (W1 – Terminal)	Switch Closed (1)	First stage of thermostat heating is requested
17	Thermostat Heat Stage #2 (W2 – Terminal)	Switch Closed (1)	Second stage of thermostat heating is requested
I/O Expansion Module Jumpers			
18	Number of Compressors	Jumper 1 = Open (0)	Single compressor
		Jumper 1 = Shorted (1)	Dual compressor
19	Hot Gas/Water Reheat (HGR)	Jumper 2 = Open (0)	None
		Jumper 2 = Shorted (1)	Hot Gas/Water Reheat (HGR)
20 & 21	Secondary Heating Options (2 Jumpers)	Jumper 3 = Open (0)	None
		Jumper 4 = Open (0)	
		Jumper 3 = Shorted (1)	Supplemental electric heat
		Jumper 4 = Open (0)	
		Jumper 3 = Open (0)	Boilerless electric heat
		Jumper 4 = Shorted (1)	

Bit Number	Bit Description	Setting	Description
Unit Controller Jumpers			
22 & 23	Fan Speed Selection (2 Jumpers)	Jumper 5 = Open (0)	Single speed fan
		Jumper 6 = Open (0)	
		Jumper 5 = Shorted (1)	Two speed fan
		Jumper 6 = Open (0)	
		Jumper 5 = Open (0)	Three speed fan
		Jumper 6 = Shorted (1)	
24	Not used	Jumper 7 = Open (0)	
25	Lead Compressor Options (Unit controller software v3.1 and newer)	Jumper 8 = Open (0)	Compressor #1 is lead
		Jumper 8 = Closed (1)	Compressor #2 is lead (dual compressor models only)
I/O Expansion Module Inputs			
26	Compressor #2 Low Pressure Switch	Switch Closed (1)	Low Pressure Switch for compressor #2 is normal
		Switch Open (0)	Low Pressure Switch for compressor #2 is in alarm
27	Compressor #2 High Pressure Switch	Switch Closed (1)	High Pressure Switch for compressor #2 is normal
		Switch Open (0)	High Pressure Switch for compressor #2 is in alarm
28	Humidistat Dehumidification Request	Closed (1)	HGR Dehumidification is requested
		Open (0)	HGR Dehumidification is not requested
29	Not used	N/A	
30	Not used	N/A	
31	Previous Unit Heat/Cool/Dehumid Mode	Provided by unit controller	Provides mode awareness in Fan Only state (0=Heating, 1=Cooling or Dehumidification)

1. This switch is effective only when the network scheduling is not in use.

Table 22: Bit Description for SmartSource Single and Two Stage Compressor (Models GSH/GSV, GTH/GTV and GCV)

Bit Number	Bit Description	Setting	Description
Unit Controller Jumpers			
0	Normal/Test Mode	Jumper 1 = Open (0)	Normal operation
		Jumper 1 = Shorted (1)	Service/Test mode operation
1	Fan Operation	Jumper 2 = Open (0)	Continuous fan operation
		Jumper 2 = Shorted (1)	Cycling fan operation
2	Loop Fluid	Jumper 3 = Open (0)	Water loop fluid
		Jumper 3 = Shorted (1)	Glycol loop fluid
3	Freeze Fault Protection	Jumper 4 = Open (0)	LWT Freeze Fault Protection is disabled
		Jumper 4 = Shorted (1)	LWT Freeze Fault Protection is enabled
4	Room Sensor Setpoint Adjust Range	Jumper 5 = Open (0)	Short range: -5º to +5º F (-2.78º to +2.78º C)
		Jumper 5 = Shorted (1)	Long range: 55º to 95º F (12.78º to 35º C)
5	Thermostat/Room Sensor	Jumper 6 = Open (0)	Thermostat control
		Jumper 6 = Shorted (1)	Room sensor control
6	Compressor Heating Source	Jumper 7 = Open (0)	Allows compressor Heating mode operation
		Jumper 7 = Shorted (1)	Disables compressor Heating mode operation
7	I/O Expansion Module	Jumper 8 = Open (0)	I/O Expansion Module is not present
		Jumper 8 = Shorted (1)	I/O Expansion Module is required
Unit Controller Inputs			
8	Compressor Low Pressure Switch	Switch Closed (1)	Compressor Low Pressure Switch is normal
		Switch Open (0)	Compressor Low Pressure Switch is in alarm
9	Compressor High Pressure Switch	Switch Closed (1)	Compressor High Pressure Switch is normal
		Switch Open (0)	Compressor High Pressure Switch is in alarm
10	Emergency Shutdown	Open (0)	Unit shuts down
11	Local Occupancy Switch[1]	Switch Open (0)	Unoccupied
		Switch Closed (1)	Occupied
12	Thermostat Heat Stage #3 (O – Terminal)	Switch Closed (1)	Third stage of thermostat heating is requested
13	Thermostat Fan Request (G – Terminal)	Switch Closed (1)	Thermostat fan operation is requested
14	Thermostat Cool Stage #1/Cool Stage #2 (Y1 – Terminal)	Switch Closed (1)	First stage of thermostat cooling is requested (unit has HGR option) Second stage of thermostat cooling is requested (unit does not have HGR option)

1. This switch is effective only when the network scheduling is not in use.

Bit Number	Bit Description	Setting	Description
Unit Controller Jumpers			
15	Thermostat Cool Stage #2/Cool Stage #3 (Y2 – Terminal)	Switch Closed (1)	Second stage of thermostat cooling is requested (unit has HGR option) Third stage of thermostat cooling is requested (unit does not have HGR option)
16	Thermostat Heat Stage #1 (W1 – Terminal)	Switch Closed (1)	First stage of thermostat heating is requested
17	Thermostat Heat Stage #2 (W2 – Terminal)	Switch Closed (1)	Second stage of thermostat heating is requested
I/O Expansion Module Jumpers			
18 & 19	Unit controller software v6.1 and older: Not used Unit Controller v6.2 and newer: Fan Row Select	Jumper 1 & Jumper 2	Fan row select for modes: Fan Only/Hydronic Heating/Hydronic Cooling
20 & 21	Secondary Heating Options (2 Jumpers)	Jumper 3 = Open (0)	None
		Jumper 4 = Open (0)	
		Jumper 3 = Shorted (1)	Supplemental electric heat
		Jumper 4 = Open (0)	
		Jumper 3 = Open (0)	Boilerless electric heat
		Jumper 4 = Shorted (1)	
		Jumper 3 = Shorted (1)	Hydronic Heating (applies only to unit controller software v6.0 and newer)
		Jumper 4 = Shorted (1)	
22 & 23	Dehumidification/Cooling Options (2 Jumpers)	Jumper 5 = Open (0)	None
		Jumper 6 = Open (0)	
		Jumper 5 = Shorted (1)	Hot Gas/Water Reheat (HGR)
		Jumper 6 = Open (0)	
		Jumper 5 = Open (0)	Hydronic Cooling (waterside economizer)
		Jumper 6 = Shorted (1)	
24	Not used	Jumper 7 = Open (0)	
25	Compressor Capacity Option	Jumper 8 = Open (0)	Single stage capacity compressor
		Jumper 8 = Shorted (1)	Dual stage capacity compressor
I/O Expansion Module Inputs			
26	Thermostat Heat Stage #4	Switch Closed (1)	Fourth stage of thermostat heating is requested
27	Compressor High Capacity – High Pressure Cutout Switch	Closed (1)	Compressor High Capacity – High Pressure Switch is normal
		Open (0)	Compressor High Capacity – High Pressure Switch is in alarm
28	Humidistat Dehumidification / Cooling Stage #1 Request	Closed (1)	HGR Dehumidification is requested (unit has HGR option) First stage of cooling is requested (unit does not have HGR option)
29 & 30	Fan Speed Lookup Table Row Select	Binary: 00 , 01, 10, 11	Fan speed duty cycle lookup table row selection
31	Previous Unit Heat/Cool/Dehumid Mode	Provided by unit controller	Provides mode awareness in Fan Only state (0=Heating, 1=Cooling or Dehumidification)

1. This switch is effective only when the network scheduling is not in use.

Table 23: Bit Description for Enfinity Large Two Compressor (Models CCH/CCW and LVC/LVW)

Bit Number	Bit Description	Setting	Description
Unit Controller Jumpers			
0	Normal/Test Mode	Jumper 1 = Open (0)	Normal operation
		Jumper 1 = Shorted (1)	Service/Test mode operation
1	Fan Operation	Jumper 2 = Open (0)	Continuous fan operation
		Jumper 2 = Shorted (1)	Cycling fan operation
2	Loop Fluid	Jumper 3 = Open (0)	Water loop fluid
		Jumper 3 = Shorted (1)	Glycol loop fluid
3	Freeze Fault Protection	Jumper 4 = Open (0)	LWT Freeze Fault Protection is disabled
		Jumper 4 = Shorted (1)	LWT Freeze Fault Protection is enabled
4	Room Sensor Setpoint Adjust Range	Jumper 5 = Open (0)	Short range: -5º to +5º F (-2.78º to +2.78º C)
		Jumper 5 = Shorted (1)	Long range: 55º to 95º F (12.78º to 35º C)
5	Thermostat/Room Sensor	Jumper 6 = Open (0)	Thermostat control
		Jumper 6 = Shorted (1)	Room sensor control

Bit Number	Bit Description	Setting	Description
Unit Controller Jumpers			
6 & 7	Compressor Availability (2 Jumpers)	Jumper 7 = Open (0)	Both compressors are available for use
		Jumper 8 = Open (0)	
		Jumper 7 = Shorted (1)	Lead compressor is available for use (lag compressor is off-line)
		Jumper 8 = Open (0)	
		Jumper 7 = Open (0)	No compressors are available for use
		Jumper 8 = Shorted (1)	
Unit Controller Inputs			
8	Compressor #1 Low Pressure Switch	Switch Closed (1)	Low Pressure Switch for compressor #1 is normal
		Switch Open (0)	Low Pressure Switch for compressor #1 is in alarm
9	Compressor #1 High Pressure Switch	Switch Closed (1)	High Pressure Switch for compressor #1 is normal
		Switch Open (0)	High Pressure Switch for compressor #1 is in alarm
10	Emergency Shutdown	Open (0)	Unit shuts down
11	Local Occupancy Switch[1]	Switch Open (0)	Unoccupied
		Switch Closed (1)	Occupied
12	Thermostat Heat Stage #3 (O – Terminal)	Switch Closed (1)	Third stage of thermostat heating is requested
13	Thermostat Fan Request (G – Terminal)	Switch Closed (1)	Thermostat fan operation is requested
14	Thermostat Cool Stage #1 / Cool Stage #2 (Y1 – Terminal)	Switch Closed (1)	First stage of thermostat cooling is requested (unit has HGR) Second stage of thermostat cooling is requested (unit does not have HGR)
15	Thermostat Cool Stage #2 / Cool Stage #3 (Y2 – Terminal)	Switch Closed (1)	Second stage of thermostat cooling is requested (unit has HGR) Third stage of thermostat cooling is requested (unit does not have HGR)
16	Thermostat Heat Stage #1 (W1 – Terminal)	Switch Closed (1)	First stage of thermostat heating is requested
17	Thermostat Heat Stage #2 W2 – Terminal)	Switch Closed (1)	Second stage of thermostat heating is requested
I/O Expansion Module Jumpers			
18	Not Used	Jumper 1 = Open (0)	
19	Not Used	Jumper 2 = Open (0)	
20 & 21	Secondary Heating Options (2 Jumpers)	Jumper 3 = Open (0)	None
		Jumper 4 = Open (0)	
		Jumper 3 = Shorted (1)	Supplemental electric heat
		Jumper 4 = Open (0)	
		Jumper 3 = Open (0)	Boilerless electric heat
		Jumper 4 = Shorted (1)	
		Jumper 3 = Shorted (1)	Hydronic Heating
		Jumper 4 = Shorted (1)	
22 & 23	Dehumidification/Cooling Options (2 Jumpers)	Jumper 5 = Open (0)	None
		Jumper 6 = Open (0)	
		Jumper 5 = Shorted (1)	Hot Gas/Water Reheat (HGR)
		Jumper 6 = Open (0)	
		Jumper 5 = Open (0)	Hydronic Cooling (waterside economizer)
		Jumper 6 = Shorted (1)	
24	Not Used	Jumper 7 = Open (0)	
25	Lead Compressor Option	Jumper 8 = Open (0)	Compressor #1 is lead
		Jumper 8 = Shorted (1)	Compressor #2 is lead
I/O Expansion Module Inputs			
26	Compressor #2 Low Pressure Switch	Switch Closed (1)	Low Pressure Switch for compressor #2 is normal
		Switch Open (0)	Low Pressure Switch for compressor #2 is in alarm
27	Compressor #2 High Pressure Switch	Switch Closed (1)	High Pressure Switch for compressor #2 is normal
		Switch Open (0)	High Pressure Switch for compressor #2 is in alarm
28	Humidistat Dehumidification / Cooling Stage #1 Request	Closed (1)	HGR Dehumidification is requested (unit has HGR) First stage of cooling is requested (unit does not have HGR)
29	Not used	N/A	
30	Not used	N/A	
31	Previous Unit Heat/Cool/Dehumid Mode	Provided by unit controller	Provides mode awareness in Fan Only state (0=Heating, 1=Cooling or Dehumidification)

1. This switch is effective only when the network scheduling is not in use.

Binary Output Status

Table 24: Bit Description for Enfinity Single Stage Compressor (Models MHC/MHW, CCH/CCW, VFC/VFW, LVC/LVW, and VHC/VHF)

Bit Number	Bit Description	Value	Description
Unit Controller Outputs			
0	Compressor #1	ON (1)	Compressor #1 request
1	Fan or Fan Low Speed	ON (1)	Fan request ON (single speed fan) or Fan request at low speed (multispeed fan)
2	Reversing Valve #1	ON (1)	Heating position for compressor #1
		OFF (0)	Cooling position for compressor #1
3	Pump Request/Isolation Valve	ON (1)	Water flow is required
4	Alarm Output (A – Terminal)	ON (1)	Alarm output is energized with 24VAC when there is no fault
		OFF (0)	Alarm output is de-energized when there is a fault
5	Remote Circuit #1 – Red LED	OFF (0) /ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate unit controller Fault/Status mode for Circuit #1
6	Remote Circuit #1 – Green LED	OFF (0)/ ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #1
7	Remote Circuit #1 – Yellow LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #1
8	Room Sensor Status LED	ON (1)	Indicates the room sensor Status LED is on Steady. LED is ON when the unit controller is in either the Occupied or Bypass modes
		OFF (0)	Indicates the room sensor Status LED is either flashing or constantly OFF
I/O Expansion Module Outputs			
9	Compressor #2 or Fan Medium Speed	ON (1)	Compressor #2 request for fan request at medium speed
10	Reversing Valve #2 or Secondary Heating	ON (1)	Heating position for compressor #2 or Secondary Heating ON request
		OFF (0)	Cooling position for compressor #2 or Secondary Heating OFF request
11	Hot Gas Reheat (HGR)	ON (1)	Hot Gas Reheat (HGR) request
12	Fan High Speed	ON (1)	Fan request at high speed
13	Remote Circuit #2 – Red LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #2
14	Remote Circuit #2 – Green LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #2
15 (MSB)[1]	Remote Circuit #2 – Yellow LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #2

1. MSB = Most Significant Bit

Table 25: Bit Description for SmartSource Single and Two Stage Compressor (Models GSH/GSV, GTH/GTV and GCV)

Bit Number	Bit Description	Setting	Description
Unit Controller Jumpers			
0	Compressor	ON (1)	Compressor request
1	Fan Main	ON (1)	Fan Main request
2	Reversing Valve	ON (1)	Heating position for compressor
		OFF (0)	Cooling position for compressor
3	Pump Request / Isolation Valve	ON (1)	Water flow Is required
4	Alarm Output (A – Terminal)	ON (1)	Alarm output is energized with 24VAC when there is a fault
		OFF (0)	Alarm output is de-energized when there is no fault
5	Remote Circuit #1 – Red LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #1
6	Remote Circuit #1 – Green LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #1
7	Remote Circuit #1 –Yellow LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #1
8	Room Sensor Status LED	ON (1)	Indicates the Room Sensor Status LED is ON steady. LED is ON when the unit controller is in either the Occupied or Bypass modes
		OFF (0)	Indicates the Room Sensor Status LED is either flashing or constantly OFF
I/O Expansion Module Outputs			
9	Compressor – High Stage Capacity	ON (1)	Compressor – High Stage Capacity request
10	Auxiliary Heat Stage #1	ON (1)	Auxiliary Heat Stage #1 ON request
11	HGR/Waterside Economizer	ON (1)	HGR/Waterside Economizer request
12	Auxiliary Heat Stage #2	ON (1)	Auxiliary Heat Stage #2 ON request
13	Remote Circuit #2 – Red LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #2
14	Remote Circuit #2 – Green LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #2
15 (MSB)[1]	Remote Circuit #2 –Yellow LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #2

1. MSB = Most Significant Bit

Table 26: Bit Description for Enfinity Large Two Compressor (Models CCH/CCW and LVC/LVW)

Bit Number	Bit Description	Setting	Description
Unit Controller Jumpers			
0	Compressor #1	ON (1)	Compressor #1 request
1	Fan Main	ON (1)	Fan Main request
2	Reversing Valve #1	ON (1)	Heating position for compressor #1
		OFF (0)	Cooling position for compressor #1
3	Pump Request/Isolation Valve	ON (1)	Water flow is required
4	Alarm Output (A – Terminal)	ON (1)	Alarm output is energized with 24VAC when there is a fault
		OFF (0)	Alarm output is de-energized when there is no fault
5	Remote Circuit #1 – Red LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #1
6	Remote Circuit #1 – Green LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #1
7	Remote Circuit #1 –Yellow LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #1
8	Room Sensor Status LED	ON (1)	Indicates the room sensor Status LED is ON steady. LED is ON when the unit controller is in either the Occupied or Bypass modes
		OFF (0)	Indicates the room sensor Status LED is either flashing or constantly OFF
9	Compressor #2	ON (1)	Compressor #2 request
10	Reversing Valve #2	ON (1)	Heating position for compressor #2
		OFF (0)	Cooling position for compressor #2
11	HGR/Waterside Economizer	ON (1)	HGR/Waterside Economizer request
12	Electric Heat/Hydronic Heat	ON (1)	Electric Heat/Hydronic Heat ON request
13	Remote Circuit #2 – Red LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #2
14	Remote Circuit #2 – Green LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #2
15 (MSB)[1]	Remote Circuit #2 –Yellow LED	OFF (0) / ON (1)	Red, Green, and Yellow LEDs are used in combination to indicate the unit controller Fault/Status mode for Circuit #2

1. MSB = Most Significant Bit

BACnet Configuration

This section describes how to set BACnet parameters using the BACnet communication module's built-in configuration menu (Figure 1). The BACnet configuration menu is accessed using Microsoft Windows® HyperTerminal® or PuTTY. It is assumed that the user is familiar with such an application. Certain parameters are can also be configured via the BACnet network (BAS). Parameters that can only be accessed using the BACnet configuration menu are noted below. The second part of this section, BACnet Commissioning and Device Management, describes optional network testing and verification tools available for the communication module.

The parameters listed below require configuration in order for the communication module to properly integrate to the BACnet network.

BACnet Device Properties

- Device Instance - must be set to a unique value on the BACnet network
- Device Name - must be set to a unique value on the BACnet network
- Location
- Units
- Description

BACnet MS/TP Settings

- MS/TP Baud Rate - must be set to match the speed of the BACnet network. Valid values are 9600, 19200, 38400, or 76800. The baud rate must be set using the BACnet configuration menu.
- MaxMasters - set to the highest address of a MS/TP master on the network segment to reduce the MS/TP token traffic and increase response time of the unit controller. MaxMasters can be set from the BAS or from the BACnet configuration menu.
- MAC Address / Address Switch - must be set according to the BACnet network requirements. The MS/TP MAC address can be set from the BAS or from the BACnet configuration menu only when the physical address switch (S3) is set to 255.

Accessing the BACnet Configuration Menu

The BACnet communication module's configuration menu is accessed through the DB-9 serial connector on the module itself. Any serial terminal device or application (such as Windows HyperTerminal) can be used to view the menu and change the configuration parameters.

Follow these steps to connect to the BACnet configuration menu (Figure 1):

1. Verify that the terminal application communication settings are set to: 19200 bps, 8-data bits, 1-stop bit, no parity, and no flow control.
2. Use a null modem serial cross over cable to connect the computer to the BACnet communication module.
3. Once connected, press the 'Enter' key to display the menu shown in Figure 1.
4. Change the terminal EIA-232 baud rate, if necessary. If a change is required, the baud rate must be set first using the BACnet configuration menu, and then the terminal device application.
5. Change the following parameters, if desired: Instance, Name, Location, Description, MS/TP Baud Rate, and Units.
6. Press 'S' to save the BACnet configuration settings.
7. Verify "Flash write – success" is shown for configuration pages 1 and 2. Otherwise, save the settings again.

Figure 1: BACnet Configuration Menu

```
==================== Configuration Menu ====================
 Daikin Applied – MTIIIUC_WSHP
 BACnet  FW  HP0  v3.2       UnitApp  HP0  v3.1
======= SW PN 2506908 ====================================
   DEVICE
1) Instance .....      3101127
2) Name .....          MTIIIUC_WSHP_3101127
3) Location .....
4) Description .....
5) Units .....         English

   MS/TP
6) Baudrate .....      38400
7) MaxMasters .....    127
M) MAC Address ...     127

   TERMINAL
8) EIA-232 Baudrate ... 19200

B) Backup
R) Restore Configuration
S) Save settings
------------------------------------------------------------
   Enter Selection:
```

BACnet Commissioning and Device Management

The Network "Wink" Command

The BACnet communication module implements a unit identification mode command to the unit controller by using the BACnet "ReinitializeDevice" request, with a Cold or Warm Start request handle, and a password of "wink" (all lower case). The "wink" unit identification function allows verification of an individual unit network address without opening the unit access panels. The Wink command can be used during all operating and non-operating (ex. Alarm) modes except for the following conditions:

- Brownout Mode
- Emergency Shutdown
- Defrost process

Upon receiving a wink command from a network management node, the unit controller exhibits the following identification sequence (all occur simultaneously):

- Room Sensor LED: flashes ON 3 seconds, then OFF 3 seconds for 15 total seconds, unless an alarm condition exists.
- Fan: the fan turns off for 5 seconds then on 5 seconds, then off again for 5 seconds.

Several parameters are used only for maintenance and testing. A network management tool such as VTS is typically used to issue the network commands. This section describes the use of these network parameters that apply to the heat pump:

- DeviceCommunicationControl – Disable
- DeviceCommunicationControl - Enable
- ReinitializeDevice (Reset)
- Network "Wink" Command

DeviceCommunicationControl - Disable

The purpose of this command is to reduce network traffic for diagnostic testing of the MS/TP network. When the communication module receives a network command to disable communication, it stops communicating fan coil unit information to the network. An optional time may be specified for how long to suspend communications. The unit continues to operate during the Disabled state.

DeviceCommunicationControl - Enable

When the communication module receives a network command to enable communication, unit controller network communication is restored.

ReinitializeDevice (Reset)

When the communication module receives a network ReinitializeDevice command, it performs the following:

1. Sends a command to the unit controller to perform a warm reset, maintaining non-volatile memory.
2. Resets the communication module.

If a warm reset is requested, the communication module's non-volatile memory is maintained. If a cold reset is requested, then the communication module's non-volatile memory is set to the factory default values.

NOTE: The password required to Reinitialize Device is "McQuay" or "MicroTech." The password "MicroTech" is supported for the following unit types:

- HP0 software v3.2 and newer
- HP2 software v6.1 and newer
- HP3 all software versions

See Table 15 for a description of which WSHP models correspond to HP0, HP2, and HP3.

A cold reset can also be performed by the following button sequence on the BACnet communication module.

1. Press and hold the button labeled "Default."
2. Momentarily press the "Reset" button.
3. The four LED indicators flash briefly and then begin sequencing on starting with LED D1.
4. Release the "Default" button when all four LED indicators are on.
5. The communication module will then clear the memory to default settings and reset.

The following functions are specific to the LONWORKS device (in this case, the LONWORKS communication module). These functions are used for maintenance and testing. A network management tool such as Echelon's LonMaker® software is typically used to issue the network commands.

The Network "Wink" Command

A wink command is initiated by the BAS or through the LONWORKS commissioning software. The "wink" identification function allows verification of an individual unit controller network address without having to physically open the unit's access panels. The Wink command can be used during all operating and non-operating (ex. Alarm) modes except for the following conditions:

- Brownout Mode
- Emergency Shutdown
- Defrost process

Upon receiving a wink command from a network management node, the unit controller exhibits the following identification sequence (all occur simultaneously):

- Room Sensor LED: flashes ON for 3.0 sec, OFF for 3.0 sec for 15 total seconds, unless an alarm condition exists.
- Fan: The fan turns off for 5 seconds, turns on for 5 seconds, then off again for 5 seconds.

Offline

When the LONWORKS communication module receives a network command to go Offline, the unit controller continues to operate but communication is suspended except for network management messages.

Online

When the LONWORKS communication module receives a network command to go Online, network messaging is restored.

Reset

When the LONWORKS communication module receives a network command Reset command, it performs the following:

1. Sends a command to the unit controller to perform a warm reset, maintaining non-volatile memory.
2. Resets the Neuron processor.

Occupancy Modes

This section describes the relationship among the three network occupancy inputs that determine the resulting effective occupancy of the unit. Refer to Table 27 for BACnet and Table 28 for LONWORKS networks.

Table 27: Effective Occupancy Mode - BACnet

Local Sensor	Occupancy Override Input (MSV7) Range: 1-5	Occupancy Scheduler Input (MSV8) Range: 1–4	Occupancy Sensor Input (MSV9) Range: 1–3	Effective Occupancy Output (MSV6) Range: 1–5
NA	1 (Occ)	NA	NA	1 (Occ)
NA	2 (Unoc)	NA	NA	2 (Unoc)
NA	3 (Bypass)	1 (Occ)	NA	1 (Occ)
		2 (Unoc)	NA	3 (Bypass)
		3 (Standby)	NA	3 (Bypass)
		4 (Null)	1 (Occ)	1 (Occ)
			2 (Unoc)	2 (Unoc)
NA	4 (Standby)	NA	NA	4 (Standby)
NA	5 (Null)	1 (Occ)	1 (Occ)	1 (Occ)
			2 (Unoc)	4 (Standby)
		2 (Unoc)	NA	2 (Unoc)
		3 (Standby)	NA	4 (Standby)
		4 (Null)	1 (Occ)	1 (Occ)
			2 (Unoc)	2 (Unoc)
Occ	5 (Null)	4 (Null)	3 (Null)	1 (Occ)
Unoc	5 (Null)	4 (Null)	3 (Null)	2 (Unoc)

Note: Refer to BACnet Network Objects for full BACnet name and descriptions.

Table 28: Effective Occupancy Mode - LONWORKS

Local Sensor	nviOccManCmd	nviOccSchedule	nviOccSensor	nvoEffectOccup
NA	OC_OCCUPIED	NA	NA	OC_OCCUPIED
NA	OC_UNOCCUPIED	NA	NA	OC_UNOCCUPIED
NA	OC_BYPASS	OC_OCCUPIED	NA	OC_OCCUPIED
		OC_UNOCCUPIED	NA	OC_BYPASS
		OC_STANDBY	NA	OC_BYPASS
		OC_NUL	OC_OCCUPIED	OC_OCCUPIED
			OC_UNOCCUPIED	OC_UNOCCUPIED
NA	OC_STANDBY	NA	NA	OC_STANDBY
NA	OC_NUL	OC_OCCUPIED	OC_OCCUPIED	OC_OCCUPIED
			OC_UNOCCUPIED	OC_STANDBY
		OC_UNOCCUPIED	NA	OC_UNOCCUPIED
		OC_STANDBY	NA	OC_STANDBY
		OC_NUL	OC_OCCUPIED	OC_OCCUPIED
			OC_UNOCCUPIED	OC_UNOCCUPIED
OCC	OC_NUL	OC_NUL	OC_NUL	OC_OCCUPIED
UNOCC	OC_NUL	OC_NUL	OC_NUL	OC_UNOCCUPIED

Notes:
1. OC_BYPASS can be initiated by either nviOccManCmd or a local input. nvoEffectOccup will only be OC_BYPASS for the duration of the Local Bypass Time (nciBypassTime), until reinitiated by either a transition of the local input or an update to nviOccManCmd.
2. The occupancy sensor can be either a local input or a network input. If a valid value for the network input is present, it has precedence over a local input.
3. For the occupancy sensor, OC_NUL (and no local input) is interpreted as OC_OCCUPIED.
4. For nviOccSchedule, this refers to the “current state” field.
5. “Any State” = Any State.

Setpoint Methods

This section details the calculations used for setting space temperature setpoints. The calculations depend on unit status (if it is occupied, unoccupied, or in standby mode) and whether a local or long range setpoint adjust is enabled. BACnet and LONWORKS methods are the shown separately. A space temperature setpoint operation diagram illustrates the relationship among the inputs and their default values (Figure 2). The last section includes examples of common applications using default values.

Table 29 is the set of default values for each parameter. Refer to these defaults for the example applications (Table 30).

Setpoint Methods - BACnet

NOTE: All calculations shown in 1-5 below apply to Stage #1 heating/cooling.

1. **The unit is operating in Unoccupied mode.**

- EffCoolOnSP = AV3
- EffCoolOffSP = (EffCoolOnSP – AV17)
- EffHeatOnSP = AV6
- EffHeatOffSP = (EffHeatOnSP + AV17)

2. **The unit is operating in Occupied or Standby mode with Local Setpoint Adjust disabled by MSV14=1.** This calculation then depends on whether or not there is a valid AV19 value. The DeadBandFactor used in this calculation is shown here for both Occupied and Standby modes (and applies to both a valid and invalid AV19 value):

   Occupied: DeadBandFactor = ((AV1 – AV4) / 2)
   Standby: DeadBandFactor = ((AV2 – AV5) / 2)

Valid AV19 value:

- ReferenceSP = (AV19 + AV35)
- EffCoolOnSP = (ReferenceSP + DeadBandFactor)
- EffCoolOffSP = (EffCoolOnSP – AV10)
- EffHeatOnSP = (ReferenceSP – DeadBandFactor)
- EffHeatOffSP = (EffHeatOnSP + AV10)

Invalid AV19 value: (Analog Null)

The Reference setpoint used in this calculation is shown here for both Occupied and Standby modes:

Occupied: ReferenceSP = (AV1 – DeadBandFactor + AV35)

Standby: ReferenceSP = (AV2 – DeadBandFactor + AV35)

- EffCoolOnSP = (ReferenceSP + DeadBandFactor)
- EffCoolOffSP = (EffCoolOnSP – AV10)
- EffHeatOnSP = (ReferenceSP – DeadBandFactor)
- EffHeatOffSP = (EffHeatOnSP + AV10)

3. **The unit is operating In Occupied or Standby mode with Long Range Local Setpoint Adjust selected and MSV14=2.** The DeadBandFactor used in this calculation is shown here for both Occupied and Standby modes.

   Occupied: DeadBandFactor = ((AV1 – AV4) / 2)
   Standby: DeadBandFactor = ((AV2 – AV5) / 2)

- ReferenceSP = AI5
- EffCoolOnSP = (ReferenceSP + DeadBandFactor)
- EffCoolOffSP = (EffCoolOnSP – AV10)
- EffHeatOnSP = (ReferenceSP – DeadBandFactor)
- EffHeatOffSP = (EffHeatOnSP + AV10)

4. **The unit is operating in Occupied mode with Short Range Local Setpoint Adjust selected and MSV14=2**.

- EffCoolOnSP = (AV1 + AV24)
- EffCoolOffSP = (EffCoolOnSP – AV10)
- EffHeatOnSP = (AV4 + AV24)
- EffHeatOffSP = (EffHeatOnSP + AV10)

5. **The unit is operating in Standby mode with Short Range Local Setpoint Adjust selected and MSV14=2.**

- EffCoolOnSP (HP0, HP1)[1] = (AV2 + AV25)
- EffCoolOnSP (HP2, HP3)[1] = (AV2 + AV24)
- EffCoolOffSP = (EffCoolOnSP – AV10)
- EffHeatOnSP = (AV5 + AV24)
- EffHeatOffSP = (EffHeatOnSP + AV10)

[1]See Table 31 for WSHP models associated with HP0, HP1, HP2 and HP3 respectively.

Setpoint Methods – LONWORKS

NOTE: All calculations shown in 1-5 below apply to Stage #1 heating/cooling.

1. **The unit is operating in Unoccupied mode.**

- EffCoolOnSP = nciSetpoints.unoccupied_cool
- EffCoolOffSP = (EffCoolOnSP – nciUnoccDiff)
- EffHeatOnSP = nciSetpoints.unoccupied_heat
- EffHeatOffSP = (EffHeatOnSP + nciUnoccDiff)

2. **The unit is operating in Occupied or Standby mode with Local Setpoint Adjust disabled by nciLocSptEnable=0.** This calculation then depends on whether or not there is a valid nviSetpoint value. The DeadBandFactor used in this calculation is shown here for both Occupied and Standby modes (and applies to both a valid and invalid nviSetpoint value):

   Occupied: DeadBandFactor = ((nciSetpoints.occupied_cool – nciSetpoints.occupied_heat) / 2)

   Standby: DeadBandFactor = ((nciSetpoints.standby_cool – nciSetpoints.standby_heat) / 2)

Valid nviSetpoint value:

- ReferenceSP = (nviSetpoint + nviSetptOffset)
- EffCoolOnSP = (ReferenceSP + DeadBandFactor)
- EffCoolOffSP = (EffCoolOnSP – nciOccDiff)
- EffHeatOnSP = (ReferenceSP – DeadBandFactor)
- EffHeatOffSP = (EffHeatOnSP + nciOccDiff)

Invalid nviSetpoint value: (Analog Null)

The Reference setpoint used in this calculation is shown here for both Occupied and Standby modes:

Occupied: ReferenceSP = (nciSetpoints.occupied_cool - DeadBandFactor+nviSetptOffset)

Standby: ReferenceSP = (nciSetpoints.standby_cool – DeadBandFactor + nviSetptOffset)

- EffCoolOnSP = (ReferenceSP + DeadBandFactor)
- EffCoolOffSP = (EffCoolOnSP – nciOccDiff)
- EffHeatOnSP = (ReferenceSP – DeadBandFactor)
- EffHeatOffSP = (EffHeatOnSP + nciOccDiff)

3. **The unit is operating In Occupied or Standby mode with Long Range Local Setpoint Adjust selected and nciLocSptEnable=1.** The DeadBandFactor used in this calculation is shown here for both Occupied and Standby modes.

   Occupied: DeadBandFactor = ((nciSetpoints.occupied_cool – nciSetpoints.occupied_heat) / 2)

   Standby: DeadBandFactor = ((nciSetpoints.standby_cool – nciSetpoints.standby_heat) / 2)

- ReferenceSP = nvoSetpoint
- EffCoolOnSP = (ReferenceSP + DeadBandFactor)
- EffCoolOffSP = (EffCoolOnSP – nciOccDiff)
- EffHeatOnSP = (ReferenceSP – DeadBandFactor)
- EffHeatOffSP = (EffHeatOnSP + nciOccDiff)

4. **The unit is operating in Occupied mode with Short Range Local Setpoint Adjust selected and nciLocSptEnable=1**.

- EffCoolOnSP = (nciSetpoints.occupied_cool + nvoSetptShift)
- EffCoolOffSP = (EffCoolOnSP – nciOccDiff)
- EffHeatOnSP = (nciSetpoints.occupied_heat + nvoSetptShift)
- EffHeatOffSP = (EffHeatOnSP + nciOccDiff)

5. **The unit is operating in Standby mode withShort Range Local Setpoint Adjust selected and nciLocSptEnable=1.**

- EffCoolOnSP = (nciSetpoints.standby_cool + nvoSetptShift)
- EffCoolOffSP = (EffCoolOnSP – nciOccDiff)
- EffHeatOnSP = (nciSetpoints.standby_heat + nvoSetptShift)
- EffHeatOffSP = (EffHeatOnSP + nciOccDiff)

NOTE: Refer below for subsequent stages #2-4 heating/cooling setpoint calculations.

1. **Enfinity Single Stage Compressor models MHC/MHW, CCH/CCW (5-ton or less), VFC/VF, LVC/LVW, and VHC/VHF (HP0)**

- Cool Stage#2 ON SP = Cool Stage#1 ON SP + 2°F
- Heat Stage#2 ON SP = Heat Stage#1 ON SP – 2°F

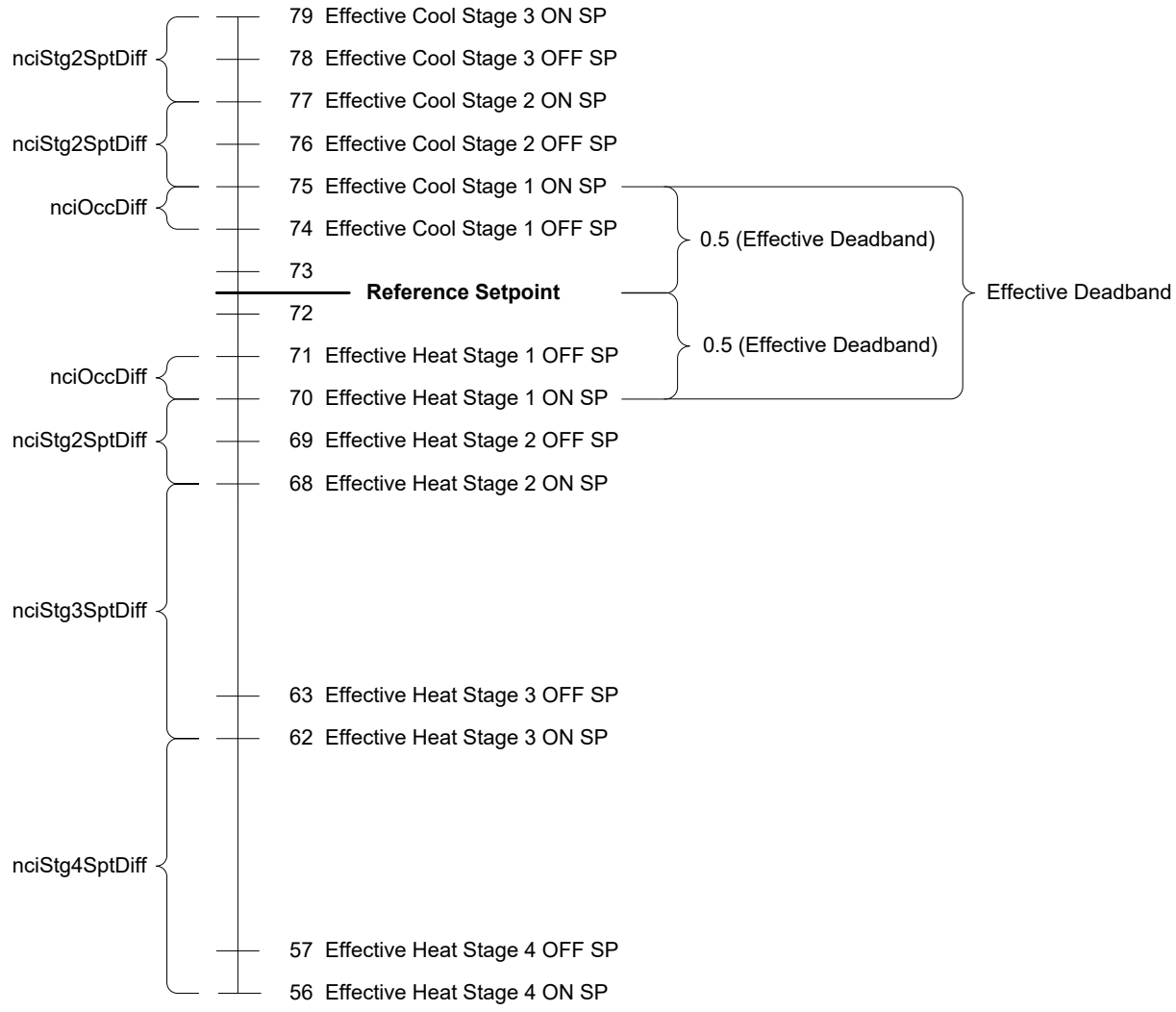
2. **SmartSource Single and Two Stage Compressor (Series2) models GSH/GSV, GTH/GTV, GCV (HP2) and Enfinity Large Two Compressor (SS2C) models CCH/CCW (6-ton or greater), and LVC/LVW (HP3)**

- Cool Stage#2 ON SP = Cool Stage#1 ON SP + nciStg2SptDiff (AV33)
- Cool Stage#3 ON SP = Cool Stage#2 ON SP + nciStg2SptDiff (AV33)
- Heat Stage#2 ON SP = Heat Stage#1 ON SP – nciStg2SptDiff (AV33)
- Heat Stage#3 ON SP = Heat Stage#2 ON SP – nciStg3SptDiff (AV36)
- Heat Stage#4 ON SP = Heat Stage#3 ON SP – nciStg4SptDiff (AV37) applies to HP2 only

Important Notes

1. The Long/Short Range configuration jumper (JP5) does not affect network setpoint operation.
2. Effective deadband does not apply to units in Unoccupied mode.
3. The LonMark organization provides a detailed description of the symmetrical method used to determine the effective setpoint calculation. Refer to the Wall Unit Functional Profile, available at: http://www.lonmark.org/technical_resources/guidelines/docs/profiles/8540_10.pdf.

Figure 2: Space Temperature Setpoint Operation



Example Setpoint Calculations

The following tables show how to apply the formulas from the preceding section. Each mode (Occupied, Unoccupied, or Standby) uses the default values shown in Table 29. Table 30 provides common setpoint scenarios as a helpful reference when working with temperature setpoint parameters. Table 31 shows which WSHP models apply to each unit type (HP0-HP3).

Table 29: Temperature Setpoint Defaults

AV1 (nciSetpoints.occupied_cool) = 75°F	AV5 (nciSetpoints.standby_heat) = 66°F
AV2 (nciSetpoints.standby_cool) = 77°F	AV6 (nciSetpoints.unoccupied_heat) = 60°F
AV3 (nciSetpoints.unoccupied_cool) = 85°F	AV10 (nciOccDiff) = 1°F
AV4 (nciSetpoints.occupied_heat) = 70°F	AV17 (uciUnoccDiff) = 2°F

Table 30: Example Calculations

Unoccupied Mode	Occupied Mode using Network Setpoints	Occupied Mode using Long Range Setpoint Adjust	Standby Mode using Short Range Setpoint Adjust
Effective Cool ON SP = 85°F	MSV14 (nciLocSptEnable) = Disabled	MSV14 (nciLocSptEnable) = Enabled	MSV14 (nciLocSptEnable) = Enabled
Effective Cool OFF SP = (85 – 2) = 83°F	AV19 (nviSetpoint) = 72°F	Reference SP = AI5 (nvoSetpoint) = 72.5°F	HP0/HP1[1]: AV25 (nvoSetptShift) = 3°F HP2/HP3[1]: AV24 (nvoSetptShift) = 3°F
Effective Heat ON SP = 60°F	AV35 (nviSetptOffset) = 0.5°F	Deadband Factor = ((75 – 70) / 2) = 2.5	Effective Cool ON SP = (77 + 3) = 80°F
Effective Heat OFF SP = (60 + 2) = 62°F	Reference SP = (72 + 0.5) = 72.5°F	Effective Cool ON SP = (72.5 + 2.5) = 75°F	Effective Cool OFF SP = (80 – 1) = 79°F
	Deadband Factor = ((75 – 70) / 2) = 2.5	Effective Cool OFF SP = (75 – 1) = 74°F	Effective Heat ON SP = (66 + 3) = 69°F
	Effective Cool ON SP = (72.5 + 2.5) = 75°F	Effective Heat ON SP = (72.5 – 2.5) = 70°F	Effective Heat OFF SP = (69 + 1) = 70°F
	Effective Cool OFF SP = (75 – 1) = 74°F	Effective Heat OFF SP = (70 + 1) = 71°F	
	Effective Heat ON SP = (72.5 – 2.5) = 70°F		
	Effective Heat OFF SP = (70 + 1) = 71°F		

1. See Table 31 for details.

Table 31: Description of WSHP Models

HP0	Enfinity Single Stage Compressor models MHC/MHW, CCH/CCW (5-ton or less), VFC/VFW, LVC/LVW, and VHC/VHF
HP1	Two Speed Compressor, Multi-Fan Speed (Series1) models C2H/C2W
HP2	SmartSource Single and Two Stage Compressor (Series2) models GSH/GSV, GTH/GTV, GCV
HP3	Enfinity Large Two Compressor (SS2C) models CCH/CCW (6-ton or greater), and LVC/LVW

BACnet PICS - Enfinity Single Stage Compressor Water Source Heat Pumps

This section contains the Protocol Implementation Conformance Statement (PICS) for the MicroTech III WSHP Unit Controller used with Enfinity Single Stage Compressor models: MHC/MHW, CCH/CCW, VFC/VFW, LVC/LVW, and VHC/VHF as required by ANSI/ASHRAE Standard 135-2004, BACnet; A Data Communication Protocol for Building Automation and Control Networks.

Protocol Implementation Conformance Statement

Date	Nov 4, 2019
Vendor Name	Daikin Applied
Product Name	MTIIIUC_WSHP
Product Model Number	WSHP
Application Software Version	3.2 (unit controller hardware PN 668105601) 1.0 (unit controller hardware PN 668105611)
Firmware Revision	3.4
BACnet Protocol Revision	Version 1 Revision 4

Product Description

The MicroTech III WSHP unit controller with optional BACnet communication module is a microprocessor designed to operate the heat pump unit and integrate it into a BACnet building automation system.

BACnet Standardized Device Profile

The MicroTech III WSHP unit controller supports the BACnet Interoperability Building Blocks (BIBBS) included in the BACnet Advanced Application Controller (B-AAC) profile. The following section provides a complete listing of BIBBS.

- ☐ **BACnet Standardized Device Profile**
- ☐ **BACnet Operator Workstation (B-OWS)**
- ☐ **BACnet Building Controller (B-BC)**
- ☐ **BACnet Advanced Application Specific Controller (B-AAC)**
- ☒ **BACnet Application Specific Controller (B-ASC)**
- ☐ **BACnet Smart Sensor (B-SS)**
- ☐ **BACnet Smart Actuator (B-SA)**

BACnet Interoperability Building Blocks (BIBBS) Supported

BIBB Name	Designation
Data Sharing – Read Property – B	DS-RP-B
Data Sharing – Read Property Multiple – B	DS-RPM-B
Data Sharing – Write Property – B	DS-WP-B
Data Sharing – Write Property Multiple – B	DS-WPM-B
Data Sharing – COV – B (15 Maximum Objects Supported)	DS-COV-B
Device Management – Dynamic Device Binding – B	DM-DDB-B
Device Management – Dynamic Object Binding – B	DM-DOB-B
Device Management – Device Communication Control – B	DM-DCC-B
Device Management – Time Synchronization – B	DM-TS-B
Device Management – Reinitialize Device – B	DM-RD-B

Standard Object Types Supported

Object-Type	Creatable	Deleteable	Optional	Writeable
Analog Input	☐	☐		COV_Increment, Out_of_Service, Present_Value, Units
Analog Value	☐	☐		COV_Increment, Present_Value, Priority_Array, Relinquish_Default, Units
Binary Input	☐	☐	Active_Text, Description, Inactive_Text	
Binary Value	☐	☐	Active_Text, Description, Inactive_Text	Present_Value
Multi-state Input	☐	☐	State_Text	
Multi-state Value	☐	☐	State_Text	Present_Value, Priority_Array, Relinquish_Default, MSV15 = Device Units (English – Metric)
Device	☐	☐	Description Location Max_Master	Description Location (Limit 32 Chars) Max_Master

Data Link Layer Options

- ☐ BACnet IP, (Annex J)
- ☐ BACnet IP, (Annex J), Foreign Device
- ☒ MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400 & 76800
- ☐ MS/TP slave (Clause 9), baud rate(s): 9600, 19200, 38400 & 76800

Segmentation Capability

- ☐ Segmented requests supported — Window Size: 4 for IP and 1 for MS/TP
- ☐ Segmented responses supported — Window Size: 4 for IP and 1 for MS/TP

Device Address Binding

- ☐ Yes Static Device Binding
- ☒ No

Character Sets Supported

- ☒ ANSI X3.4
- ☐ IBM®/Microsoft® DBCS
- ☐ ISO 8859-1
- ☐ ISO 10646 (UCS-2)
- ☐ ISO 10646 (UCS-4)
- ☐ JIS C 6226

NOTE: Support for multiple character sets does not imply they can be supported simultaneously.

BACnet PICS - SmartSource Single and Two Stage Compressor Water Source Heat Pumps

This section contains the Protocol Implementation Conformance Statement (PICS) for the MicroTech III WSHP Unit Controller used with SmartSource Single and Two Stage Compressor models GSH/GSV, GTH/GTV and GCV as required by ANSI/ASHRAE (American National Standards Institute/American Society of Heating, Refrigeration, and Air Conditioning Engineers) Standard 135-2004, BACnet; A Data Communication Protocol for Building Automation and Control Networks.

Protocol Implementation Conformance Statement

Date	Nov 4, 2019
Vendor Name	Daikin Applied
Product Name	MTIIIUC_WSHP_Ser2
Product Model Number	WSHP
Application Software Version	6.2 (unit controller hardware PN 668105601) 1.0 (unit controller hardware PN 668105611)
Firmware Revision	6.4
BACnet Protocol Revision	Version 1 Revision 4

Product Description

The MicroTech III WSHP unit controller with optional BACnet communication module is a microprocessor designed to operate the heat pump unit and integrate it into a BACnet building automation system.

BACnet Standardized Device Profile

The MicroTech III WSHP unit controller supports the BACnet Interoperability Building Blocks (BIBBS) included in the BACnet Advanced Application Controller (B-AAC) profile. The following section provides a complete listing of BIBBS.

- ☐ **BACnet Standardized Device Profile**
- ☐ **BACnet Operator Workstation (B-OWS)**
- ☐ **BACnet Building Controller (B-BC)**
- ☐ **BACnet Advanced Application Specific Controller (B-AAC)**
- ☒ **BACnet Application Specific Controller (B-ASC)**
- ☐ **BACnet Smart Sensor (B-SS)**
- ☐ **BACnet Smart Actuator (B-SA)**

BACnet Interoperability Building Blocks (BIBBS) Supported

BIBB Name	Designation
Data Sharing – Read Property – B	DS-RP-B
Data Sharing – Read Property Multiple – B	DS-RPM-B
Data Sharing – Write Property – B	DS-WP-B
Data Sharing – Write Property Multiple – B	DS-WPM-B
Data Sharing – COV – B (15 Maximum Objects Supported)	DS-COV-B
Device Management – Dynamic Device Binding – B	DM-DDB-B
Device Management – Dynamic Object Binding – B	DM-DOB-B
Device Management – Device Communication Control – B	DM-DCC-B
Device Management – Time Synchronization – B	DM-TS-B
Device Management – Reinitialize Device – B	DM-RD-B

Standard Object Types Supported

Object-Type	Creatable	Deleteable	Optional	Writeable
Analog Input	☐	☐		COV_Increment, Out_of_Service, Present_Value, Units
Analog Value	☐	☐		COV_Increment, Present_Value, Priority_Array, Relinquish_Default, Units
Binary Input	☐	☐	Active_Text, Description, Inactive_Text	
Binary Value	☐	☐	Active_Text, Description, Inactive_Text	Present_Value
Multi-state Input	☐	☐	State_Text	
Multi-state Value	☐	☐	State_Text	Present_Value, Priority_Array, Relinquish_Default, MSV15 = Device Units (English – Metric)
Device	☐	☐	Description Location Max_Master	Description Location (Limit 32 Chars) Max_Master

Data Link Layer Options

- ☐ BACnet IP, (Annex J)
- ☐ BACnet IP, (Annex J), Foreign Device
- ☒ MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400 & 76800
- ☐ MS/TP slave (Clause 9), baud rate(s): 9600, 19200, 38400 & 76800

Segmentation Capability

- ☐ Segmented requests supported — Window Size: 4 for IP and 1 for MS/TP
- ☐ Segmented responses supported — Window Size: 4 for IP and 1 for MS/TP

Device Address Binding

- ☐ Yes Static Device Binding
- ☒ No

Character Sets Supported

- ☒ ANSI X3.4
- ☐ IBM®/Microsoft® DBCS
- ☐ ISO 8859-1
- ☐ ISO 10646 (UCS-2)
- ☐ ISO 10646 (UCS-4)
- ☐ JIS C 6226

NOTE: Support for multiple character sets does not imply they can be supported simultaneously.

BACnet PICS - Enfinity Large Two Compressor Water Source Heat Pumps

This section contains the Protocol Implementation Conformance Statement (PICS) for the MicroTech III WSHP unit controller used with Enfinity Large Two Compressor models CCH/CCW, LVC/LVW as required by ANSI/ASHRAE (American National Standards Institute/American Society of Heating, Refrigeration, and Air Conditioning Engineers) Standard 135-2004, BACnet; A Data Communication Protocol for Building Automation and Control Networks.

Protocol Implementation Conformance Statement

Date	Nov 4, 2019
Vendor Name	Daikin Applied
Product Name	MTIIIUC_WSHP_SS2C
Product Model Number	WSHP
Application Software Version	1.1 (unit controller hardware PN 668105601) 1.0 (unit controller hardware PN 668105611)
Firmware Revision	1.3
BACnet Protocol Revision	Version 1 Revision 4

Product Description

The MicroTech III WSHP unit controller with optional BACnet communication module is a microprocessor designed to operate the heat pump unit and integrate it into a BACnet building automation system.

BACnet Standardized Device Profile

The MicroTech III WSHP unit controller supports the BACnet Interoperability Building Blocks (BIBBS) included in the BACnet Advanced Application Controller (B-AAC) profile. The following section provides a complete listing of BIBBS.

- ☐ **BACnet Standardized Device Profile**
- ☐ **BACnet Operator Workstation (B-OWS)**
- ☐ **BACnet Building Controller (B-BC)**
- ☐ **BACnet Advanced Application Specific Controller (B-AAC)**
- ☒ **BACnet Application Specific Controller (B-ASC)**
- ☐ **BACnet Smart Sensor (B-SS)**
- ☐ **BACnet Smart Actuator (B-SA)**

BACnet Interoperability Building Blocks (BIBBS) Supported

BIBB Name	Designation
Data Sharing – Read Property – B	DS-RP-B
Data Sharing – Read Property Multiple – B	DS-RPM-B
Data Sharing – Write Property – B	DS-WP-B
Data Sharing – Write Property Multiple – B	DS-WPM-B
Data Sharing – COV – B (15 Maximum Objects Supported)	DS-COV-B
Device Management – Dynamic Device Binding – B	DM-DDB-B
Device Management – Dynamic Object Binding – B	DM-DOB-B
Device Management – Device Communication Control – B	DM-DCC-B
Device Management – Time Synchronization – B	DM-TS-B
Device Management – Reinitialize Device – B	DM-RD-B

Standard Object Types Supported

Object-Type	Creatable	Deleteable	Optional	Writeable
Analog Input	☐	☐		COV_Increment, Out_of_Service, Present_Value, Units
Analog Value	☐	☐		COV_Increment, Present_Value, Priority_Array, Relinquish_Default, Units
Binary Input	☐	☐	Active_Text, Description, Inactive_Text	
Binary Value	☐	☐	Active_Text, Description, Inactive_Text	Present_Value
Multi-state Input	☐	☐	State_Text	
Multi-state Value	☐	☐	State_Text	Present_Value, Priority_Array, Relinquish_Default, MSV15 = Device Units (English – Metric)
Device	☐	☐	Description Location Max_Master	Description Location (Limit 32 Chars) Max_Master

Data Link Layer Options

- ☐ BACnet IP, (Annex J)
- ☐ BACnet IP, (Annex J), Foreign Device
- ☒ MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400 & 76800
- ☐ MS/TP slave (Clause 9), baud rate(s): 9600, 19200, 38400 & 76800

Segmentation Capability

- ☐ Segmented requests supported — Window Size: 4 for IP and 1 for MS/TP
- ☐ Segmented responses supported — Window Size: 4 for IP and 1 for MS/TP

Device Address Binding

- ☐ Yes Static Device Binding
- ☒ No

Character Sets Supported

- ☒ ANSI X3.4
- ☐ IBM®/Microsoft® DBCS
- ☐ ISO 8859-1
- ☐ ISO 10646 (UCS-2)
- ☐ ISO 10646 (UCS-4)
- ☐ JIS C 6226

NOTE: Support for multiple character sets does not imply they can be supported simultaneously.

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