

BACnet Integration Guidelines



CoolMasterNet
CooLinkNet
CooLinkHub
CooLinkBridge

BACnet Integration Guidelines

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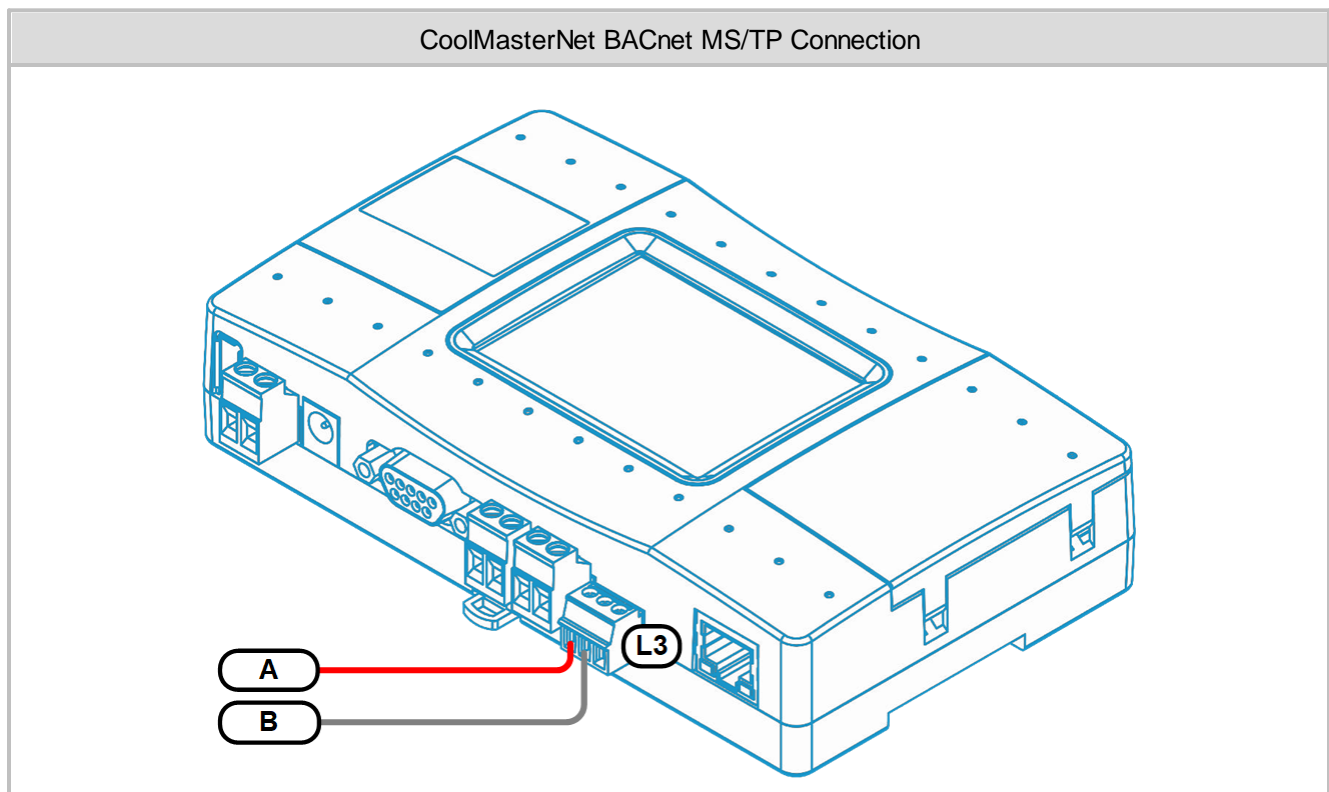
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1 Connection

CoolAutomation devices support BACnet MS/TP and/or BACnet IP protocols with accordance to the ANSI/ASHRAE Standard 135-2004.

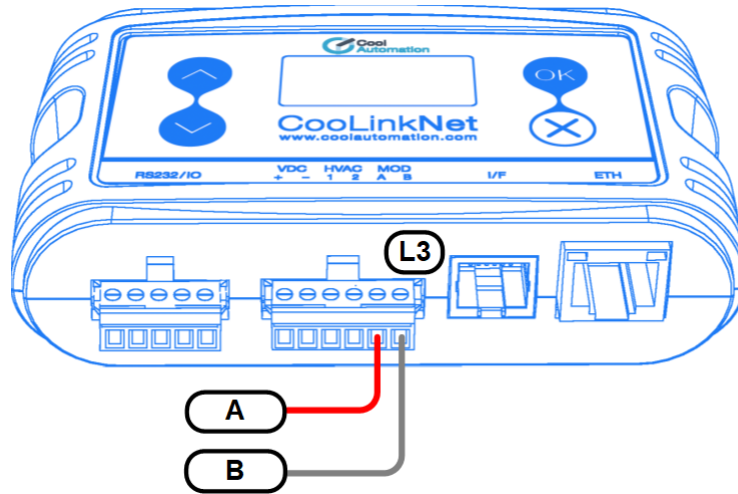
1.1 BACnet MS/TP Connection

In BACnet MS/TP mode physical connection to the CoolAutomation devices is implemented over “Two-Wire” electrical interface in accordance to EIA/TIA-485 standard. Connection is made via 485-A and 485-B terminals. Ground wire connection is not mandatory but highly recommended.



In CoolMasterNet Line L3 is recommended for BACnet MS/TP connection, although Lines L4, L5, L6 and L7 can also be used for that purpose. Picture above shows connection to Line L3.

CoolLinkNet/CoolLinkHub/CoolLinkBridge BACnet MS/TP Connection



In CoolLinkNet/CoolLinkHub/CoolLinkBridge devices **only** Line L3 can be used for BACnet MS/TP connection.

1.2 BACnet IP Connection

BACnet IP is supported in CoolMasterNet and CoolLinkNet/CoolLinkHub/CoolLinkBridge devices. Devices are communicating on the Ethernet TCP/IP network using UDP protocol. Physical connection in this case is made via RJ45 Ethernet connector.

2 Configuration

CoolAutomation device must be configured to support BACnet functionality. Configuration is made via CoolAutomation's proprietary ASCII_IF interface described in details in [Programmer Reference Manual \(PRM\)](#) document for the corresponding device.

One BACnet MS/TP and one BACnet IP connection can run simultaneously on CoolAutomation device. Additional MS/TP connections are not supported although physical interfaces may be available.

2.1 BACnet MS/TP Configuration

BACnet MS/TP interface module of CoolAutomation device has to be activated by assigning appropriate communication Line. In CoolMasterNet it is highly recommended to use Line L3, although it is possible to use any of the following lines: L4, L5, L6, L7 lines. Using line L3 in CoolLinkNet/CoolLinkHub/CoolLinkBridge for BACnet MS/TP is mandatory.

CoolMasterNet BACnet MS/TP activation:

```
>line type L3 BAC
OK, Boot Required!
```

CoolLinkNet/CoolLinkHub/CoolLinkBridge BACnet MS/TP activation:

```
>line type L3 BAC
OK, Boot Required!
```

Use `line` command to check if BACnet MS/TP module is already activated and to display it's parameters.

CoolMasterNet:

```
>line
L1: DK Master U00/G00 myid:0B
Tx:2/2 Rx:2/2 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
L2: Unused
Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
L3: BACnet TS:0x40(64) DEV_INST:0x000040(64) 9600_8N1
Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
L4: Unused
Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
L5: Unused
Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
L6: Unused
Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
L7: Unused
Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
L8: Unused
Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
OK
```

CoolLinkNet/CoolLinkHub/CoolLinkBridge:

```
>line
L1: Unused
Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
L2: Unused
Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
L3: BACnet TS:0x40(64) DEV_ID_INST:0x000040(64) 9600_8N1
Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
L4: MIM2 Slave U00/G00 Not Connected
Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
L5: Unused
Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
OK
```

Next: VA's have to be configured to use BACnet MS/TP module. See: [VA's Configuration](#).

2.1.1 BACnet MS/TP MAC Address

On MS/TP networks, MAC address or TS (This Station) address is the eight bit address used to identify devices on a single RS-485 subnet. TS can be configured with `line myid` command (in this example TS will be set to 0x41 or 65 decimal):

```
>line myid L3 41
OK, Boot Required!
```

TS can be queried with `bacnet` or `line` command.

2.1.2 BACnet MS/TP Frame Format

The default BACnet MS/TP frame format in CoolAutomation devices is 9600_8N1:

Baud Rate	9600 bps
Data Bits	8
Parity	None
Stop Bits	1

Frame format parameters are configurable with `line baud` command:

```
>line baud L3 19200_8N2
OK, Boot Required!
```

In above example frame format will become 19200 bps, 8 data bits, no parity, 2 stop bits.

2.2 BACnet IP Configuration

BACnet IP module is activated with below command:

```
>bacnet IP enable
OK, Boot Required!
```

BACnet IP server is started by device only after it establishes an Ethernet link and gets proper IP address (dynamic via DHCP or static). Ethernet and IP management is done with `ifconfig` command that is out of the spec of this document.

To query BACnet IP status use `bacnet` command without parameters:

```
>bacnet
Dev instance   : 64 (0x000040)
BACnet IP     : enabled
UDP port      : 47808 (0xBAC0)
BACnet MSTP   : L3
TS address    : 64 (0x40)
OK
```

The default UDP port number used by BACnet IP Server is 47808 (0xBAC0). This is "well-known" Ethernet port assigned for the BACnet IP protocol. If required port number can be changed (new port number in example below will be 503):

```
>bacnet port 503
OK, Boot Required!
```

Next: VA's have to be configured to use BACnet IP Server. See: [VA's Configuration](#).

2.3 VA's Configuration

VA's -Virtual Addresses are used by CoolAutomation devices in order to simplify translation of the Indoor Unit number - UID into Instance Number of the BACnet Object Identifier.

UID is a string in format **Ln.XYY**. For Example:

L1.102 - Indoor Unit 102 on line L1

L2.003 - Indoor Unit 003 on line L2

List of UID's detected (visible) by CoolAutomation device can be retrieved with **ls** command.

```
>ls
L1.100 ON 19C 30C High Fan OK # 0
L1.101 OFF 28C 23C High Cool OK - 0
```

Each UID can have none, one or a number of associated VA's. VA's are plain numbers starting from 1. Device can automatically allocate and associate VA's with existing (visible by **ls** command) UID's:

```
>va auto
OK
```

To query allocated VA's use **va** command without parameters:

```
>va
INDOORS
L1.100 --> 0001 [Hex: 0x0011 | Dec: 00017]
L1.101 --> 0002 [Hex: 0x0021 | Dec: 00033]
OK
```

In example above UID L1.100 has a VA=0001 and UID L1.101 has a VA=0002. Numbers is '[' ']' braces are not applicable for BACnet modules (they are used for Modbus modules).

VA's can be allocated or deallocated (deleted) all together or separately. As shown above for automatic VA's allocation **va auto** command is used. It is possible to allocate VA for specific UID. For example, allocate VA 0004 for UID L1.102:

```
>va + L1.102 0004
OK
```

In this case UID does not have to be detected (visible) by CoolAutomation device at the VA allocation time. It is allowed to allocate a number of VA's for any given UID.

To delete all allocated VA's:

```
>va delall
OK
```

Specific VA can also be deleted (below command will delete VA 0004):

```
>va - 0004
OK
```

Alternatively all VA's associated with specific UID can be deleted (below command will delete all VA's associated with UID L1.102):

```
>va - L1.102
OK
```

Once VA's are allocated BACnet MS/TP and/or BACnet IP can be used to access Indoor Unit parameters. Translation of the VA into Instance Number of the BACnet Object Identifier is made according to the scheme below:

Object Identifier bits																															
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Type											Instance Number																				
											VA							Index													

3 BACnet Tables

Supported Object Types

Object Type	Abbreviation	Read/Write	Encoding
Binary Value	BV	R/W	5
Binary Input	BI	RO	3
Analog Value	AV	R/W	2
Analog Input	AI	RO	0
Multi State Value	MV	R/W	19
Character String Value	CSV	RO	40
Integer Value	IV	RO	45
Positive Integer Value	PIV	R/W	48

3.1 Indoor Unit Objects

Object Identifier bits			Object Description
Type	Instance		
	VA	Index	
AI		00	Room Temperature
AV		00	Set Temperature
BI		00	HVAC Failure Indication. Present Value = 0 - No Failure Present Value = 1 - Failure. "Active Text" property contains failure code
BI		01	Demand State (Therm_ON)
BI		02	External Terminals Status
BV		00	ON/OFF
BV		01	Filter Sign
BV		02	Lock (prohibit) ON/OFF change from WRC
BV		03	Lock (prohibit) Operation Mode change from WRC
BV		04	Lock (prohibit) Set Temperature change from WRC
BV		05	Global Lock (prohibit)
MV		00	Fan Speed: 1 - Low 2 - Medium 3 - High 4 - Auto 5 - Top 6 - Very Low 7 - Super High 8 - HRV Super High 9 - HRV Low FreshUp 10 - HRV High FreshUP
MV		01	Operation Mode: 1 - Cool 2 - Heat 3 - Auto 4 - Dry 5 - HAUX 6 - Fan 7 - Heat+HAUX 9 - HRV Auto 10 - HRV Bypass 11 - HRV Heat Exchange 12 - HRV Normal
MV		02	Louver 1 - Vertical 5 - Horizontal 2 - 30 deg 3 - 45 deg 4 - 60 deg 6 - Auto (Swing) 7 - Off 8 - No Louver Control
PIV		00	Set Temperature low limit
PIV		01	Set Temperature high limit

3.2 PRO Functionality

3.2.1 DK

3.2.1.1 DK PRO Outdoor Systems

- **VRV4S1, VRV4S2, VRV-3S, VRV-M, VRV-3P**

Object Identifier bits				Short Name	Object Description
31	22	21	8 7 0		
Type	Instance		Index		
	VA				
CSV			00	Type	Outdoor System Type Name
PIV			01	AirNet	AirNet
PIV			02	SysHP	System_HP
AI			03	SysCur	System_Current
AI			04	TrgtEvT	Target_evaporating_temp.
PIV			05	TrgtCndT	Target_condensing_temp.
CSV			06	ErrCode	Error_code
BI			07	Cool	Cooling
BI			08	Heat	Heating
BI			09	Vent	Ventilation
BI			10	TstatOn	Thermostat_ON
BI			11	ResrtStby	Restart_stand-by
BI			12	BkpOp	Backup_ope.
PIV			13	DmndState	Demand_state

- **VRV4S3, VRVX, VRV4-EU**

Object Identifier bits				Short Name	Object Description
31	22	21	8 7 0		
Type	Instance		Index		
	VA				
CSV			00	Type	Outdoor System Type Name
PIV			01	AirNet	AirNet
PIV			02	SysHP	System_HP
AI			03	SysCur	System_Current
AI			04	TrgtEvT	Target_evaporating_temp.
PIV			05	TrgtCndT	Target_condensing_temp.
CSV			06	ErrCode	Error_code
BI			07	Cool	Cooling
BI			08	Heat	Heating
BI			09	Vent	Ventilation
BI			10	TstatOn	Thermostat_ON
BI			11	ResrtStby	Restart_stand-by
BI			12	Dfrst	Defrost
BI			13	StrtupCtl	Startup_control
BI			14	BkpOp	Backup_ope.
BI			15	OiRtrn	Oil_return

Object Identifier bits					Short Name	Object Description
31	22	21	8	7 0		
Type	Instance					
	VA	Index				
PIV			16		DmndState	Demand_state
PIV			17		OpCtlMod	Operation_control_mode
AI			18		TstatOnCap	I/U_thermostat_ON_capacity

• VRV-3R, VRV3C

Object Identifier bits					Short Name	Object Description
31	22	21	8	7 0		
Type	Instance					
	VA	Index				
CSV			00		Type	Outdoor System Type Name
PIV			01		AirNet	AirNet
PIV			02		SysHP	System_HP
AI			03		SysCur	System_Current
AI			04		TrgtEvT	Target_evaporationg_temp.
PIV			05		TrgtCndT	Target_condensing_temp.
CSV			06		ErrCode	Error_code
BI			07		Cool	Cooling
BI			08		Heat	Heating
BI			09		Vent	Ventilation
BI			10		TstatOn	Thermostat_ON
BI			11		ResrtStby	Restart_stand-by
BI			12		BkpOp	Backup_ope.
BI			13		CoolHeatPrll	Cool/Heat_parallel_ope.
PIV			14		DmndState	Demand_state

• VRV-4R

Object Identifier bits					Short Name	Object Description
31	22	21	8	7 0		
Type	Instance					
	VA	Index				
CSV			00		Type	Outdoor System Type Name
PIV			01		AirNet	AirNet
PIV			02		SysHP	System_HP
AI			03		SysCur	System_Current
AI			04		TrgtEvT	Target_evaporationg_temp.
PIV			05		TrgtCndT	Target_condensing_temp.
CSV			06		ErrCode	Error_code
BI			07		Cool	Cooling
BI			08		Heat	Heating
BI			09		Vent	Ventilation
BI			10		TstatOn	Thermostat_ON
BI			11		ResrtStby	Restart_stand-by
BI			12		Dfrst	Defrost
BI			13		StrtupCtl	Startup_control

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		Index				
	VA						
BI					14	BkpOp	Backup_ope.
BI					15	CoolHeatPrll	Cool/Heat_parallel_ope.
BI					16	OiRtrn	Oil_return
PIV					17	DmndState	Demand_state
PIV					18	OpCtlMod	Operation_control_mode
AI					19	TstatOnCap	I/U_thermostat_ON_capacity

3.2.1.2 DK PRO Outdoor Units

- VRV4S1, VRV4S2, VRV-3S, VRV-3P

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		Index				
	VA						
PIV					00	AirNet	AirNet
PIV					01	HP	HP
IV					02	AmbT	Ambient_temp.
IV					03	SuctT	Suction_temp.
IV					04	EvT	Evaporating_temp.
IV					05	CndT	Condensing_temp.
PIV					06	InvRS	Inverter_Revolution_speed
PIV					07	EVOp1	EV_opening_1
PIV					08	EVOp2	EV_opening_2
PIV					09	CTSTD1	CT1(STD1)
PIV					10	CTSTD2	CT2(STD2)
PIV					11	FanStp	Fan_step
IV					12	CiIT	R4T_:Coil_temp.
IV					13	ScCilExtT	Subcooling_Coil_exit_Temp.
PIV					14	DschTInv	Disch._temp.(INV)
PIV					15	DschTStd1	Disch._temp.(STD1)
PIV					16	DschTStd2	Disch._temp.(STD2)
IV					17	AccEntrT	Accumulator_Entrance_Temp.
IV					18	RcvrLiqT	Receiver_Liquid_Temp.
PIV					19	InvT	Inverter_temp.
PIV					20	InvCur	Inverter_current
PIV					21	InvFanCur	INV_FAN_current
BI					22	Comp1Inv	Compressor1(INV)
BI					23	Comp2Std1	Compressor2(STD1)
BI					24	Comp3Std2	Compressor3(STD2)
BI					25	OiRtrn	Oil_return
BI					26	HotGas	Hot_Gas
BI					27	CcH1	CH1:Crankcase_Heater
BI					28	CcH2	CH2:Crankcase_Heater

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		VA	Index			
	BI						
BI				30	SoftStrt	Soft_start	
BI				31	ResrtStby	Restart_stand-by	
BI				32	MulOi	multi_oil	
BI				33	ErrState	Unit_Error_stat	
BI				34	EnrgyCutOutp	Energy_cut_output	
BI				35	HiPRtry	High_pressure_retry	
BI				36	LoPRtry	Low_pressure_retry	
BI				37	DischPipRtry	Disch._pipe_retry	
BI				38	4WayVlv	4_way_valve	
BI				39	Injct	Injection	
BI				40	Dfrst	Defrost	
BI				41	HiPStpDnCtl	H.P._stepping_down_cntl	
BI				42	LoPStpDnCtl	L.P._stepping_down_cntl	
BI				43	DmndStpDnCtl	Demand_stepping_down_cntl	
BI				44	InvRtry	INV_retry	
BI				45	InvDschStpDnCtl	INV_Disch._stepping_down_cntl	
BI				46	InvOCStpDnCtl	INV_OC_stepping_down_cntl	
BI				47	InvFinStpDnCtl	INV_Fin_stepping_down_cntl	
BI				48	Std1DschStpDnCtl	STD1_Disch._stepping_down_cntl	
BI				49	Std1OCStpDnCtl	STD1_OC_stepping_down_cntl	
BI				50	Std2DschStpDnCtl	STD2_Disch._stepping_down_cntl	
BI				51	Std2OCStpDnCtl	STD2_OC_stepping_down_cntl	

• VRV4S3, VRVX, VRV4-EU

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		VA	Index			
	PIV						
PIV				01	HP	HP	
PIV				02	Inv1RotAmnt	INV_1_rotation_amount	
PIV				03	Inv2RotAmnt	INV_2_rotation_amount	
PIV				04	Fan1RotAmnt	Fan_1_rotation_amount	
PIV				05	Fan2RotAmnt	Fan_2_rotation_amount	
PIV				06	FanStp	Fan_step	
PIV				07	EVOp1	EV_opening_1	
PIV				08	EVOp2	EV_opening_2	
PIV				09	EVOp3	EV_opening_3	
BI				10	Complnv1	Compressor_1(INV1)	
BI				11	Complnv2	Compressor_2(INV2)	
BI				12	CcH1	CH1:Crankcase_Heater	
BI				13	CcH2	CH2:Crankcase_Heater	

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		VA	Index			
	BI						
BI				15	OiRtrn1	Oil_return_1	
BI				16	AccOiRtrn	Accumulator_oil_return	
BI				17	OiRtrn2	Oil_return_2	
BI				18	4WayVlvHeat	4_way_valve(Heating)	
BI				19	ErrState	Unit_Error_stat	
BI				20	DrnPanHtr	Drain_pan_heater	
BI				21	EnrgyCutOutp	Energy_cut_output	
BI				22	HiPRtry	High_pressure_retry	
BI				23	LoPRtry	Low_pressure_retry	
BI				24	DischPipRtry	Disch._pipe_retry	
BI				25	OHSby	Overheating_stand-by	
BI				26	Inv1Stby	INV1_stand-by	
BI				27	Inv2Stby	INV2_stand-by	
BI				28	HiPStpDnCtl	H.P._stepping_down_cntl	
BI				29	LoPStpDnCtl	L.P._stepping_down_cntl	
BI				30	DmndStpDnCtl	Demand_stepping_down_cntl	
BI				31	Comp1DschStpDnCtl	Comp.1_Disch._stepping_down_cntl	
BI				32	Comp2DschStpDnCtl	Comp.2_Disch._stepping_down_cntl	
BI				33	Comp1OCStpDnCtl	Comp.1_OC_stepping_down_cntl	
BI				34	Comp2OCStpDnCtl	Comp.2_OC_stepping_down_cntl	
BI				35	Inv1FinStpDnCtl	INV1_Fin_stepping_down_cntl	
BI				36	Inv2FinStpDnCtl	INV2_Fin_stepping_down_cntl	

• VRV4S3, VRVX, VRV4-EU

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		VA	Index			
	PIV						
IV				01	AmbT	Ambient_temp.	
PIV				02	DschTComp1	Discharge_pipe_temp.(Comp.1)	
PIV				03	DschTComp2	Discharge_pipe_temp.(Comp.2)	
IV				04	EvT	Evaporating_temp.	
IV				05	CndT	Condensing_temp.	
IV				06	HexT	Heat_exchanger_temp.	
IV				07	HexLiqT	heat_exchanger_liquid_pipe_temp.	
IV				08	SchHexGasT	Subcooling_heat_exchanger_gas_temp.	
IV				09	SchHexLiqT	Subcooling_heat_exchanger_liquid_temp.	
PIV				10	CompSrfT	Compressor_surface_temp.	
IV				11	AcclnIT	Accumulator_inlet_temp.	
PIV				12	Comp1Cur	Comp.1_current	
PIV				13	Comp2Cur	Comp.2_current	

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		Index				
	VA						
IV			14			Inv1FinT	INV1_fin_temp.
IV			15			Inv2FinT	INV2_fin_temp.
PIV			16			InvFanCur	INV_FAN_current

• VRV-3R, VRV3C

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		Index				
	VA						
PIV			00			AirNet	AirNet
PIV			01			HP	HP
IV			02			AmbT	Ambient_temp.
IV			03			SuctT	Suction_temp.
IV			04			EvT	Evaporating_temp.
IV			05			CndT	Condensing_temp.
PIV			06			InvRS	Inverter_Revolution_speed
PIV			07			EVOp1	EV_opening_1
PIV			08			EVOp2	EV_opening_2
PIV			09			EVOp	EV_opening
PIV			10			CTSTD1	CT1(STD1)
PIV			11			CTSTD2	CT2(STD2)
PIV			12			FanStp	Fan_step
PIV			13			DschTInv	Disch._temp.(INV)
PIV			14			DschTStd1	Disch._temp.(STD1)
PIV			15			DschTStd2	Disch._temp.(STD2)
IV			16			InvT	Inverter_temp.
PIV			17			InvCur	Inverter_current
PIV			18			InvFanCur	INV_FAN_current
BI			19			Comp1Inv	Compressor1(INV)
BI			20			Comp2Std1	Compressor2(STD1)
BI			21			Comp3Std2	Compressor3(STD2)
BI			22			OiRtrn	Oil_return
BI			23			HotGas	Hot_Gas
BI			24			Cch1	CH1:Crankcase_Heater
BI			25			Cch2	CH2:Crankcase_Heater
BI			26			Cch3	CH3:Crankcase_Heater
BI			27			SoftStrt	Soft_start
BI			28			ResrtStby	Restart_stand-by
BI			29			ErrState	Unit_Error_stat
BI			30			EnrgyCutOutp	Energy_cut_output
BI			31			HiPRtry	High_pressure_retry
BI			32			LoPRtry	Low_pressure_retry
BI			33			DischPipRtry	Disch._pipe_retry

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		Index				
	VA						
BI				34	4WayVlv	4_way_valve	
BI				35	4WayVlv2	4-way_valve_2	
BI				36	Dfrst	Defrost	
BI				37	HiPStpDnCtl	H.P._stepping_down_cntl	
BI				38	LoPStpDnCtl	L.P._stepping_down_cntl	
BI				39	DmndStpDnCtl	Demand_stepping_down_cntl	
BI				40	InvRtry	INV_retry	
BI				41	InvDschStpDnCtl	INV_Disch._stepping_down_cntl	
BI				42	InvOCStpDnCtl	INV_OC_stepping_down_cntl	
BI				43	InvFinStpDnCtl	INV_Fin_stepping_down_cntl	
BI				44	Std1DschStpDnCtl	STD1_Disch._stepping_down_cntl	
BI				45	Std1OCStpDnCtl	STD1_OC_stepping_down_cntl	
BI				46	Std2DschStpDnCtl	STD2_Disch._stepping_down_cntl	
BI				47	Std2OCStpDnCtl	STD2_OC_stepping_down_cntl	
BI				48	EVByp	EV_bypass	
BI				49	RfrgGasPrg	Refrigerant_regu._gas_purging	
BI				50	RfrgLiq	Refrigerant_regu._liquid	
BI				51	RfrgDsching	Refrigerant_regu._discharging	
BI				52	RfrgDsch	Refrigerant_regu._discharge	
BI				53	OpOutp	Operation_output	
IV				54	HexT	Heat_exchanger_temp.	
IV				55	HexGasT	Heat_Ex._Gas_temp.	
IV				56	HexLiqT	heat_exchanger_liquid_pipe_temp.	
IV				57	SchHexGasT	Subcooling_heat_exchanger_gas_temp.	
IV				58	SchHexLiqT	Subcooling_heat_exchanger_liquid_temp.	
IV				59	EVLiqT	EV_liquid_pipe_temp.	

• VRV-4R

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		Index				
	VA						
PIV				00	AirNet	AirNet	
PIV				01	HP	HP	
PIV				02	Inv1RotAmnt	INV_1_rotation_amount	
PIV				03	Inv2RotAmnt	INV_2_rotation_amount	
PIV				04	Fan1RotAmnt	Fan_1_rotation_amount	
PIV				05	Fan2RotAmnt	Fan_2_rotation_amount	
PIV				06	FanStp	Fan_step	
PIV				07	EVOp1	EV_opening_1	
PIV				08	EVOp2	EV_opening_2	
PIV				09	EVOp3	EV_opening_3	
PIV				10	EVOp4	EV4_pls.(receiver_gas_purge)	

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		Index				
	VA						
PIV					11	EVOp5	EV5_pls.(cooling_refrigerant)
PIV					12	EVOp6	EV6_pls.(leak_detection)
BI					13	CompInv1	Compressor_1(INV1)
BI					14	CompInv2	Compressor_2(INV2)
BI					15	Cch1	CH1:Crankcase_Heater
BI					16	Cch2	CH2:Crankcase_Heater
BI					17	4WayVlv	4_way_valve
BI					18	OiRtrn1	Oil_return_1
BI					19	OiRtrn2	Oil_return_2
BI					20	ErrState	Unit_Error_stat
BI					21	4WayVlvUprr	4-way_valve(upper_heat_exchanger)
BI					22	4WayVlvUndr	4-way_valve(under_heat_exchanger)
BI					23	SolVlv	sol._valve(shutoff_liquid_pipe)
BI					24	DrnPanHtr	Drain_pan_heater
BI					25	EnrgyCutOutp	Energy_cut_output
BI					26	HiPRtry	High_pressure_retry
BI					27	LoPRtry	Low_pressure_retry
BI					28	DischPipRtry	Disch._pipe_retry
BI					29	OHStby	Overheating_stand-by
BI					30	Inv1Stby	INV1_stand-by
BI					31	Inv2Stby	INV2_stand-by
BI					32	HiPStpDnCtl	H.P._stepping_down_cntl
BI					33	LoPStpDnCtl	L.P._stepping_down_cntl
BI					34	DmndStpDnCtl	Demand_stepping_down_cntl
BI					35	Comp1DschStpDnCtl	Comp.1_Disch._stepping_down_cntl
BI					36	Comp2DschStpDnCtl	Comp.2_Disch._stepping_down_cntl
BI					37	Comp1OCStpDnCtl	Comp.1_OC_stepping_down_cntl
BI					38	Comp2OCStpDnCtl	Comp.2_OC_stepping_down_cntl
BI					39	Inv1FinStpDnCtl	INV1_Fin_stepping_down_cntl
BI					40	Inv2FinStpDnCtl	INV2_Fin_stepping_down_cntl

• VRV-4R

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		Index				
	VA						
PIV					00	AirNet	AirNet
IV					01	AmbT	Ambient_temp.
PIV					02	DschTComp1	Discharge_pipe_temp.(Comp.1)
IV					03	DschTComp2	Discharge_pipe_temp.(Comp.2)
IV					04	EvT	Evaporating_temp.
IV					05	CndT	Condensing_temp.
IV					06	HexT	Heat_exchanger_temp.

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance						
	VA	Index					
IV					07	HexLiqT	heat_exchanger_liquid_pipe_temp.
IV					08	HexGasTUp	heat_exchanger_gas_pipe_temp.(upper)
IV					09	HexGasTLo	heat_exchanger_gas_pipe_temp.(low)
IV					10	HexLiqTUp	heat_exchanger_liquid_pipe_temp.(upper)
IV					11	HexLiqTLo	heat_exchanger_liquid_pipe_temp.(low)
IV					12	ScHexGasT	Subcooling_heat_exchanger_gas_temp.
IV					13	ScHexLiqT	Subcooling_heat_exchanger_liquid_temp.
IV					14	SuctT	Suction_temp.
IV					15	CompSuctPipT	comp_suction_pipe_temp.
PIV					16	CompSrfT	Compressor_surface_temp.
IV					17	RcvrInlT	receiver_inlet_temp.
IV					18	RcvrGasPrgT	receiver_gas_purge_temp.
PIV					19	Comp1Cur	Comp.1_current
PIV					20	Comp2Cur	Comp.2_current
IV					21	Inv1FinT	INV1_fin_temp.
IV					22	Inv2FinT	INV2_fin_temp.
PIV					23	InvFanCur	INV_FAN_current

• VRV-M

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance						
	VA	Index					
PIV					00	AirNet	AirNet
PIV					01	HP	HP
IV					02	AmbT	Ambient_temp.
IV					03	SuctT	Suction_temp.
IV					04	EvT	Evaporating_temp.
IV					05	CndT	Condensing_temp.
PIV					06	EVOp1	EV_opening_1
PIV					07	EVOp2	EV_opening_2
PIV					08	CTSTD1	CT1(STD1)
PIV					09	CTSTD2	CT2(STD2)
PIV					10	FanStp	Fan_step
IV					11	CiIT	R4T_:Coil_temp.
IV					12	ScCiExtT	Subcooling_Coil_exit_Temp.
PIV					13	DschTInv	Disch._temp.(INV)
PIV					14	DschTStd1	Disch._temp.(STD1)
PIV					15	DschTStd2	Disch._temp.(STD2)
IV					16	RcvrLiqT	Receiver_Liquid_Temp.
PIV					17	InvT	Inverter_temp.
PIV					18	InvCur	Inverter_current
PIV					19	InvFanCur	INV_FAN_current

Object Identifier bits					Short Name	Object Description	
31	22	21	8	7			0
Type	Instance		VA	Index			
	BI						
BI				21	Comp2Std1	Compressor2(STD1)	
BI				22	Comp3Std2	Compressor3(STD2)	
BI				23	OiRtrn	Oil_return	
BI				24	HotGas	Hot_Gas	
BI				25	CcH1	CH1:Crankcase_Heater	
BI				26	CcH2	CH2:Crankcase_Heater	
BI				27	CcH3	CH3:Crankcase_Heater	
BI				28	SoftStrt	Soft_start	
BI				29	ResrtStby	Restart_stand-by	
BI				30	MulOi	multi_oil	
BI				31	ErrState	Unit_Error_stat	
BI				32	EnrgyCutOutp	Energy_cut_output	
BI				33	HiPRtry	High_pressure_retry	
BI				34	LoPRtry	Low_pressure_retry	
BI				35	DischPipRtry	Disch._pipe_retry	
BI				36	4WayVlv	4_way_valve	
BI				37	Injct	Injection	
BI				38	Dfrst	Defrost	
BI				39	HiPDroCtl	High_pres._drooping_cntl.	
BI				40	LoPDroCtl	Low_pres._drooping_cntl.	
BI				41	InvDschDroCtl	INV_Disch._pipe_drooping_cntl.	
BI				42	InvCurDroCtl	INV_current_drooping_cntl.	
BI				43	InvFinDroCtl	INV_fin_drooping_cntl.	
BI				44	Std1DschDroCtl	STD1_Disch._pipe_drooping_cntl.	
BI				45	Std1OCDroCtl	STD1_OC_drooping_cntl.	
BI				46	Std2DschDroCtl	STD2_Disch._pipe_drooping_cntl.	
BI				47	Std2OCDroCtl	STD2_OC_drooping_cntl.	
BI				48	InvStby	INV_stand-by	
BI				49	RcvrGasIn	SVL:Receiver_gas_in	
BI				50	RcvrGasOut	SVG:Receiver_gas_out	
BI				51	StpUnGasOut	SVSG:StopUnit_Gas_out	
BI				52	StpUnLiqPipCls	SVSL:StopUnit_Liquid_pipe_close	
IV				53	OiPEqT	Oil_Pres._equalizer_Temp.	
PIV				54	InvFrq	Inverter_frequency	

3.2.2 ME

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3.2.2.1 ME PRO Outdoor Units

- **PUMY-P100-140Y/VHM/36-48NHMU** Type code: 1

Object Identifier bits					Short Name	
31	22	21	8	7		0
Type		Instance				
		VA	Index			
CSV				00	Type	
AI				01	TH3	
AI				02	TH4	
AI				03	TH6	
AI				04	TH7	
AI				05	TH8	
AI				06	63HS	
AI				07	Vdc	
AI				08	li	
AI				09	lc	
PIV				10	F(Hz)	
PIV				11	FAN	
AI				12	Pdm	
AI				13	ETm	
AI				14	SC	
AI				15	SCm	
PIV				16	LEV1	
PIV				17	LEV2	
PIV				18	LEV3	
PIV				19	LEV4	

• **PUMY-P*V/Y/NH/KM(BR4/UR4/SR1/C-C/-A)** Type code: 7

Object Identifier bits					Short Name	
31	22	21	8	7		0
Type		Instance				
		VA	Index			
CSV				00	Type	
AI				01	TH2	
AI				02	TH3	
AI				03	TH4	
AI				04	TH6	
AI				05	TH7	
AI				06	TH8	
AI				07	63HS	
AI				08	63LS	
AI				09	Vdc	
AI				10	li	
AI				11	lc	
PIV				12	F(Hz)	
PIV				13	FAN	
AI				14	Pdm	
AI				15	ETm	
AI				16	SC	

Object Identifier bits					Short Name	
31	22	21	8	7		0
Type		Instance				
		VA	Index			
AI			17		SCm	
PIV			18		LEV1	
PIV			19		LEV2	
PIV			20		LEV3	
PIV			21		LEV4	

• **PURY-P** Type code: 9, **PUHY-P** Type code: 10

Object Identifier bits					Short Name	
31	22	21	8	7		0
Type		Instance				
		VA	Index			
CSV			00		Type	
AI			01		TH1	
AI			02		TH2	
AI			03		TH3	
AI			04		TH4	
AI			05		TH5	
AI			06		TH6	
AI			07		TH7	
AI			08		TH8	
AI			09		TH9	
AI			10		TH10	
AI			11		TH12	
AI			12		63HS	
AI			13		63LS	
AI			14		THHS	
AI			15		THBOX	
AI			16		Tc	
AI			17		Te	
PIV			18		F(Hz)	
PIV			19		FAN	
PIV			20		QjC	
PIV			21		QjH	
AI			22		SCo	
AI			23		SCc	
AI			24		SHb	

• **PURY-P** Type code: 20

Object Identifier bits					Short Name	
31	22	21	8	7		0
Type		Instance				
		VA	Index			
CSV			00		Type	
AI			01		TH2	

Object Identifier bits					Short Name	
31	22	21	8	7		0
Type	Instance		Index			
	VA					
AI					02	TH3
AI					03	TH4
AI					04	TH5
AI					05	TH6
AI					06	TH7
AI					07	TH9
AI					08	TH10
AI					09	TH11
AI					10	TH12
AI					11	63HS
AI					12	63LS
AI					13	THHS
AI					14	Tc
AI					15	Te
PIV					16	F(Hz)
PIV					17	FAN
PIV					18	QjC
PIV					19	QjH

• **PURY-(E)P** Type code: 22, **PURY-(W)** Type code: 13

Object Identifier bits					Short Name	
31	22	21	8	7		0
Type	Instance		Index			
	VA					
CSV					00	Type
AI					01	TH3
AI					02	TH4
AI					03	TH5
AI					04	TH6
AI					05	TH7
AI					06	63HS1
AI					07	63LS
AI					08	THHS
AI					09	Tc
AI					10	Te
AI					11	Vdc
AI					12	lu
AI					13	lw
PIV					14	F(Hz)
PIV					15	FAN
PIV					16	Foc
PIV					17	QjC
PIV					18	QjH

• **PURY-(E)P** Type code: 23, **PURY-(E)** Type code: 14

Object Identifier bits				Short Name
31	22	21	8 7 0	
Type	Instance			
	VA	Index		
CSV		00	Type	
AI		01	TH3	
AI		02	TH4	
AI		03	TH5	
AI		04	TH6	
AI		05	TH7	
AI		06	63HS1	
AI		07	63LS	
AI		08	THHS	
AI		09	Tc	
AI		10	Te	
AI		11	Vdc	
AI		12	lu	
AI		13	lw	
PIV		14	FAN	
PIV		15	QjC	
PIV		16	QjH	

• **PURY-P** Type code: 8

Object Identifier bits				Short Name
31	22	21	8 7 0	
Type	Instance			
	VA	Index		
CSV		00	Type	
AI		01	TH1	
AI		02	TH2	
AI		03	TH5	
AI		04	TH6	
AI		05	TH7	
AI		06	63HS	
AI		07	63LS	
AI		08	THHS	
AI		09	Tc	
AI		10	Te	
AI		11	Vdc	
AI		12	lu	
AI		13	lw	
PIV		14	F(Hz)	
PIV		15	FAN	
PIV		16	QjC	
PIV		17	QjH	

• **PURY-P** Type code: 3

Object Identifier bits				Short Name
31	22	21	8 7 0	
Type	Instance		Index	
	VA			
CSV			00	Type
AI			01	TH5
AI			02	TH6
AI			03	TH7
AI			04	TH11
AI			05	63HS
AI			06	63LS
AI			07	Tc
AI			08	Te
AI			09	Vdc
AI			10	lu
AI			11	lw
PIV			12	F(Hz)
PIV			13	FAN
PIV			14	QjC
PIV			15	QjH
AI			16	SCo
AI			17	SCc
AI			18	SHb

• **PURY-P** Type code: 2

Object Identifier bits				Short Name
31	22	21	8 7 0	
Type	Instance		Index	
	VA			
CSV			00	Type
AI			01	TH5
AI			02	TH6
AI			03	TH7
AI			04	TH11
AI			05	TH12
AI			06	63HS
AI			07	63LS
AI			08	Tc
AI			09	Te
AI			10	Vdc
AI			11	lu
AI			12	lw
PIV			13	F(Hz)
PIV			14	FAN
PIV			15	QjC
PIV			16	QjH
AI			17	SCo

Object Identifier bits					Short Name
31	22	21	8	7 0	
Type	Instance				
	VA	Index			
AI			18		SCc
AI			19		SHb

• **PURY-P (T/Y)LMU** Type code: 24

Object Identifier bits					Short Name
31	22	21	8	7 0	
Type	Instance				
	VA	Index			
CSV			00		Type
AI			01		TH3
AI			02		TH4
AI			03		TH5
AI			04		TH6
AI			05		TH7
AI			06		63HS1
AI			07		63LS
AI			08		THHS
AI			09		Tc
AI			10		Te
PIV			11		Vdc
AI			12		lu
AI			13		lw
PIV			14		F(Hz)
PIV			15		FAN
PIV			16		Foc
PIV			17		QjC
PIV			18		QjH

• **PURY-P YLM-A** Type code: 12

Object Identifier bits					Short Name
31	22	21	8	7 0	
Type	Instance				
	VA	Index			
CSV			00		Type
AI			01		TH3
AI			02		TH4
AI			03		TH5
AI			04		TH6
AI			05		TH7
AI			06		TH9
AI			07		TH11
AI			08		63HS1
AI			09		63LS
AI			10		THHS

Object Identifier bits				Short Name
31	22	21	8 7 0	
Type	Instance		Index	
	VA			
AI			11	Tc
AI			12	Te
PIV			13	Vdc
AI			14	lu
AI			15	lw
PIV			16	F(Hz)
PIV			17	FAN
PIV			18	Foc
PIV			19	QjC
PIV			20	QjH

• **PUHY-P YKB** Type code: 19

Object Identifier bits				Short Name
31	22	21	8 7 0	
Type	Instance		Index	
	VA			
CSV			00	Type
AI			01	TH2
AI			02	TH3
AI			03	TH4
AI			04	TH5
AI			05	TH6
AI			06	TH7
AI			07	TH9
AI			08	TH11
AI			09	63HS1
AI			10	63LS
AI			11	THHS
AI			12	Tc
AI			13	Te
PIV			14	Vdc
AI			15	lu
AI			16	lw
PIV			17	F(Hz)
PIV			18	FAN
PIV			19	Foc
PIV			20	QjC
PIV			21	QjH
AI			22	SCo
AI			23	SCc
AI			24	SHb
IV			25	LEV1

• **PUHY-(E)P** Type code: 5

Object Identifier bits				Short Name
31	22	21	8 7 0	
Type	Instance		Index	
	VA			
CSV			00	Type
AI			01	TH2
AI			02	TH3
AI			03	TH4
AI			04	TH5
AI			05	TH6
AI			06	TH7
AI			07	63HS1
AI			08	63LS
AI			09	THHS
AI			10	Tc
AI			11	Te
AI			12	Vdc
AI			13	lu
AI			14	lw
PIV			15	F(Hz)
PIV			16	FAN
PIV			17	Foc
PIV			18	QjC
PIV			19	QjH
AI			20	SCo
AI			21	SCc
AI			22	SHb

• **PUHY-(E)P** Type code: 17

Object Identifier bits				Short Name
31	22	21	8 7 0	
Type	Instance		Index	
	VA			
CSV			00	Type
AI			01	TH2
AI			02	TH3
AI			03	TH4
AI			04	TH5
AI			05	TH6
AI			06	TH7
AI			07	63HS1
AI			08	63LS
AI			09	THHS
AI			10	THBOX
AI			11	Tc
AI			12	Te
AI			13	Vdc

Object Identifier bits					Short Name	
31	22	21	8	7		0
Type	Instance					
	VA	Index				
AI				14	lu	
AI				15	lw	
PIV				16	F(Hz)	
PIV				17	FAN	
PIV				18	Foc	
PIV				19	QjC	
PIV				20	QjH	
AI				21	SCo	
AI				22	SCc	
AI				23	SHb	
IV				24	LEV1	
IV				25	LEV2	

• **PUHY-(E)P** Type code: 6

Object Identifier bits					Short Name	
31	22	21	8	7		0
Type	Instance					
	VA	Index				
CSV				00	Type	
AI				01	TH2	
AI				02	TH3	
AI				03	TH4	
AI				04	TH5	
AI				05	TH6	
AI				06	TH7	
AI				07	63HS1	
AI				08	63LS	
AI				09	THHS	
AI				10	Tc	
AI				11	Te	
AI				12	Vdc	
AI				13	lu	
AI				14	lw	
PIV				15	FAN	
PIV				16	QjC	
PIV				17	QjH	
AI				18	SCo	
AI				19	SCc	
AI				20	SHb	

• **PUHY-(E)P** Type code: 18

Object Identifier bits				Short Name
31	22	21	8 7 0	
Type	Instance			
	VA	Index		
CSV		00	Type	
AI		01	TH2	
AI		02	TH3	
AI		03	TH4	
AI		04	TH5	
AI		05	TH6	
AI		06	TH7	
AI		07	63HS1	
AI		08	63LS	
AI		09	THHS	
AI		10	THBOX	
AI		11	Tc	
AI		12	Te	
AI		13	Vdc	
AI		14	lu	
AI		15	lw	
PIV		16	FAN	
PIV		17	QjC	
PIV		18	QjH	
AI		19	SCo	
AI		20	SCc	
AI		21	SHb	
IV		22	LEV1	
IV		23	LEV2	

• **BC** Type code: 11

Object Identifier bits				Short Name
31	22	21	8 7 0	
Type	Instance			
	VA	Index		
CSV		00	Type	
AI		01	T1	
AI		02	T2	
AI		03	T3	
AI		04	T4	
AI		05	T5	
AI		06	T6	
AI		07	P1	
AI		08	P2	
AI		09	P3	
IV		10	L1	
IV		11	L2	
IV		12	L3	

Object Identifier bits					Short Name
31	22	21	8	7 0	
Type	Instance				
	VA	Index			
IV			13		L4

• **BC(main)** Type code: 21

Object Identifier bits					Short Name
31	22	21	8	7 0	
Type	Instance				
	VA	Index			
CSV			00		Type
AI			01		T1
AI			02		T2
AI			03		T5
AI			04		T6
AI			05		P1
AI			06		P3
IV			07		L1
IV			08		L3

• **BC(main)** Type code: 4, **BC(main)** Type code: 15

Object Identifier bits					Short Name
31	22	21	8	7 0	
Type	Instance				
	VA	Index			
CSV			00		Type
AI			01		T1
AI			02		T2
AI			03		T5
AI			04		T6
AI			05		P1
AI			06		P3
IV			07		L1
IV			08		L2
IV			09		L3

• **BC(sub)** Type code: 16

Object Identifier bits					Short Name
31	22	21	8	7 0	
Type	Instance				
	VA	Index			
CSV			00		Type
AI			01		T2
AI			02		T5
IV			03		L3

4 Commands Reference

[line](#)
[bacnet](#)
[va](#)

4.1 bacnet

SYNOPSIS

```
bacnet
bacnet IP enable
bacnet IP disable
bacnet port <PORT>
bacnet instance <DEV_INST>
```

DESCRIPTION

- Without parameters `bacnet` command displays current bacnet configuration.
- `bacnet IP` command is used to enable or disable BACnet IP module.
- `bacnet port` command is used to configure UDP port used by BACnet IP module.
- `bacnet instance` command is used to configure Device Instance of the Device Object Identifier.

EXAMPLE

See examples in [Configuration](#) chapter.

4.2 line

SYNOPSIS

```
line
line type <Ln> BAC
line myid <Ln> <TS>
line baud <Ln> <FRAME>
```

DESCRIPTION

<Ln> parameter denotes communication line number like for example: L3 or L4.

- Without parameters `line` command prints status of all communication lines available in specific device.
- `line type` command is used to activate BACnet MS/TP module on line <Ln>.
- `line myid` command is used to change TS address. <TS> parameter should be provided as hexadecimal number without leading 0x.
- `line baud` command is used to change BACnet MS/TP frame format for line <Ln>. <FRAME> parameter format is <BAUD>_<8|9><N|E|O><1|2>. Supported baud rates for <BAUD> parameter are: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200. Frame format change is effective only after power reset.

EXAMPLE

See examples in [BACnet MS/TP Configuration](#) chapter.



4.3 va

SYNOPSIS

```
va
va auto
va + <UID> <VA>
va delall
va - <UID>|<VA>
va ram <N>
```

DESCRIPTION

<UID> parameter denotes Indoor Unit identifier/number like for example: L1.100 or L2.003. <VA> parameter denotes VA number in decimal format.

- Without parameters `va` command prints status of all allocated VA's.
- `va auto` command is used to automatically distribute VA's for all detected UID's one to one. Previously allocated VA's will be deleted
- `va + <UID> <VA>` command will allocate VA for given UID. Number of VA's allocated for UID is not limited.
- `va delall` command will delete all allocated VA's.
- `va - <UID>` will delete all allocated VA's for given UID.
- `va - <VA>` will delete specific VA.
- `va ram <N>` resizes RAM memory used for VA's. Parameter <N> denotes a desired total number of VA's that can be allocated. By default N=170. VA's memory resize is effective only after power reset.

EXAMPLE

See examples in [VA's Configuration](#) chapter.