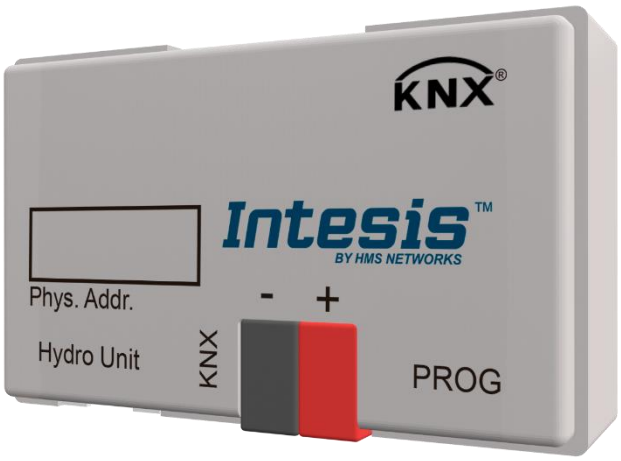
Interface for the integration of Panasonic's Air-to-Water units into KNX TP-1 (EIB) control systems

Compatible with Air-to-Water Aquarea series

Application's Program Version: 1.0

USER MANUAL

Issue date: 10/2017 r1.0 ENGLISH



HMS Connecting Devices

Important User Information

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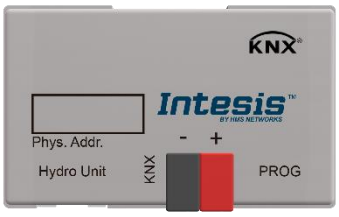
ORDER CODE	LEGACY ORDER CODE
INKNXPAN001A000	PA-AW2-KNX-1

INDEX

1. Presentation



The INKNXPAN001A000 gateways allows fully bidirectional monitoring and control of the Panasonic Air-to-Water systems from KNX installations.

The interface is compatible with all the models of the Aquarea H Generation line commercialized by Panasonic.

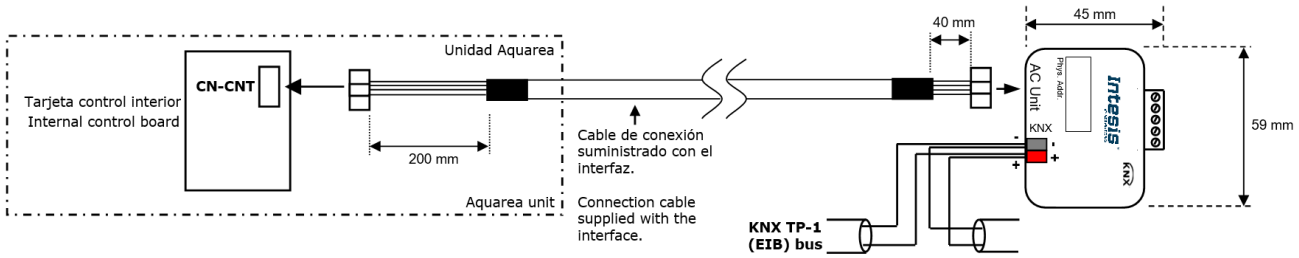
General features:

- Reduced dimensions.
- Easy and fast installation.
- External power not required.
- Direct connection to the A.W. system.
- Multiple control and status objects (bit, byte, characters…) with standard KNX datapoints.
- One status object available for each control object.
- Total supervision and control of the Panasonic A.W. unit from KNX, including unit internal variables supervision, special modes control and error alarm and codes too.

2. Connection

Connection of the interface to the Aquarea system may vary depending on the different available models. Below you will find a sketch for the Monobloc system and after that an example for the Bibloc system. Please, use only the cables supplied by Panasonic and ourselves to carry out the connection process.

Connection of the interface to the KNX bus is by means of the standard KNX bus connector also supplied with the interface.



3. Installation and setup

This is a fully compatible KNX device that must be configured using the ETS software.
The ETS database can be downloaded from:

http://intesis.com/products/ac-interfaces/panasonic-gateways/panasonic-knx-air-to-water-pa-aw2-knx-1

Please, check the README.txt file located inside the zip file to find instructions for proper installation of the database.

⚠ ***IMPORTANT**: Do not forget to select the corresponding features of the Air-to-Water system connected to the INKNXPAN001A000 interface. This should be selected in the "Parameters" section on the ETS software.*

4. ETS parameters and communication objects

The INKNXPAN001A000 works as a standard KNX interface and needs to be configured using the standard ETS configuration tool, ETS.

4.1 *Default settings*

When importing the ETS database for the first time, the following menu appears, with these parameter values selected as default:

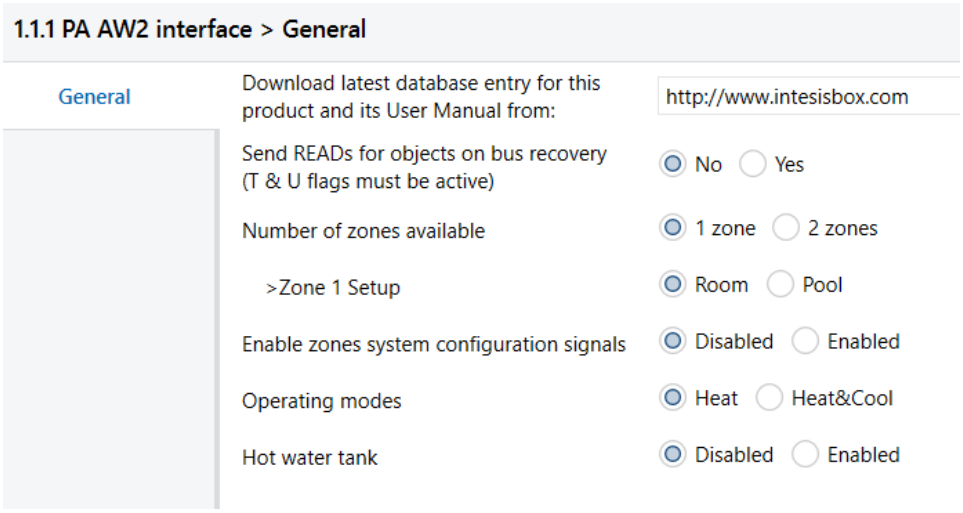


Figure 4.1 Default parameters

With this configuration is possible to control the system (Control_ objects) and monitoring it (Status_ objects) through the communication objects listed below.

4.1.1 System On/Off

This object, ***System On/Off***, allows turning the Aquarea unit on or off. Sending a "0" value will turn it off, while sending a '1' value will turn it on.

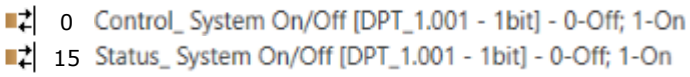


Figure 4.2 Start/Stop communication objects

4.1.2 Heat Mode Water Temperature Setting Method

This object, ***Heat Mode Water Temperature Setting Method***, allows turning the Aquarea unit on or off. Sending a "0" value will set the system into "Direct", while sending a '1' value will set the system into "Compensation Curve". Check the Panasonic User Manual for more information about these values and how they need to be set according to the installation.

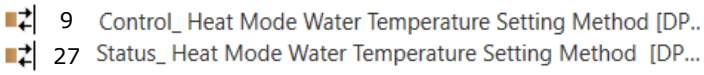


Figure 4.3 Heat Mode Water Temperature Setting Method communication objects

4.1.3 Zone 1 Setpoint Temperature

This object, ***Zone 1 Setpoint Temperature***, allows setting the Setpoint temperature for the Zone 1. Depending on the value set in the previous object (***Heat Mode Water Temperature Setting mode***), the setpoint sent may refer to the real Water setpoint or just a delta parameter to be applied to the previous Setpoint Temperature running.

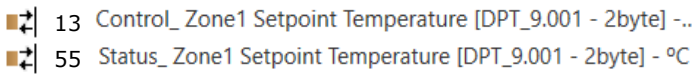


Figure 4.4 Zone 1 Setpoint Temperature communication objects

4.1.4 Extra temperature status

On this default settings, there also some extra temperature communication objects. These objects make reference to the outdoor temperature, the inlet water temperature, the outlet water temperature and the current (*Actual*) Water Outlet or Room temperature.

Outdoor Temperature

This Status_ communication object is used to indicate the current outdoor temperature. Value ranges may vary from -127 ºC to 127 ºC.

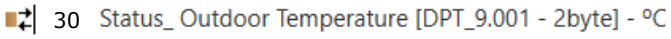


Figure 4.5 Outdoor Temperature communication object

Inlet Water Temp

This Status_ communication object is used to indicate the inlet water temperature. Value ranges may vary from Value ranges may vary from 0 ºC to 127 ºC.

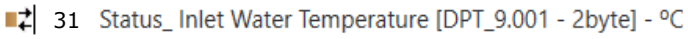


Figure 4.6 Inlet Water Temperature communication object

Outlet Water Temp

This Status_ communication object is used to indicate the outlet water temperature. Value ranges may vary from 0ºC to 127ºC.

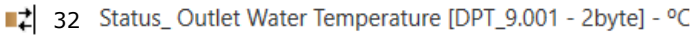


Figure 4.7 Outlet Water Temperature communication object

Zone 1 Actual (Water Outlet/Room) Temperature

This Status_ communication object is used to indicate the outlet water temperature. Value ranges may vary from 0ºC to 127ºC.

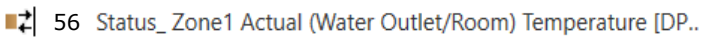


Figure 4.8 Zone 1 Actual (Water Outlet/Room) Temperature communication object

4.1.5 Outdoor Unit Type

Theses objects, indicate the type of Aquarea Outdoor Unit of the system. Information is expressed in three independent 1-bit signals, indicating the corresponding type: STD (standard), TCAP (T-CAP) or HWT (Heat Water Tank). The communication object with a '1' value will indicate the type of Outdoor Unit running the system.

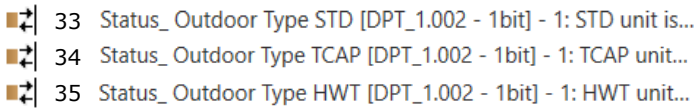


Figure 4.9 Outdoor Unit Type status communication objects

4.1.6 Heat Mode Energy Consumption

This object, ***Heat Mode Energy Consumption***, indicates the instant power consumption when the system is running with this default settings (1 zone, heat mode). The corresponding value is expressed in kW.

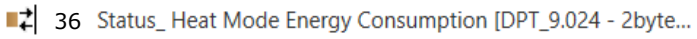


Figure 4.10 Heat Mode Energy Consumption communication objects

4.1.7 Error

INKNXPAN001A000 controls the error and alarm status of the unit in a three-level way: Simple error/alarm signal, current error and historic errors. Please, visit section 0 for more information related with error codes and check your AW user/installer manual for more details.

Current Error

This object indicates if there is any alarm or error active in the system.

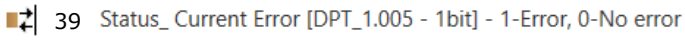


Figure 4.11 Error communication objects

Error Code and Error Text

In case an error is present currently in the system, these status objects indicate which specific error is. See section 0 to get more information about the error codes.

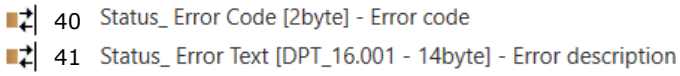


Figure 4.12 Error communication objects

4.2 *Send READs for objects on bus recovery*

When this parameter is enabled, INKNXLGE001R000 will send READ telegrams for the group addresses associated on its *Control_* objects on bus recovery or application reset/start-up.

- If set to **"No"** the gateway will not perform any action.
- If set to **"Yes"** all *Control_* objects with both Transmit **(T)** and Update **(U)** flags enabled will send READs and their values will be updated with the response when received.

Figure 4.13 *Send Reads* parameter selection

- Delay before sending READs (sec):

  With this parameter, a delay can be configured between 0 and 30 seconds for the READs sent by the *Control_* objects. This is to give time enough to other KNX devices on the bus to start-up before sending the READs.

4.3 *Zones*

The Aquarea system support up to two independent zones. Using the *Number of zones available*, specific communication objects to control and monitor Zone 1 and Zone 2 will be enabled.

Notice that zones can be configured as ***Room*** or ***Pool***. In case of having two zones, keep in mind that the pool zone may be always associated to zone 2.

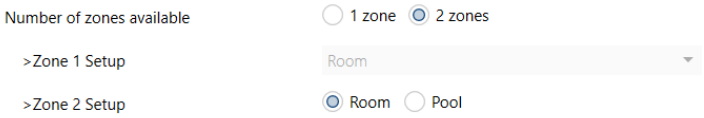


Figure 4.14 Number of zones configuration

Communication object related to zone control are:

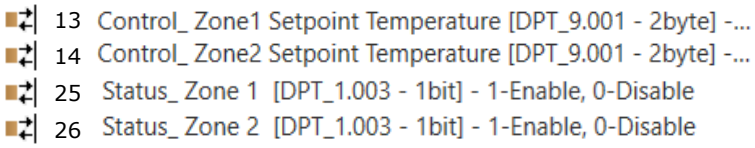


Figure 4.15 Zone control and status communication objects

Communication object related to zone temperature are:

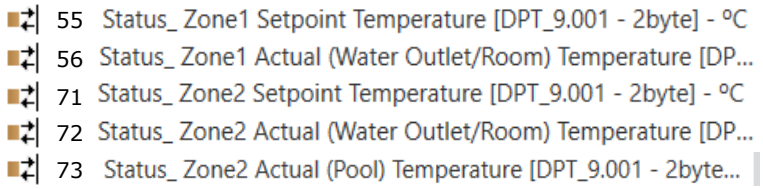


Figure 4.16 Zone temperature communication objects

In addition, there are also some special communication objects related to the zone system configuration. Those are disabled by default, but can be enabled using the corresponding parameter in the Parameters dialog.

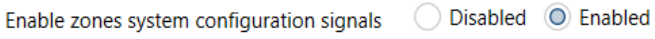


Figure 4.17 Zone system enabling parameter

The corresponding communication objects activated are the followings:

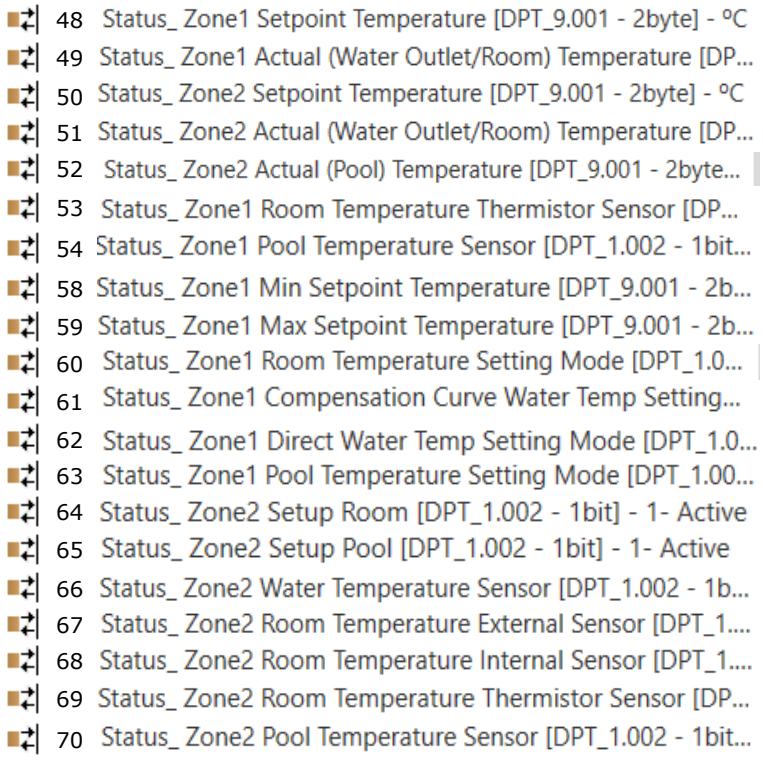


Figure 4.18 Zone temperature communication objects

4.4 *Operating mode*

This parameter enables or disables Control_ and Status_ communication objects related with Operating Mode. Please, check your system features in your AW user/installation manual to ensure that your climate system has this feature available and to find more information for each function.

Figure 4.19 Operating mode parameter details

If the Heat&Cool mode is selected, several new parameters can be selected:

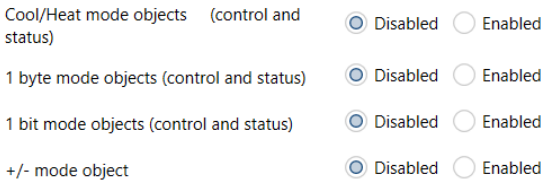


Figure 4.20 Cool&Heat mode parameter details

Cool/Heat mode objects

This parameter enables the use of a single communication object to control and monitor the current mode and allows only to switch between Cool and Heat mode.

If enabled, this paramaters activates the following communication objects:

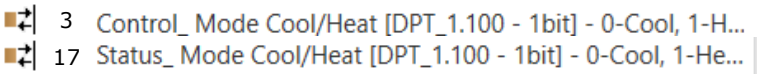


Figure 4.21 Cool/Heat communication objects

These communication objects are used to control and monitor the current mode of the system: '0' for Cool mode and '1' for Heat mode.

1 byte mode objects

This parameter enables communication objects to control the mode using a single 1 byte communication object for control and another for status.

If enabled, this paramaters activates the following communication objects:

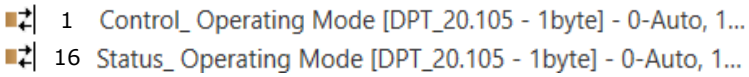


Figure 4.22 Tank setpoint temperature communication objects

These communication objects are used to control and monitor the current mode of the system: '0' for Auto mode, '1' for Cool mode and '3' for Heat mode.

1 bit mode objects
This parameter enables communication objects to control and monitor the mode using independent 1 bit communication objects.

If enabled, this paramaters activates the following communication objects:

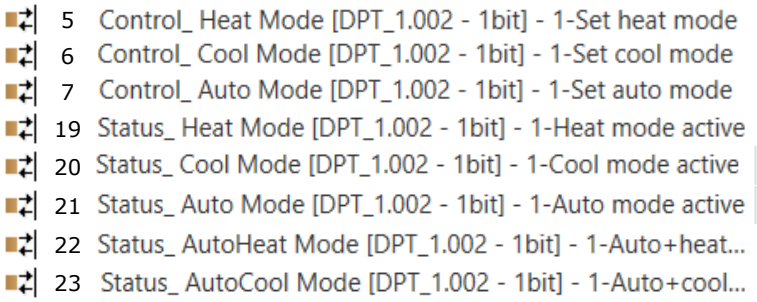


Figure 4.23 1 bit communication objects

Notice that for the auto mode, there are multiple status objects depending on the current mode the system is working with, such as: AutoHeat (Auto+Heat) and AutoCool (Auto+Cool).

+/- mode object
This parameter enables communication objects to control the mode using increasing or decreasing values to swap between the available modes.

If enabled, this paramaters activates the following communication objects:

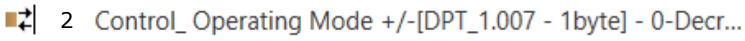


Figure 4.24 +/- mode communication object

Sending a '0' value will decrease and sending a '1' value will increase the current mode.

The sequence followed when using this object is shown below:

- Increase
- Decrease

* If available

4.5 *Hot water tank*

This parameter is used to enable the tank control of the system.

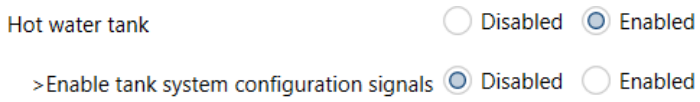


Figure 4.25 Booster status communication objects

When enabled, the following communication objects will be shown:

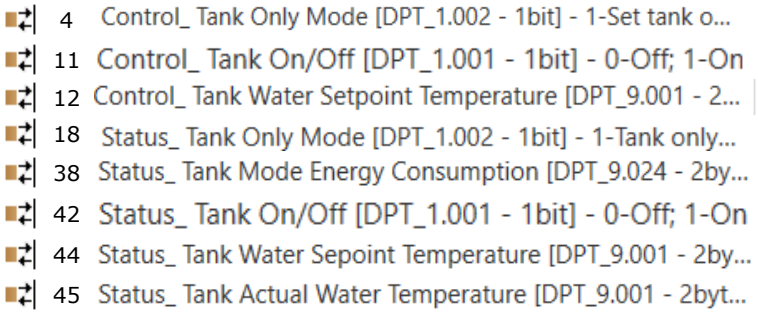


Figure 4.26 Hot Water tank communication object

Enable tank system configuration

This Status_ communication object is used to indicate the cooling setpoint temperature. Value ranges may vary from 20ºC to 70ºC.

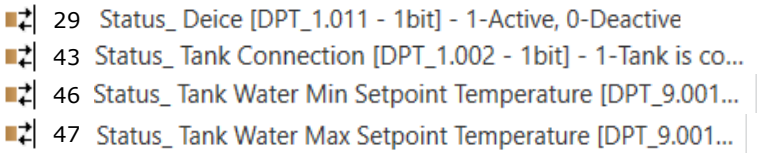


Figure 4.27 Heating Setpoint Temperature communication object

5. Technical Specifications

Enclosure	ABS (UL 94 HB) de 2,5 mm thick Net dimensions (dxwxh): 100 x 70 x 28 mm / 4" x 2.8"x 1.2" Color: Ivory White	Operation Temperature	0ºC to +60ºC
Weight	70 g.	Stock Temperature	-20ºC to +85ºC
Power supply	Power is supplied by: 1.- Aquarea bus 2.- KNX bus (29V DC, 6mA)	Operational Humidity	<90% RH, non-condensing
Terminal Wiring (for low-voltage signals)	For terminal: solid wires or stranded wires (twisted or with ferrule) 1 core: 0.5mm^2… 2.5mm^2 2 cores: 0.5mm^2… 1.5mm^2 3 cores: not permitted	Stock Humidity	<90% RH, non-condensing
KNX port	1 x KNX TP1 (EIB) port opto-isolated. Plug-in terminal block (2 poles). TNV-1	Isolation voltage	1500 VDC
Hydro unit port	1 x Specific connector Specific cable included	Isolation resistance	1000 MΩ
Configuration	Configuration with ETS	Protection	IP20 (IEC60529)
LED indicators	1 x Onboard LED - Operational status		

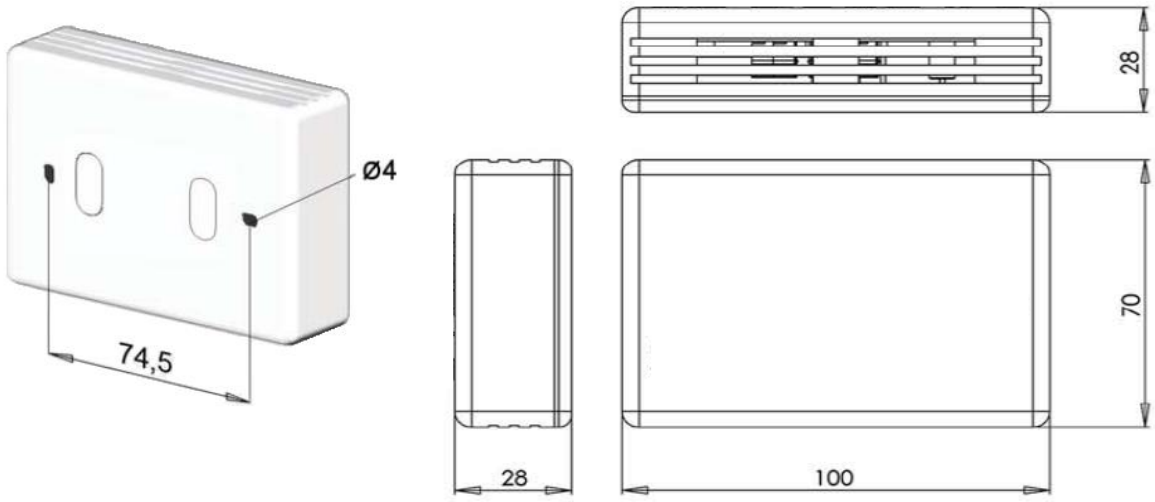


Figure 5.1 INKNXPAN001A000 dimensions (mm)

6. Compatible Air-to-Water (A.W.) units

A list of Panasonic Aquarea H generation unit model references, compatible with INKNXPAN001A000 and their available features, can be found in:
https://www.intesis.com/docs/compatibilities/inxxxpan001a000_compatibility

7. Error Codes

KNX Error Code	Error in Remote Controller	Error Description
0	H00	No abnormality detected
112	H12	Indoor/Outdoor capacity unmatched
115	H15	Outdoor compressor temperature sensor abnormality
120	H20	Water pump abnormality
123	H23	Indoor refrigerant liquid temperature sensor abnormality
127	H27	Service valve error
128	H28	Abnormal solar sensor
131	H31	Abnormal swimming pool sensor
136	H36	Abnormal buffer tank sensor
138	H38	Brand code not match
142	H42	Compressor low pressure abnormality
143	H43	Abnormal Zone 1 sensor
144	H44	Abnormal Zone 2 sensor
162	H62	Water flow switch abnormality
163	H63	Refrigerant low pressure abnormality
164	H64	Refrigerant high pressure abnormality
165	H65	Deice circulation error
167	H67	Abnormal External Thermistor 1
168	H68	Abnormal External Thermistor 2
170	H70	Back-up heater OLP abnormality
172	H72	Tank sensor abnormal
174	H74	PCB communication error
175	H75	Low water temperature control
176	H76	Indoor - control panel communication abnormality
190	H90	Indoor/outdoor abnormal communication
191	H91	Tank heater OLP abnormality
195	H95	Indoor/Outdoor wrong connection
198	H98	Outdoor high pressure overload protection
199	H99	Indoor heat exchanger freeze prevention
212	F12	Pressure switch activate
214	F14	Outdoor compressor abnormal revolution
215	F15	Outdoor fan motor lock abnormality
216	F16	Total running current protection
220	F20	Outdoor compressor overheating protection
222	F22	IPM (power transistor) overheating protection
223	F23	Outdoor Direct Current (DC) peak detection
224	F24	Refrigeration cycle abnormality
225	F25	Cooling/Heating cycle changeover abnormality
227	F27	Pressure switch abnormality
229	F29	Low Discharge Superheat
230	F30	Water outlet sensor 2 abnormality
232	F32	Abnormal Internal Thermostat
236	F36	Outdoor air temperature sensor abnormality
237	F37	Indoor water inlet temperature sensor abnormality
240	F40	Outdoor discharge pipe temperature sensor abnormality
241	F41	PFC control
242	F42	Outdoor heat exchanger temperature sensor abnormality
243	F43	Outdoor defrost sensor abnormality
245	F45	Indoor water outlet temperature sensor abnormality
246	F46	Outdoor Current Transformer open circuit
248	F48	Outdoor EVA outlet temperature sensor abnormality
249	F49	Outdoor bypass outlet temperature sensor abnormality
295	F95	Cooling high pressure overload protection

In case you detect an error code not listed, please contact your nearest Panasonic support center to get more information about the meaning of the error.

Appendix A – Communication objects description table

Control Objects

SECTION	OBJECT NUMBER	NAME	LENGTH	DATAPOINT TYPE		FLAGS				FUNCTION
				DPT_NAME	DPT_ID	R	W	T	U	
On / Off	0	Control_ System On/Off	1 bit	DPT_Switch	1.001		W	T		0 - Off; 1-On
Mode	1	Control_ Operating Mode	1 bit	DPT_HVAC_Mode	20.105		W	T		0 – Auto; 1 – Heat; 3 – Cool
	2	Control_ Mode +/-	1 bit	DPT_Step	1.007		W	T		0 – Decrease; 1 – Increase;
	3	Control_ Mode Cool/Heat	1 bit	DPT_Heat/Cool	1.100		W	T		0 - Cool; 1 - Heat;
	4	Control_ Tank Only Mode	1 bit	DPT_Bool	1.002		W	T		1 – Set Tank Only mode
	5	Control_ Mode Heat	1 bit	DPT_Bool	1.002		W	T		1 – Set HEAT mode
	6	Control_ Mode Cool	1 bit	DPT_Bool	1.002		W	T		1 – Set COOL mode
	7	Control_ Mode AUTO	1 bit	DPT_Bool	1.002		W	T		1 – Set AUTO mode
Zones	8	Control_ Zones	1 bit	DPT_Start/Stop	1.017		W	T		0 – Disable Zones; 1 – Enable Zones;
Temperatures	9	Control_ Heat Mode Water Temp. Set. Method	2 bytes	DPT_Value_Temp	9.001		W	T		(ºC)
	10	Control_ Cool Mode Water Temp. Set. Method	2 bytes	DPT_Value_Temp	9.001		W	T		(ºC)
Tank	11	Control_ Tank On/Off	1 bit	DPT_Switch	1.001		W	T		(ºC)
Temperatures	12	Control_ Tank Water Setpoint Temperature	2 bytes	DPT_Value_Temp	9.001		W	T		(ºC)
	13	Control_ Zone 1 Setpoint Temperature	2 bytes	DPT_Value_Temp	9.001		W	T		(ºC)
	14	Control_ Zone 2 Setpoint Temperature	2 bytes	DPT_Value_Temp	9.001		W	T		(ºC)

Status Objects

SECTION	OBJET NUMBER	NAME	LONG.	DATAPOINT TYPE		FLAGS				FUNCTION
				DPT_NAME	DPT_ID	R	W	T	U	
On / Off	15	Status_ System On/Off	1 bit	DPT_Switch	1.001	R		T		0 - Off; 1-On
Mode	16	Status_ Operating Mode	1 byte	DPT_HVAC_Mode	20.105	R		T		0 – Auto; 1 – Heat; 3 – Cool
	17	Status_ Mode Cool/Heat	1 bit	DPT_Heat/Cool	1.100	R		T		0 - Cooling; 1 - Heating
	18	Status_ Tank Only Mode	1 bit	DPT_Bool	1.002	R		T		1 – Tank Only Mode active
	19	Status_ Heat Mode	1 bit	DPT_Bool	1.002	R		T		1 – Heat Mode active
	20	Status_ Cool Mode	1 bit	DPT_Bool	1.002					1 – Cool Mode active
	21	Status_ Auto Mode	1 bit	DPT_Bool	1.002	R		T		1 – Auto Mode active
	22	Status_ AutoHeat Mode	1 bit	DPT_Bool	1.002	R		T		1 – AutoHeat Mode active
	23	Status_ AutoCool Mode	1 bit	DPT_Bool	1.002	R		T		1 – AutoCool Mode active
Zones	24	Status_ Number of Zones	1 byte	DPT_Value_1_Ucount	5.010	R		T		1 – 1 zone; 2 – 2 zones
	25	Status_ Zone 1	1 bit	DPT_Enable	1.003	R		T		0 – Zone disabled; 1 – Zone enabled;
	26	Status_ Zone 2	1 bit	DPT_Enable	1.003	R		T		0 – Zone disabled; 1 – Zone enabled;
Temperatures	27	Status_ Heat Mode Water Temp. Set. Method	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
	28	Status_ Cool Mode Water Temp. Set. Method	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
	29	Status_ Deice	1 bit	DPT_State	1.011	R		T		0 – Deactive; 1 – Active;
	30	Status_ Outdoor Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
	31	Status_ Inlet Water Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
	32	Status_ Outlet Water Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
Outdoor Type	33	Status_ Outdoor Type STD	1 bit	DPT_Bool	1.002	R		T		1: Standard unit is active
	34	Status_ Outdoor Type TCAP	1 bit	DPT_Bool	1.002	R		T		1: TCAP unit is active
	35	Status_ Outdoor Type HWT	1 bit	DPT_Bool	1.002	R		T		1: HWT unit is active

Consumption	**36**	Status_ Heat Mode Energy Consumption	2 bytes	DPT_Power	9.024	R		T		(kW)
	37	Status_ Cool Mode Energy Consumption	2 bytes	DPT_Power	9.024	R		T		(kW)
	38	Status_ Tank Mode Energy Consumption	2 bytes	DPT_Power	9.024	R		T		(kW)
Errors	**39**	Status_ Current Error	1 bit	DPT_Alarm	1.005	R		T		0 - No Alarm; 1 - Alarm
	40	Status_ Current Error Code	2 bytes	Enumerated		R		T		0 - No Error; Any other see user's manual
	41	Status_ Current Error Code Text	14 bytes	DPT_String_8859_1	16.001	R		T		3 char PA Error; Empty - None
Tank	**42**	Status_ Tank On/Off	1 bit	DPT_Switch	1.001	R		T		0 - Off; 1-On
	43	Status_ Tank Connection	1 bit	DPT_Bool	1.002	R		T		1: Tank is connected
	44	Status_ Tank Water Setpoint Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
	45	Status_ Tank Actual Water Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
	46	Status_ Tank Water Min Setpoint Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
	47	Status_ Tank Water Max Setpoint Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
Zones	**48 / 64**	Status_ Zonex Setup Room	1 bit	DPT_Bool	1.002	R		T		1: Active
	49 / 65	Status_ Zonex Setup Pool	1 bit	DPT_Bool	1.002	R		T		1: Active
	50 / 66	Status_ Zonex Water Temperature Sensor	1 bit	DPT_Bool	1.002	R		T		1: Active
	51 / 67	Status_ Zonex Room Temp. External Sensor	1 bit	DPT_Bool	1.002	R		T		1: Active
	52 / 68	Status_ Zonex Room Temp. Internal Sensor	1 bit	DPT_Bool	1.002	R		T		1: Active
	53 / 69	Status_ Zonex Room Temp. Thermistor Sensor	1 bit	DPT_Bool	1.002	R		T		1: Active
	54 / 70	Status_ Zonex Pool Temp. Sensor	1 bit	DPT_Bool	1.002	R		T		1: Active
	55 / 71	Status_ Zonex Setpoint Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
	56 / 72	Status_ Zonex Actual (Water Outlet/Room) Temp	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
	57 / 73	Status_ Zonex Actual (Pool) Temp	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
	58 / 74	Status_ Zonex Min Setpoint Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)
	59 / 75	Status_ Zonex Max Setpoint Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(ºC)

	60 / 76	Status_ Zonex Room Temp Setting Mode	1 bit	DPT_Bool	1.002	R		T		1: Room Temperature Mode active
	61 / 77	Status_ Zonex Compensation Curve WaterTemp Setting Mode	1 bit	DPT_Bool	1.002	R		T		1: Comp Curve Mode active
	62 / 78	Status_ Zonex Direct Water Setting Mode	1 bit	DPT_Bool	1.002	R		T		1: Direct Water Mode active
	63 / 79	Status_ Zonex Pool Temp Setting Mode	1 bit	DPT_Bool	1.002	R		T		1: Pool Temperature Mode active

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