June 2021 – revised December 2023

HITACHI

SPX-RAMHLK

Features & Benefits

PRODUCT DEVELOPMENT EUROPE

Cooling & Heating

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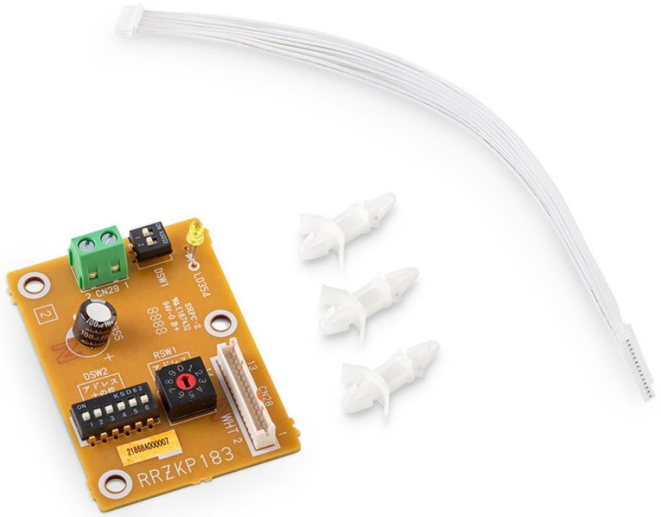
New HLINK adapter for R32 MULTIZONE systems

SPX-RAMHLK HLINK adapter is now available!

The HLINK adapter SPX-RAMHLK dedicated to MULTIZONE units is now available for sales in all JCH-EU regions (Western EU, Eastern EU, South & Export areas, Turkey and its areas) from **1st of July 2021**.

- Gateway reference and ordering code : **SPX-RAMHLK**
- Product description: **HLINK gateway for R32 Multi range**
- Product available on stock at JCH-EU



SPX-RAMHLK
HLINK adapter

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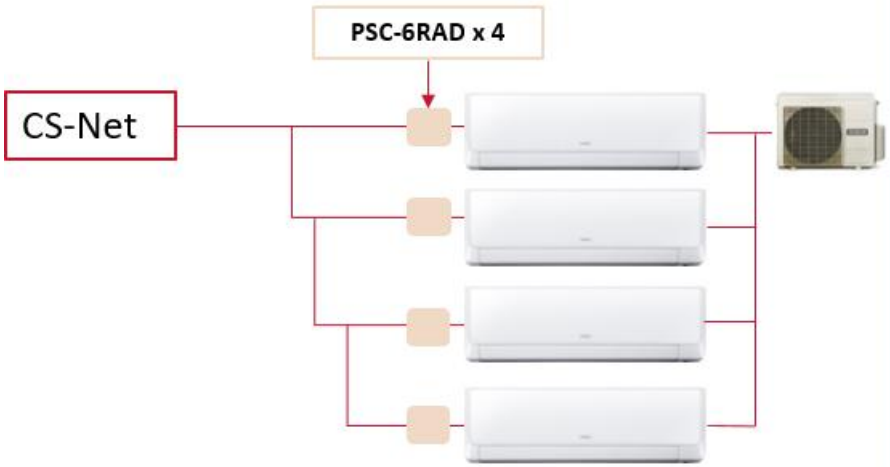
NEW HLINK adapter SPX-RAMHLK

Concept

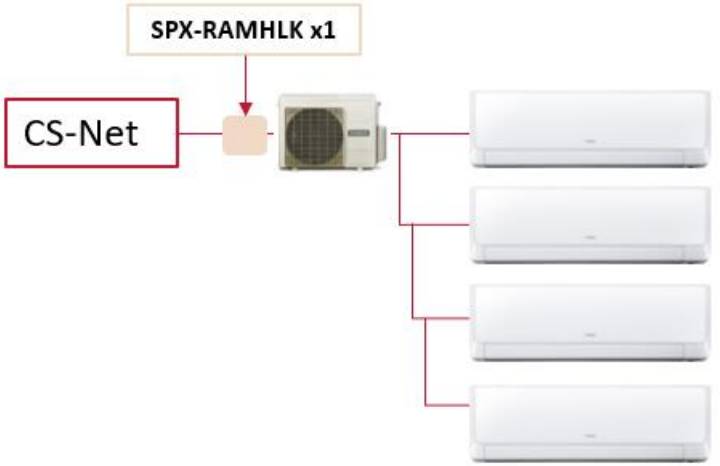
Before

1 adapter per indoor unit,
no data from outdoor unit.



After

Only 1 adapter to get the data of all the units (indoor + outdoor units)



Benefit

- Time saving for installer
- Cost saving for installer / End-user

Note: RAC Monosplit systems shall keep using the single unit HLINK adapter **PSC-6RAD**

NEW HLINK adapter SPX-RAMHLK

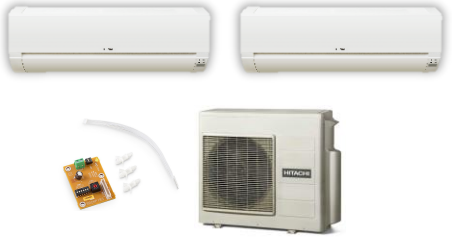
Main Features

Thanks to **SPX-RAMHLK**, **R32 Multi systems** can be combined with:

- **HLINK central controllers**: CSNET Manager 2 devices, CSNET Lite, PSC-A32MN & PSC-A64GT
- air**Cloud Pro** iOT gateway (Update December 2023: if combined with one native HLINK system)
- **VRF BMS gateways**:
  - Modbus gateways **HC-A16MB** & **HC-A64MB** are fully compatible with SPX-RAMHLK
  - BACnet and KNX devices are not compatible yet (software update is pending, see next slides for details)

Key features:

- Indoor units data + **some outdoor unit parameters** are now available!
- **Only 1 adapter per system**: lower products cost and lower installation time!



Compatibility limitations:

- To ensure a perfect operation with HLINK controllers, a software revision has been necessary!
- The **Multi R32 outdoor unit PCB must be updated** with the last software released in June 2021
- The current stocks of units in JCH-EU warehouses are not updated and will not be updated globally, only the most recently manufactured units are up to date (see next slide for details)
- **The software update can be easily applied on site** using a dedicated tool that can be shared with service teams

NEW HLINK adapter SPX-RAMHLK

The HLINK adapter **SPX-RAMHLK** is fully compatible with the **R32 MULTI units** listed below:

Range	Model	Serial number of 1st unit manufactured with the updated software	Manufacturing date & RAC Job number	JCH Factory
R32 Multi	RAM-33NP2E	219221543001	Sep 2021(#221543)	JCH-MY
	RAM-40NP2E	218221536001	Aug 2021 (#221536)	JCH-MY
	RAM-53NP2E	219221547001	Sep 2021 (#221547)	JCH-MY
	RAM-53NP3E	219221565001	Aug 2021 (#221565)	JCH-MY
	RAM-68NP3E	219221561001	Aug 2021 (#221561)	JCH-MY
	RAM-70NP4E	219221568001	Aug 2021 (#221568)	JCH-MY
	RAM-90NP5E	2162303829	July 2021 (#221386)	JCH-MY
	RAM-110NP5E	4549873088648	June 2021(#001218)	JCH-WH
R32 Entry Multi	RAM-40NE2F	219221544001	Sep 2021(#221544)	JCH-MY
	RAM-53NE2F	219221546001	Sep 2021 (#221546)	JCH-MY
	RAM-53NE3F	219221570001	Aug 2021 (#221570)	JCH-MY
R32 YUTAMPO	RAM-53NYP3E	217221456001	July 2021(#221456)	JCH-MY
	RAM-70NYP4E	219221573001	Aug 2021 (#221573)	JCH-MY
	RAM-90NYP5E	2162306009	July 2021 (#221404)	JCH-MY

Notes:

- **Outdoor units** are fully compatible with SPX-RAMHLK from the serial number indicated.
- A technical bulletin will be released in July 2021 to inform about the identification of the updated units (specific mark on carton box).
- For **older outdoor units**, an **update of the main PCB is necessary** to get a full compatibility with SPX-RAMHLK. This update can be done on site **easily** using the dedicated tool. A detailed procedure is available for this job and the tool can be requested to the EU PM Team.
- All the **indoor units** compatible with the outdoor units listed above are compatible with SPX-RAMHLK without any limitation related to their serial number or main PCB software version.

NEW HLINK adapter SPX-RAMHLK – Compatibility table

RAC indoor units connected to Multi R32 outdoor units with SPX-RAMHLK can be controlled and monitored from the **HLINK controllers** listed below, with the following parameters:

- Controlling: Run / Stop, operation mode, fan speed, temperature set point.
- Monitoring: same parameters + room temperature, operation status, alarm status / error codes (with limitations).
- Outdoor unit parameters: compressor running current, frequency and temperature, outdoor temperature.

Combination with HLINK controllers	HLINK Central Controllers				HLINK BMS gateways		
	CSNET Manager 2	CSNET Lite	airCloud Pro	Central Stations	VRF Modbus Gateway	VRF KNX Gateway	VRF BACnet Gateway
Device or gateway reference	CSNET Manager 2T10, 2T15, 2SL HC-A64NET Updated to v2.0	CSNET Lite Software v2.0	HC-IOTGW	PSC-A32MN PSC-A64GT	HC-A16MB HC-A64MB	HI-AC-KNX-16 HI-AC-KNX-64	HI-AC-BAC-16 HI-AC-BAC-64
Compatibility with Multi HLINK adapter SPX-RAMHLK	Yes (1)	Yes (1)	Yes, combined with a VRF unit (2)	Yes	Yes	Partial, update pending	Partial, update pending
Compatibility with SPX-WKT3 (1 per IU)	Yes	Yes	Yes, combined with a VRF unit (2)	Yes	Yes	Partial, update pending	Partial, update pending
Combination with **airCloud Home** or **Hi-Kumo**	Can work but not recommended						

Notes

(1): CSNET Manager and CSNET Lite can manage RAC units using SPX-RAMHLK adapter IF there is no ATW system using ATW-HCD-01 adapter on the HLINK line. Communication issues between SPX-RAMHLK and ATW-HCD-01 have been detected and shall be solved.

(2): Update December 2023: airCloud PRO cannnot work with an HLINK system made only of RAC adpaters (PSC-6RAD or SPX-RAMHLK). RAC units can be controlled from airCloud PRO ONLY if they are combined with a native HLINK unit (VRF or Utopia/IVX) on their HLINK line. In case the HLINK line is made only of RAC adapters, airCloud PRO is currenlty not able to detect the indoor units during the HLINK discovery sequence.

NEW HLINK adapter SPX-RAMHLK – Compatibility table

Combination with HLINK controllers	HLINK Central Controllers				HLINK BMS gateways		
	CSNET Manager 2	CSNET Lite	airCloud Pro	Central Stations	VRF Modbus Gateway	VRF KNX Gateway	VRF BACnet Gateway
Device or gateway reference	CSNET Manager 2T10, 2T15, 2SL HC-A64NET Updated to v2.0	CSNET Lite Software v2.0	HC-IOTGW	PSC-A32MN PSC-A64GT	HC-A16MB HC-A64MB	HI-AC-KNX-16 HI-AC-KNX-64	HI-AC-BAC-16 HI-AC-BAC-64
Compatibility with Multi HLINK adapter SPX-RAMHLK	Yes (1)	Yes (1)	Yes, combined with a VRF unit (2)	Yes	Yes	Partial, update pending	Partial, update pending
Compatibility with SPX-WKT3 (1 per IU)	Yes	Yes	Yes, combined with a VRF unit (2)	Yes	Yes	Partial, update pending	Partial, update pending
Combination with **airCloud Home** or **Hi-Kumo**	Can work but not recommended						

Additional Notes:

- Available data for RAC indoor and outdoor units may change depending on the HLINK controller used, check the details on the next slides
- For CSNET Manager devices, make sure to use updated devices with the software version 2.0 or 2.0.1 + HC-A64NET version 2.0
- Combination with **SPX-WKT3** (1 wired controller per RAC IU) is always possible when one HLINK Central Controller is used. The last order received from the Central Controller or from SPX-WKT3 will have priority. Central controllers like CSNET and Central Stations can block some or all the settings of SPX-WKT3 (RCS lock features). Refer to the detailed table explaining the available functions for each controller.

NEW HLINK adapter SPX-RAMHLK – Compatibility table

RAC indoor units connected to Multi R32 unit with SPX-RAMHLK can also be controlled with **RAC wired controllers like SPX-WKT3**. Other combinations (with iOT systems or SPx-DST1) are not recommended:

Combination with HLINK controllers	Home Automation			RAC system	
	airCloud Home	Hi-Kumo Wifi	Hi-Kumo Hi-box	RAC wired controller	
Device or gateway reference	SPX-WFG02	SPX-WFG01	SPX-TAG01 AHP-SMB-01	SPX-WKT3 (1 per IU)	SPX-WKT3 + SPX-DST1
Compatibility with Multi HLINK adapter SPX-RAMHLK	Not recommended (1)	Not recommended (1)	Not recommended (1)	Yes	To be confirmed (2)

Notes:

(1): Combination with iOT gateways can work but is not recommended. RAC indoor unit can follow the orders either from the HLINK system or from the iOT App, the last order submitted will have priority. However these are not recommended combinations, as depending on the settings done on the HLINK system to lock parameters, unexpected behavior of the RAC units may occur. It is not recommended to propose such combination to customers. In case it is required to control RAC units through an App, it is better to propose airCloud PRO.

(2): Combination of HLINK controller through SPX-RAMHLK with SPX-WKT3 and SPX-DST1 has not been tested. Instead of combining SPX-WKT3+SPX-DST1 + HLINK controller, it is recommended to use only one HLINK controller like PSC-A32MN to control all the RAC units.

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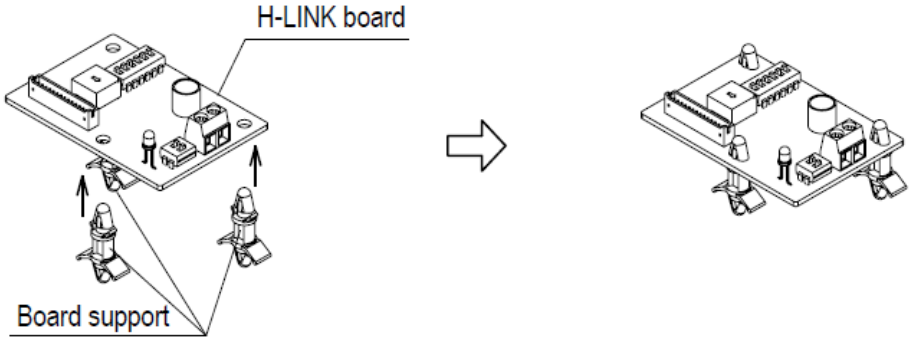
NEW HLINK adapter SPX-RAMHLK

Content of the product

The product is delivered with the following content:

- HLINK PCB + connection cord to the outdoor unit PCB
- Plastic supports to plug the adaptor on the main PCB of outdoor unit
- Installation manual

No	Part Name	Quantity
①	H-LINK board	1
②	Board support	3
③	14 pin cord	1
④	Installation manual	1



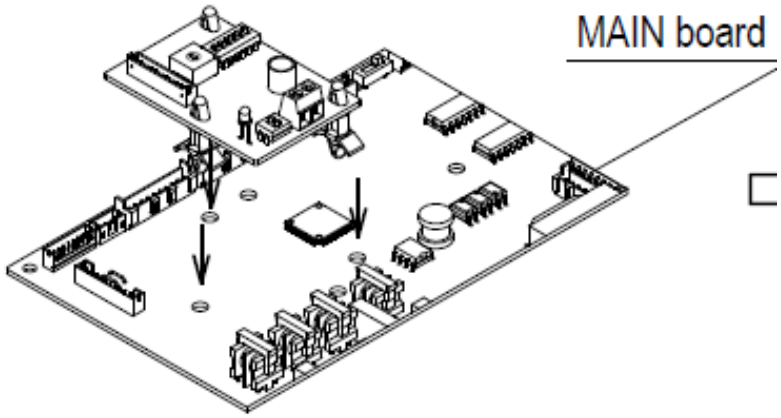
NEW HLINK adapter SPX-RAMHLK

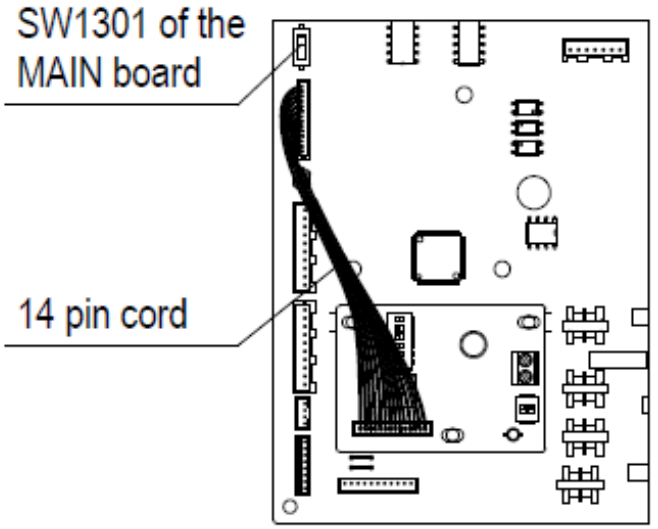
Installation information

Place the adapter on the main PCB: holes are available on the main PCB to plug it

Connect the connection cord from the adapter to the main PCB CN2026

Activate SW1301 on Outdoor unit to activate HLINK communication (OFF => ON)





Do not forget to set SW1301 to ON position to get HLINK data.

If SW1301 is kept OFF, even with the adapter installed, no data will be read from the HLINK controller.

When HLINK communication is activated by SW1301, OU hibernation mode is suspended.

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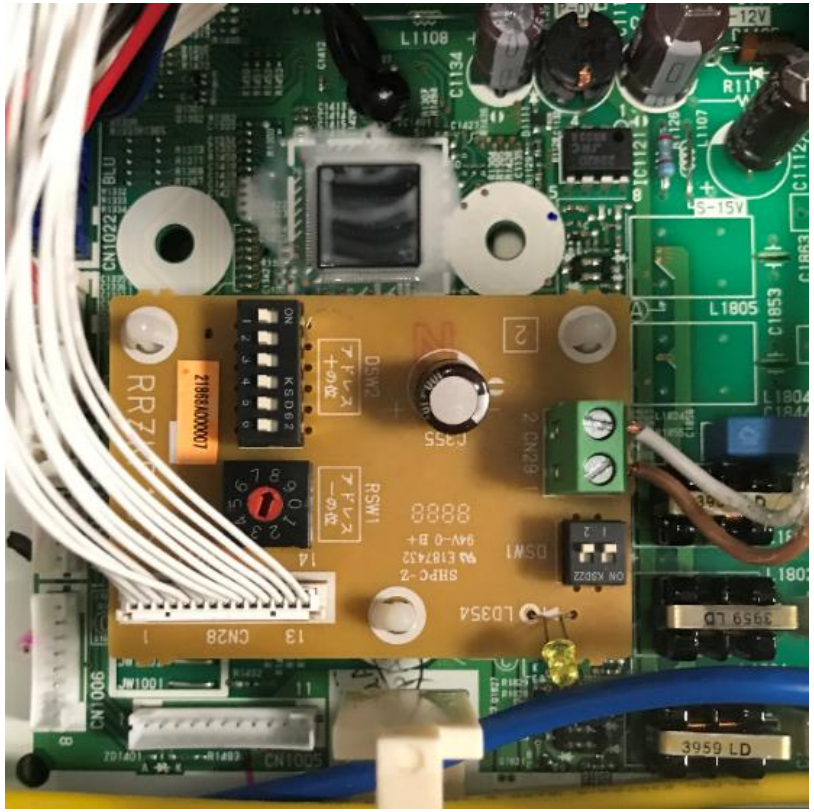
NEW HLINK adapter SPX-RAMHLK

Installation information

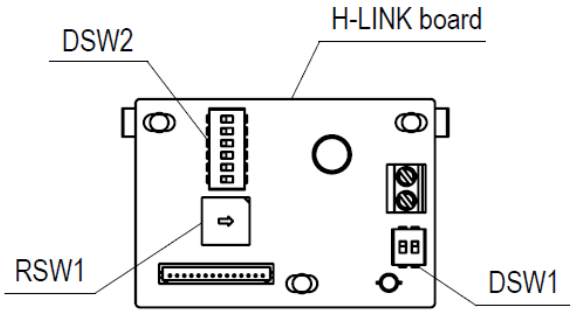
Place the adapter on the main PCB: holes are available on the main PCB to plug it



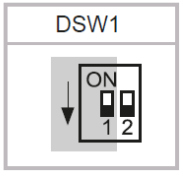
NEW HLINK adapter SPX-RAMHLK

Configuration information

- Confirm **SW1301** activation (ON position) to get HLINK data
- Set **outdoor unit** address using the standard HLINK DSW address setting **RSW1 + DSW2**
- **Outdoor unit** HLINK address range: **[0-63]** (HLINK 2 specifications)
- **Indoor units addresses are automatically set** by the HLINK adapter according to their position on the outdoor unit terminal boards (IU address range **[0-4])**
- Set the terminal resistance according to your system:
  - In case of only RAC units: terminal resistance is necessary, **DSW1#1 ON** for one system only
  - In case this RAC system is connected to a HLINK system: set the end resistance on the native HLINK units, not on the RAC system.



i. DSW1 setting.
Pin number 1 of DSW1 shall be set to OFF position.
(Default setting from factory is pin number 1 of DSW1 set to OFF condition).



If 2 or more units that using H-LINK board connected to the same Central Station, only one of the unit shall be selected to set it pin number 1 of DSW1 to ON condition. The others connected unit shall be keep it pin number 1 of DSW1 to OFF condition.

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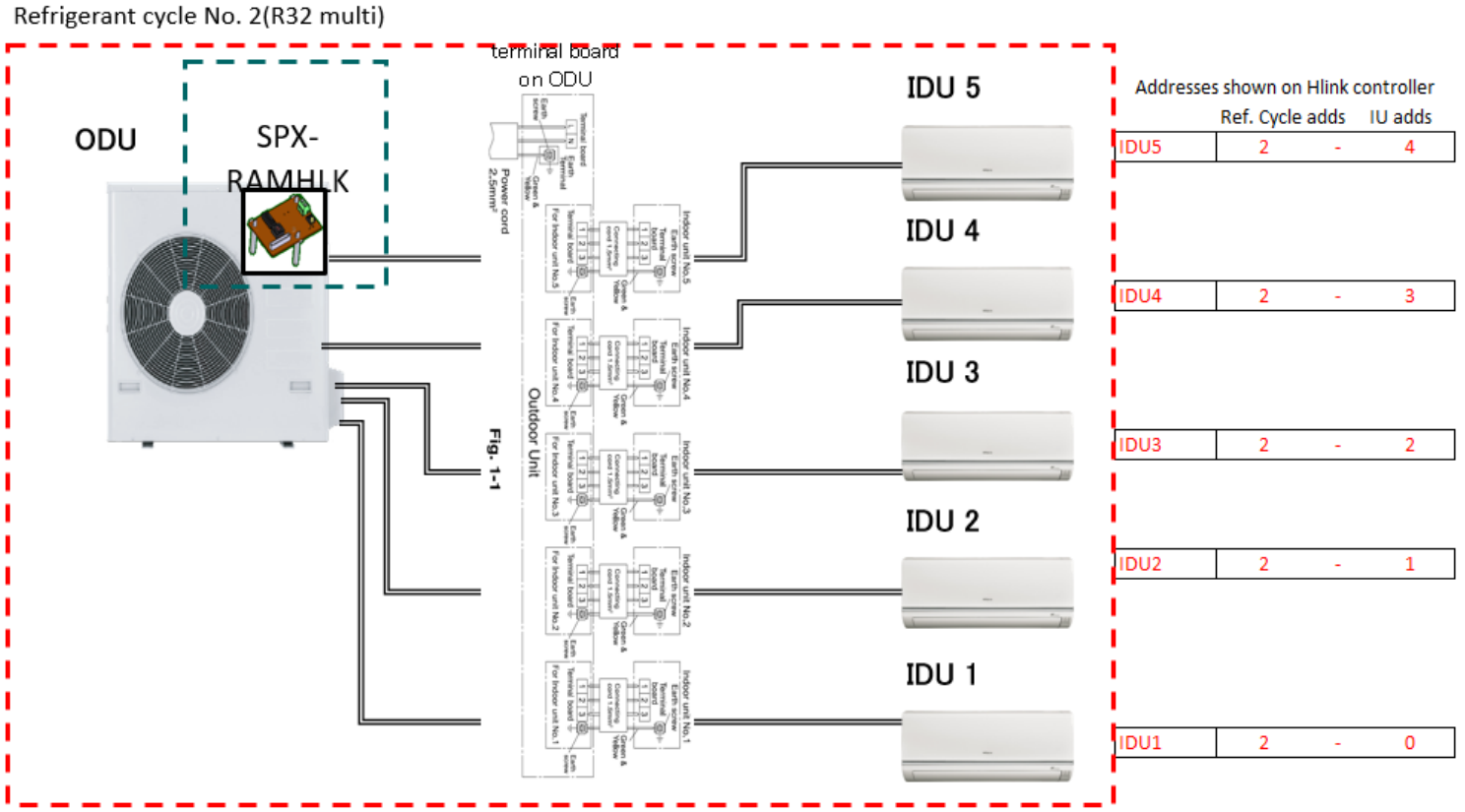
NEW HLINK adapter SPX-RAMHLK

Configuration information

Indoor units address configuration

- This setting is automatic
- Indoor units addresses are set according to their position on the outdoor unit terminal board.



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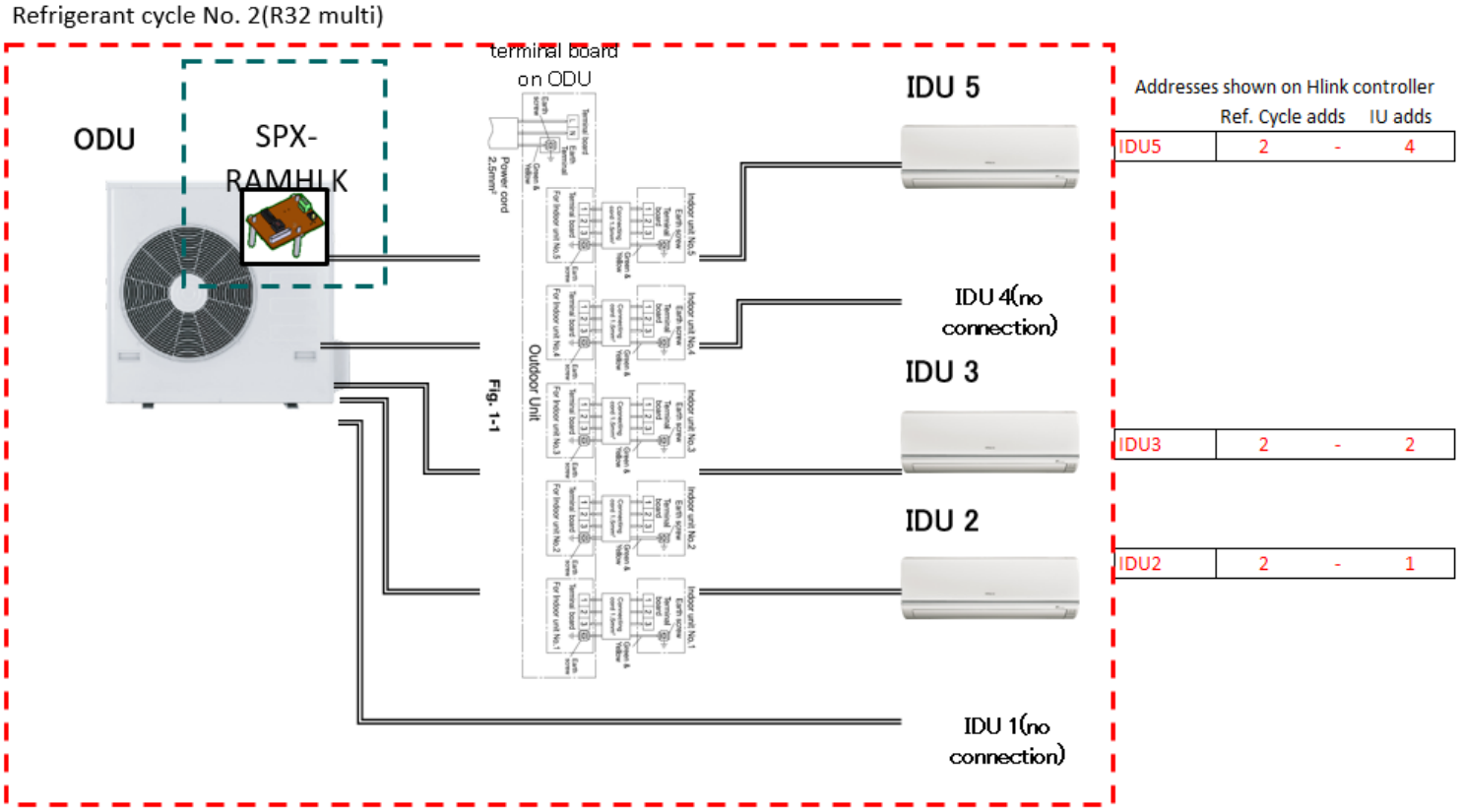
NEW HLINK adapter SPX-RAMHLK

Configuration information

Indoor units address configuration

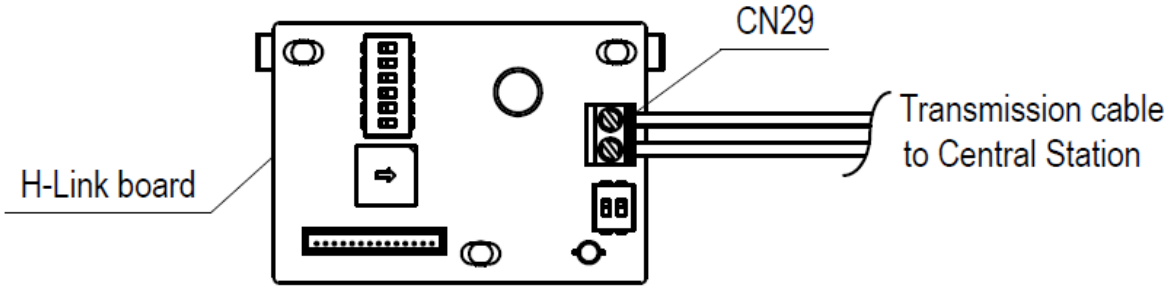
- This setting is automatic
- Indoor units addresses are set according to their position on the outdoor unit terminal board.



NEW HLINK adapter SPX-RAMHLK

Configuration of the device: once the adapter is installed on the outdoor unit PCB,

- Connect the adapter to the HLINK system
- Follow the same wiring protocol as the standard HLINK units



The transmission cable used shall be as below.

i. 2 cores cable (0.75mm^2 to 1.25mm^2). Model : VCTF, VCT, CVV, MVVS, CVVS VVR, VVF.

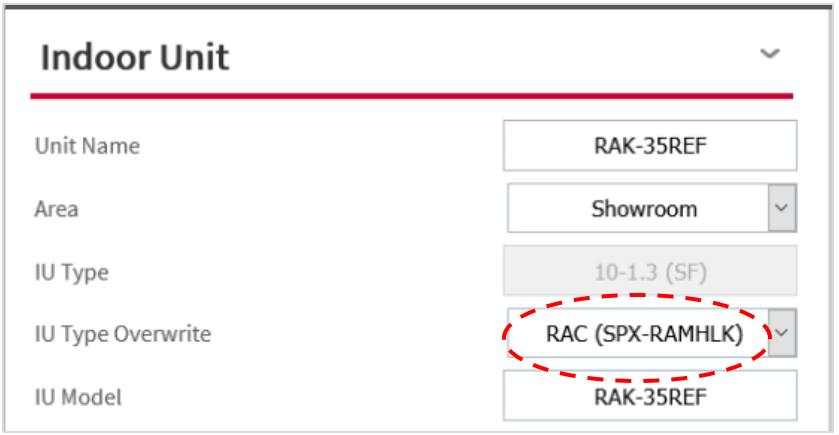
ii. 2 cores twist pair cable. Model : KPEV, KPEV-S.

Total length of the transmission cable shall be below than 1000m.

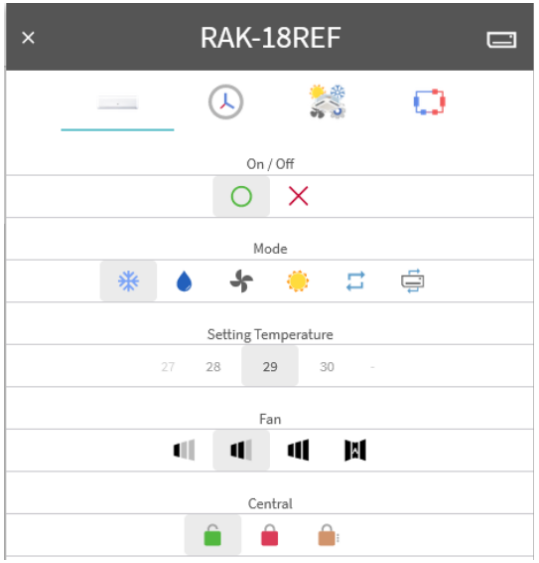
SPX-RAMHLK + CSNET Manager devices: available data

Thanks to this new RAC adapter, data for outdoor unit and all its indoor units are available:

A specific indoor unit profile is available on CSNET Manager software to select RAC unit with SPX-RAMHLK (indoor unit configuration menu):



Silent fan speed and louver control are not available from CSNET Manager and CSNET Lite for RAC units (with SPX-RAMHLK and PSC-6RAD):



IU commands:

All operation modes, including Auto (CSNET) mode & Auto RCS

Fan speed setting: low, med, high & Auto (silent speed is not available)

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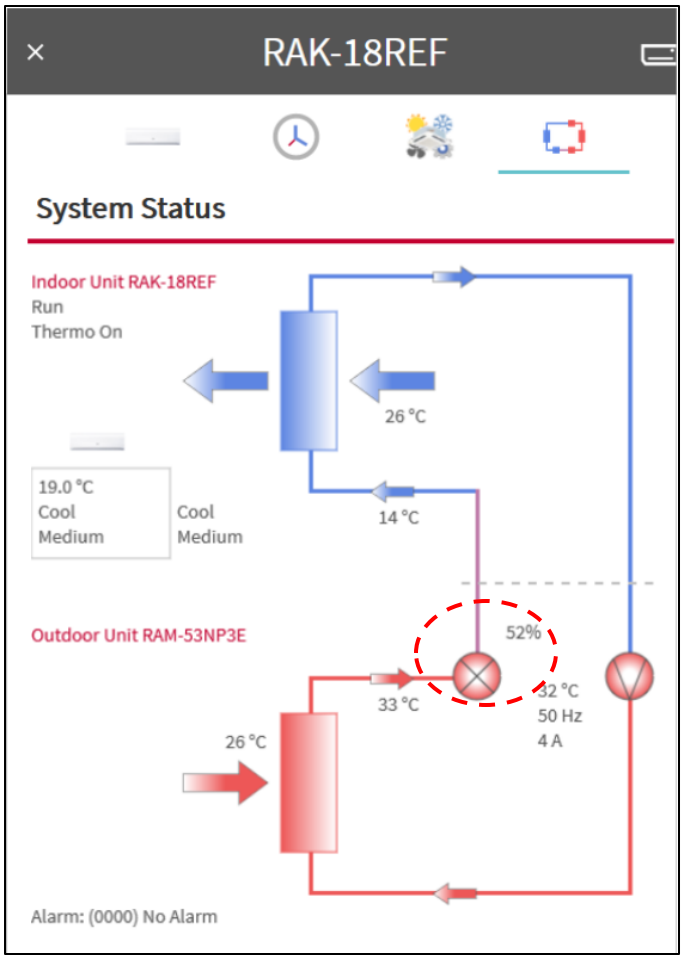
SPX-RAMHLK + CSNET Manager devices: available data

Thanks to this new RAC adapter, data for outdoor unit and all its indoor units are available:



IU data:
Unit status:
ON/OFF, mode, alarm,
Thermo ON/OFF
Unit Settings:
Tset, Fan, mode
Tin (Room temp.)
HEX temp.

OU data:
Compressor Td, Frequency, running current (+/- 0,5 A)
Outdoor temp.
HEX temp.
+
Indoor unit expansion valve opening

RAC IU and OU parameters are available through the Modbus IP output of CSNET Manager devices (according to the standard Modbus data table for HLINK units), check slide 20.

SPX-RAMHLK + CSNET Manager devices: available data

Focus on indoor unit data:

Item	Indoor Units IU 1	Indoor Units IU 2	Read/Write	Comments
On/Off	On	On	Read + Write	Standard on/off command
Mode	Cool	Cool	Read + Write	Operation mode : Cool, Heat, Dry, Fan, Auto (RCS) or Auto (CSNET)
Tset	19 ºC	19 ºC	Read + Write	Tset ranges: Cool [19-30]°C, Heat [17-30]°C
Fan	Medium	Medium	Read + Write	Low, Med, High, Auto (Silent is not managed by HLINK)
Real fan speed	Medium	Medium	Read only	Same as fan speed setting
Louver ctrl	2	4	Not available	RAC swing louver operation is not managed by HLINK
Central (RCS lock)	2	2	Read + Write	RCS lock (individual + full) are compatible with SPX-WKT3
Status	Thermo-ON	Thermo-ON	Read only	Thermo ON/OFF status is correct for RAC units
Tin	35 ºC	35 ºC	Read only	Room temperature read from indoor unit sensor (air inlet sensor). If a wired controller SPX-WKT3 is used on IU, sensor selection can be done from this controller (air inlet sensor on IU or remote controller room sensor). The value displayed for Tin on CSNET and all HLINK devices will be the sensor value selected on wired controller (IU sensor or controller sensor). Other parameters like Tout, Trem, RCS sensor are not available for RAC units.
HEX temperature	21 ºC	23 ºC	Read only	Value from Heat Exchanger temp. sensor of RAC indoor unit (Indoor unit liquid & gas temp. values are reporting the same Hex temperature)
Expansion valve opening	43%	46%	Read only	Expansion value opening for the related RAC indoor unit (exp. Valve is physically located into the outdoor unit)
Alarm	0	0	Read only	Alarm code (correct value displayed for CSNET devices)
Capacity	0.6	1.5	Read only	RAC IU capacity in HP

SPX-RAMHLK + CSNET Manager devices: available data

Focus on outdoor unit data:

Outdoor Unit		Read/Write	Comments
Item	Value		
Ta	26 ºC	Read only	Outdoor temperature read from OU sensor
Te	32 ºC	Read only	Heat exchanger temperature from outdoor unit
Td	33 ºC	Read only	Compressor discharge temperature
Hz	43 Hz	Read only	Compressor frequency
Current	8 Amps	Read only	Compressor primary current (RMS value, +/- 0,5 A)
IU Qty	2	Read only	Quantity of indoor units connected to this OU
Capacity	14	Read only	RAC OU capacity in HP (may not be 100 % accurate)

SPX-RAMHLK + CSNET Manager devices: available functions

Compatibility

with CSNET Manager 2

(table from APN of CSNET

Manager 2 v2.0 software)

Function	Heating Units with previous HC-A64NET version	Heating Units with CSNET Lite v2.0 or HC-A64NET updated	SPX-RAMHLK	Primary units
Unit control	General On/Off	Zone control: ON/OFF, Room Temp. setting, Eco/Comfort, Water Temp. setting for DHW and SWP	All parameters except Dual set point	All parameters except Dual set point
System status	Some extra information	All settings and current temperatures for the zones	Limited (IDU+ODU data)	Limited (IDU data only)
Timer	Only On/Off	Only On/Off	Yes	Yes
Auto Cool/Heat	No	No	Yes	Yes
Heat Draft	No	No	Yes (*1)	Yes (*1)
Cold Draft	No	No	No	No
Set Back	No	No	Yes	Yes
Unit Configuration	Yes	Yes with specific parameters for ATW units	Yes	Yes
Optional Functions	No	No	No	No
Power Consumption	Yes	Yes with detailed consumption per zone	No (*2)	No (*2)
Historical Data	Yes	Yes. Extra data for heating	Yes	Yes
Hotel Application	No	No	No	No
Server Room	No	No	Yes	Yes
Maintenance Function	No	No	No	No
Interlock	Yes	Yes. Specific parameters for heating zones are available.	Yes	Yes
Outdoor control	Yes	Yes	No	No
Modbus	Yes	Yes. Extra parameters for heating	Yes	Yes
Fidelio	Yes	Yes	Yes	Yes
Alarm Notification	Yes	Yes. Specific alarms of ATW units are available	Yes. Specific alarms of RAC units are available.	Yes (alarm status only)

Notes:

(*1) Heat Draft can work for RAC and PRIMAIRY units using the air inlet temperature sensor (Tin) as control sensor. This is not a recommended option, as when units are stopped, Tin is not properly reading the room temperature. This option shall be used with caution by experienced service engineer only.

(*2) It is possible to use a Power meter dedicated to RAC or Primary units but CSNET will only display the global power consumption value measured by the power meter. Power distribution estimation is not available for these units.

SPX-RAMHLK + CSNET Manager Modbus IP output: available data

CSNET Manager Modbus IP output, table of registers for RAC units with SPX-RAMHLK

Refer to the APN of CSNET Manager 2 version 2.0 for more details

Parameter Address	Name	Description	R/W	Example
0	Exist	0: Not exist 1: Exist	Read Only	1
1	System Address	Outdoor unit address: H-LINK 1: 0~15, H-LINK 2: 0~63	Read Only	8
2	Unit Address	Indoor unit address: H-LINK 1: 0~15, H-LINK 2: 0~63	Read Only	1
3	On / Off	ON/OFF setting order: 0: Stop 1: Run	Read/Write	1
4	Mode Setting	Mode setting order: 0: Cool 1: Dry 2: Fan 3: Heat 4: Auto (CSNET Auto mode) 5: Auto RCS (Auto mode from wired remote controller)	Read/Write	0
5	Fan Setting	Fan speed setting command: 0: Low fan speed 1: Medium fan speed 2: High fan speed Silent and Auto fan speed settings of RAC units are not available from CSNET Manager or from Modbus. High 2 and Auto fan speed setting from CSNET Manager or Modbus are not known by the RAC unit.	Read/Write	1
6	Setting Temperature	Setting temperature: limited to the temperature range of HLINK units. heating mode: [17~30]°C cooling mode: [19~30]°C	Read/Write	19
7	Louver Setting	Not available	-	-
8	Central Setting	Central setting: this register is a decimal value. Convert the value to binary to read or set the parameters: bits set to 1 are activated, bits set to 0 are not activated. For the example below, decimal value 4 means bit 2 activated: temperature setting is locked by CSNET for this indoor unit. Decimal value: 4 — binary value: 0 0 1 0 — bit: 4 3 2 1 bit: 4 3 2 1 0 — decimal value of each bit: 16 8 4 2 1 bit 1: Operation mode bit 2: Temperature setting bit 3: Fan speed setting bit 4: not available for RAC units Set the register to 15 (bits 0 to 3 activated) to lock all the parameters of the RAC unit by CSNET.	Read/Write	0

9	On / Off Read	Reading ON/OFF status: 0: OFF 1: ON	Read Only	1
10	Mode Read	Reading operation mode status: 0: Cool 1: Dry 2: Fan 3: Heat 4: Auto (CSNET Auto mode, when this mode is sets. Once CSNET is deciding the operation mode of indoor unit, this real operation mode is read) 5: Auto RCS (Auto mode from wired remote controller)	Read Only	0
11	Fan Read	Reading Fan speed setting: 0: Low fan speed 1: Medium fan speed 2: High fan speed	Read Only	1
12	Setting temperature Read	Setting temperature read (17ºC to 30ºC)	Read Only	19
13	Louver Read	Not available	-	-
14	RCS Group	Remote controller group set from CSNET Manager 0 ~ 255	Read Only	8
15	Inlet Temperature	Inlet temperature (Note 2) For RAC units with SPX-RAMHLK, this temperature is normally read from the air inlet sensor. In case SPX-WKT3 is used as RCS, it is possible to select the control sensor (inlet sensor, RCS sensor, average value). The Modbus register is then displaying the value of the selected sensor.	Read Only	21
16	Outlet Temperature	Not available	-	-
17	Gas Temperature	Indoor unit heat exchanger pipe sensor (Note 2).	Read Only	7
18	Liquid Temperature	RAC units only have one pipe sensor on the heat exchanger.	Read Only	7
19	Error Code	Alarm code (real RAC alarm code, 9 = 00-09, indoor unit alarm 9, room sensor issue, 104 = 01-04, outdoor unit alarm 4, compressor issue)	Read Only	0
20	Stop Cause	Not available	-	-
21	Valve Opening	Indoor unit expansion valve opening (to be confirmed, it requires an update of the Outdoor Unit PCB)	Read Only	23
22	Unit Operation Condition	Unit operation condition 0: OFF 1: Thermo OFF 2: Thermo ON 3: Alarm	Read Only	2
23	Defrost	Not available	-	-
24	Ambient Temperature	Not available	-	-
25	RCS Temperature	Not available	-	-
26	Timer Disabled	"Timer disabled" option activated from CSNET Manager 0: option not activated 1: option activated	Read/Write	0
27	Options	Not available	-	-
28	Power	Not available	-	-
29	Compressor Qty	Not available	-	-
30	Compressor Frequency	Inverter compressor frequency	-	-
31	Remote Temperature	Not available	-	-

Notes: (2) These numbers refer to signed 16-bit value using 2-complement format for negative values.

SPX-RAMHLK + Modbus gateway: available data for indoor units

Example: Modbus gateway HC-A8MB / HC-A16MB / HC-A64MB, table of registers for RAC units with SPX-RAMHLK (standard indoor unit table version)

Standard Modbus table for RAC units (using SPX-RAMHLK) with HC-A8/16/64MB

Parameter	Name	Description	Values	Read/Write
0	EXIST	Indoor unit available or not available	0: Not exist (not available) 1: Exist (available)	Read
1	SYSTEM_ADDRESS	Refrigerant cycle address	H-LINK 2: 0~63	Read
2	UNIT_ADDRESS	Indoor unit address	H-LINK 2: 0~4 (automatic setting)	
3	SET_ONOFF	On/Off setting order	0: Stop 1: Run	Read/Write
4	SET_MODE	Mode setting order	0: Cool 1: Dry 2: Fan 3: Heat 4: Auto	Read/Write
5	SET_FAN	Fan setting order	0: Low 3: not available 1: Medium 4: Auto 2: High (Silent fan speed is not available)	Read/Write
6	SET_TSET	Setting temperature	Heating mode: [17-30]°C Cooling mode: [19-30]°C	Read/Write
7	SET_LOUVER	Auto swing louver operation	Not available	-
8	SET_CENTRAL	Central setting	Central setting: this register is a decimal value. Convert the value to binary to read or set the parameters: bits set to 1 are activated, bits set to 0 are not activated. For the example below, decimal value 4 means bit 2 activated: temperature setting is locked by the gateway for this indoor unit. Decimal 4 / Binary 0 0 1 0 0 / Bit 4 3 2 1 0 bit 4 3 2 1 0 / decimal value of each bit 16 8 4 2 1 bit 1: Operation mode bit 2: Temperature setting bit 3: Fan speed setting bit 4: not available for RAC units Set the register to 15 (bits 0 to 3 activated) to fully lock the remote controller by the gateway. When the Full RCS lock is engaged with the related indoor unit in OFF status, this unit will be locked in OFF status (not possible to start the unit from the remote controller while the full RCS lock is engaged). It is not possible to lock the unit in ON status.	Read/Write
9	READ_ONOFF	On/Off status	0: Off 1: On	Read
10	READ_MODE	Mode status	0: Cool 1: Dry 2: Fan 3: Heat 4: Auto	Read
11	READ_FAN	Fan status	0: Low 3: not available 1: Medium 4: Auto 2: High (Silent fan speed is not available)	Read
12	READ_TSET	Setting temperature status	Temperature setting read from the unit	Read
13	READ_LOUVER	Louver status	not available	-
14	(Not used)	(Not used)	(Not used)	-
15	Tin	Air inlet / room temperature	-63ºC ~ 63ºC	Read
16	TOUT	Air outlet temperature	not available	-
17	TGAS	Heat exchanger temperature	-63ºC ~ 63ºC, same as Tliquid	Read
18	TLIQUID	Heat exchanger temperature	-63ºC ~ 63ºC, same as Tgas	Read
19	ERROR_CODE	Alarm code	Error code from indoor or outdoor unit. Register is a decimal value to be translated to hexadecimal. An additional translation table is necessary to read the real RAC alarm code.	Read
20	STOP_CAUSE	Compressor stop cause	not available	-
21	VALVE_OPEN	IU expansion valve opening %	0~100 %, Indoor unit expansion valve opening	Read
22	OPER_CONDITION	Unit operation condition	0: OFF 1: Thermo OFF 2: Thermo ON 3: Alarm	Read
23	(Not used)	(Not used)	(Not used)	-
24	Outdoor ambient Temperature	Outdoor temperature read from OU sensor	-63ºC ~ 63ºC	Read
25	RCS_TEM	Wired controller temp. sensor	not available	-
26	RCS_CONFIG	Remote control config	not available	-
27	RCS_GROUP	Remote control group	not available	-
28~30	(Not used)	(Not used)	(Not used)	-
31	REM_TEM	Remote sensor temperature	not available	-

Offset position is: 20000 + N*32 + Parameter Address as shown in the table, N is the unit Modbus ID.
Unit Modbus ID is set on the gateway using Net Configuration tool.
Be careful as address 0 is used as first register for this Modbus table.
According to the Modbus protocol, address 1 may be used as first value.
In that case, it is necessary to add 1 to the address calculation when reading Modbus data from the gateway (with Modscan for example).

SPX-RAMHLK + Modbus gateway: available data for outdoor unit

Example: Modbus gateway HC-A8MB / HC-A16MB / HC-A64MB, table of registers for RAC units with SPX-RAMHLK (outdoor unit data table)

Outdoor Unit data Modbus table for RAC units (using SPX-RAMHLK) with HC-A8/16/64MB				
Parameter	**Description**	**Values / comment**	**Example**	**Read/Write**
0	Outdoor Air Temperature	-63~63°C, from outdoor unit temp. sensor	26	Read
1	Compressor Discharge Temperature	0~200°C, compressor top temperature	31	Read
2	Heating Evaporating Temperature	-63~63°C, outdoor heat exchanger temperature	31	Read
3	Number of operating Compressor	not available	0	Read
4	Discharge Pressure	not available	-	-
5	Suction Pressure	not available	-	-
6	Total Current	Outdoor unit running current (A)	4	Read
7	Total Real Frequency	Compressor frequency (Hz)	39	Read
8	EVO1	not available	-	-
9	EVO2 / Hot Bypass	not available	-	-
10	EVB	not available	-	-
11	Alarm code	not available	-	-
12	Operation	not available	-	-
13	TDSH	not available	-	-
14	Compressor stop cause	not available	-	-
15	Outdoor Unit Option Enabled	not available	-	-
16	Noise Control Enabled	not available	-	-
17	Noise Control Level Set	not available	-	-
18	Power Control Enabled	not available	-	-
19	Power Level	not available	-	-
20	Power Level Set	not available	-	-
21	Power Level Current Value	not available	-	-
22	Power Control Possible	not available	-	-

Offset position is: 30000 + (OU address x 100) + Parameter Address as shown in the table, N is the unit Modbus ID.

Unit Modbus ID is set on the gateway using Net Configuration tool.

Be careful as address 0 is used as first register for this Modbus table.

According to the Modbus protocol, address 1 may be used as first value.

In that case, it is necessary to add 1 to the address calculation when reading Modbus data from the gateway (with Modscan for example).

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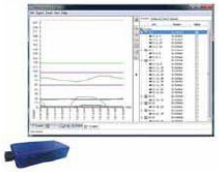
SPX-RAMHLK + Service tool 3: available data



Date available on Service tool 3:

Outdoor

Item	Value
Ta	27 ºC
Te	32 ºC
Td	34 ºC
Pd	0.0 MPa
Ps	0.00 MPa
Hz	43 Hz
Current	4 Amps
EVO1	0%
EVO2	0%
EVO3	0%
IU Qty	2
Capacity	14
Single Phase	1
R410	1

Indoor

Item	IU 1	IU 2
On/Off (RCS)	On	On
Mode (RCS)	Cool	Cool
Tset (RCS)	22 ºC	19 ºC
Fan (RCS)	Medium	Medium
Louver (RCS)	2	4
Central (RCS)	2	2
Mode (Unit)	Auto	Auto
Fan (Unit)	Stop	Stop
Status	Thermo-ON	Thermo-ON
Tin	25 ºC	25 ºC
Tout	-10 ºC	-10 ºC
Trem	-62 ºC	-62 ºC
Tl	14 ºC	14 ºC
Tg	14 ºC	14 ºC
EVI	43%	46%
Req. Hz	0 Hz	0 Hz
Alarm	0	0
Comp Stop	0	0
Filter T.	00 h	00 h
Filter S.	0	0
Alarm Count	0	0
Moment. Count	0	0
RCS Count	0	0
Inv. Count	0	0
RCS Sensor	0 ºC	0 ºC
Capacity	0.6	1.5
d1-09	Off	Off
CN3	Disabled	Disabled
CN3 I1	Off	Off
CN3 I2	Off	Off

Notes:

Outdoor unit data:
Capacity data for OU may not be 100 % accurate

Running current : primary current on OU PCB (RMS value), accuracy +/- 0,5 A

Indoor units data:
Silent fan speed not managed by HLINK

Tin: room temperature read from indoor unit sensor (air inlet sensor).

If a wired controller SPX-WKT3 is used on IU, sensor selection can be done from this controller (air inlet sensor on IU or remote controller room sensor).

The value displayed for Tin on CSNET and all HLINK devices will be the sensor value selected on wired controller (IU sensor or controller sensor).

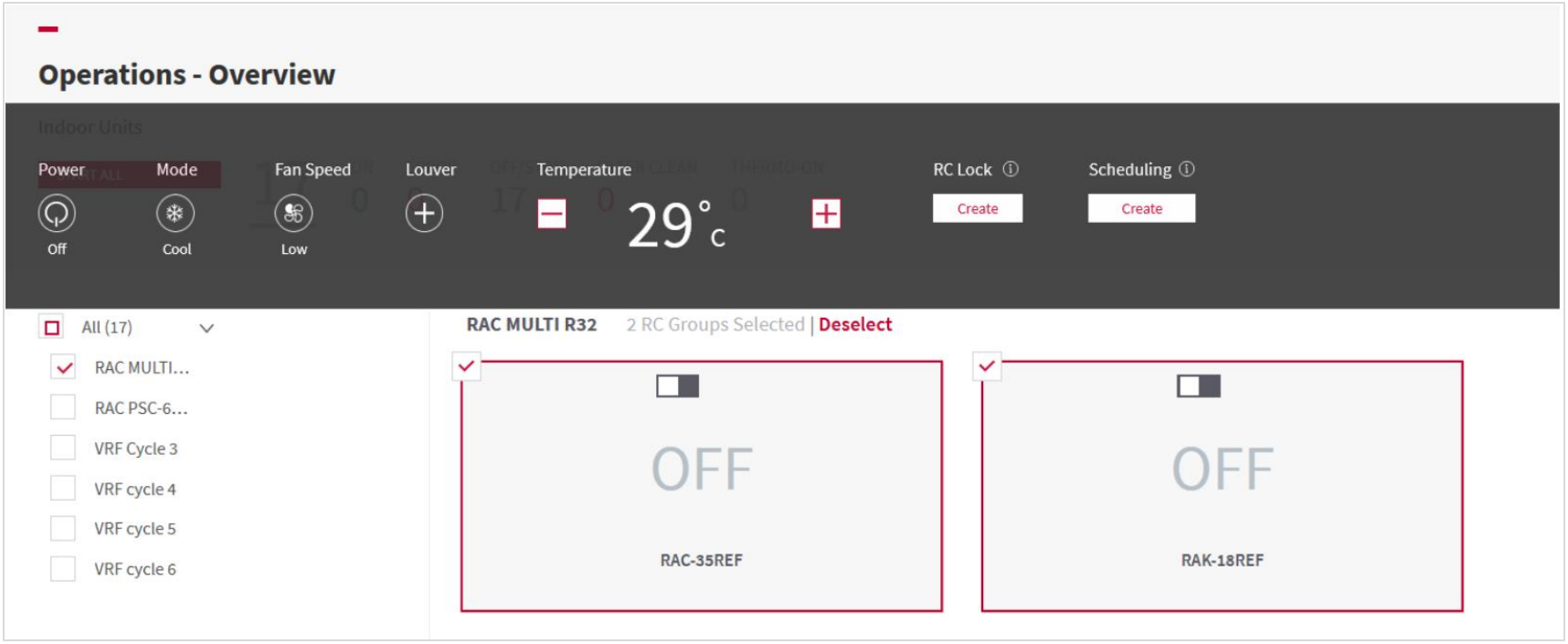
Other parameters like Tout, Trem, RCS sensor are not available for RAC units.

Indoor unit capacity in HP is correct.

NEW HLINK ADAPTER + airCloud PRO: available data

RAC units with SPX-RAMHLK are detected as standard HLINK units by the airCloud PRO gateway when they are combined with a native HLINK unit on their HLINK line (VRF or Utopia / IVx unit).

RAC units can be controlled and monitored from airCloud PRO, with data for both indoor and outdoor units, but with some limitations on some settings and parameters. Check the details on slide 27.



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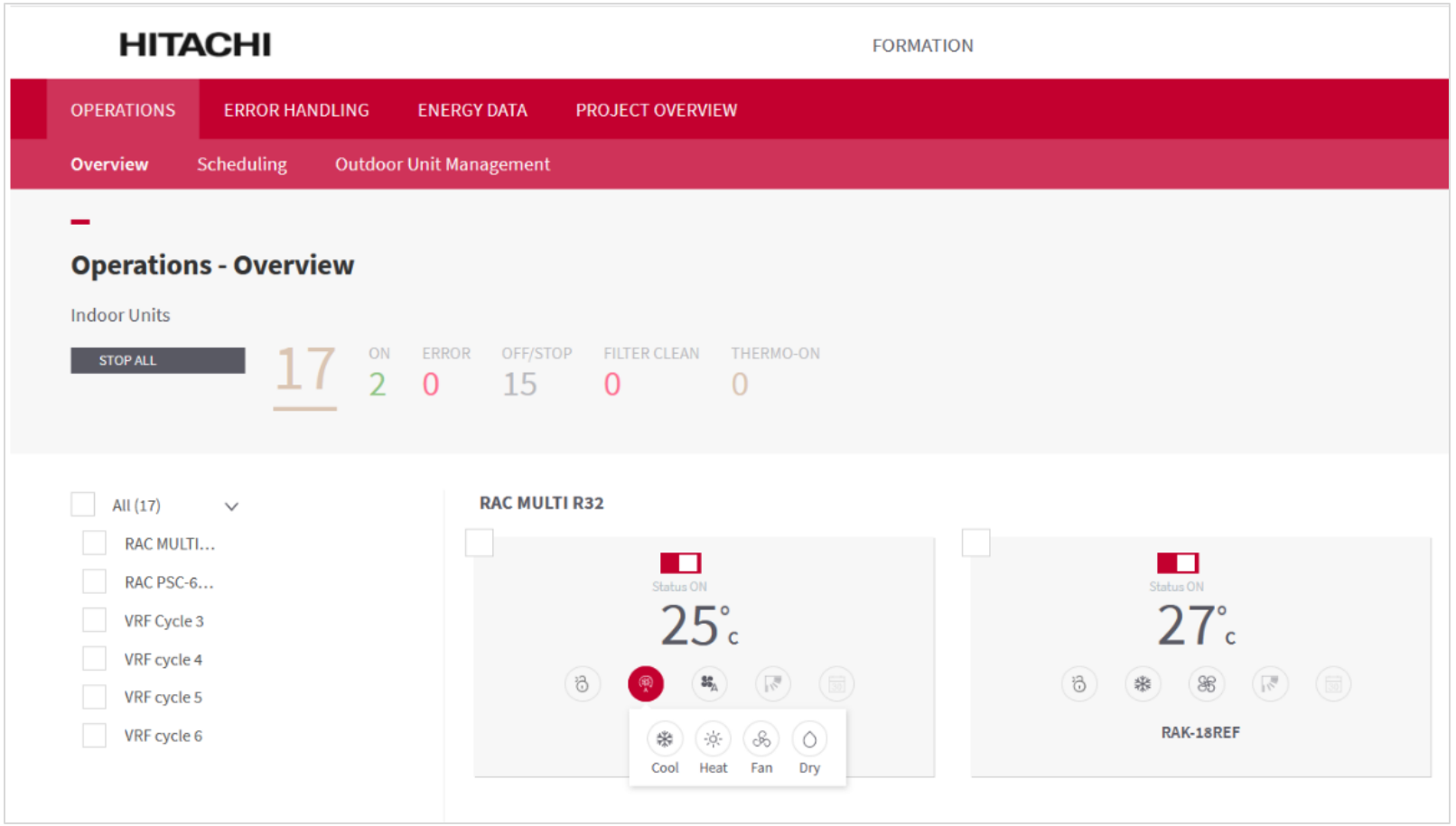
NEW HLINK ADAPTER + airCloud PRO: available data



Caution: if the HLINK system is made only of RAC adapters, without any native HLINK unit in the system, the RAC units will not be discovered by airCloud PRO.

NEW HLINK ADAPTER + airCloud PRO: available data

DATA	DESCRIPTION	VALUE
Indoor Unit	Model of the Indoor Unit & Power	
	Thermo ON/OFF	ON
	Power ON/OFF	ON
	Filter Time	---
	Air Outlet Temperature	-10 °C
	Air Inlet Temperature	25 °C
	Optional Remote Thermistor	Circuit Open
	Gas Piping Temperature	13 °C
	Liquid Piping Temperature	13 °C
	Expansion Valve Opening	51%
	Real Operation Mode	Cool
	Real Vent Speed	Low-
Remote Control	Setting Temperature	19 °C
	Selected Operation Mode	Cool
	Selected Fan Speed	Med-
Outdoor Unit	Model of the outdoor Unit & Power	RAM-53NE3F
	Discharge Pressure	0.0 MPa
	Suction Pressure	0.0 MPa
	Discharge Gas Overheating (TdSH)	83 °C
	Discharge Gas Temperature	32 °C
	Compressor 1 Frequency	51.0 Hz
	Compressor 2 Frequency	-----
	MV1 Expansion Valve Opening	20%
	MV2 Expansion Valve Opening	0%
	Ambient Temperature	26 °C
	Evaporating Temperature (Heating)	31 °C
Alarms	Number and Description of Alarms	
	Last Cause of Compressor Stop	0

IU data:
Unit status:
ON/OFF, mode, alarm,
Thermo ON/OFF
Unit Settings:
Tset, Fan, mode
Tin (Room temp.)
HEX temp.
+
Indoor unit expansion valve opening

OU data:
OU model
Compressor Td, Frequency,
Outdoor temp.
HEX temp.

Alarm data:
Alarm status is well detected, but alarm code is not correct.

Live operation data can be exported from airCloud Pro to an Excel file.

Relevant data are highlighted in red in the table of this slide

Data available only if the RAC adapter is connected to one HLINK system with at least one native HLINK unit (VRF or Utopia / IVX).

NEW HLINK ADAPTER + airCloud PRO: available data

Indoor Units			Read/Write	Comments
Item	IU 1	IU 2		
On/Off	On	On	Read + Write	Standard on/off command
Mode	Cool	Cool	Read + Write	Operation mode : Cool, Heat, Dry, Fan. Auto mode is not available from airCloud PRO, but it can be set and used from the RAC remote controller
Tset	19 ºC	19 ºC	Read + Write	Tset ranges: Cool [19-30]°C, Heat [17-30]°C
Fan speed	Medium	Medium	Read + Write	Low, Med, High, Auto (Silent is not managed by HLINK) Settings from airCloud Pro are not matching with the real setting on RAC unit: Low- = low Low = Med Med = High Auto = Auto This situation may lead to some long refresh time for this setting. It is recommended to set the fan speed from the RAC controller and to not manage this setting from airCloud Pro, until this compatibility matter is improved.
Real fan speed	Medium	Medium	Read only	Same as fan speed setting
Louver ctrl	2	4	Not available	RAC swing louver operation is not managed by HLINK
Central (RCS lock)	2	2	Read + Write	RCS lock (individual + full) are compatible with SPX-WKT3 Caution with the fan speed setting (it is recommended to not block this setting from airCloud Pro until the setting compatibility is improved)
Status	Thermo-ON	Thermo-ON	Read only	Thermo ON/OFF status is correct for RAC units
Tin	35 ºC	35 ºC	Read only	Room temperature read from indoor unit sensor (air inlet sensor). If a wired controller SPX-WKT3 is used on IU, sensor selection can be done from this controller (air inlet sensor on IU or remote controller room sensor). The value displayed for Tin on CSNET and all HLINK devices will be the sensor value selected on wired controller (IU sensor or controller sensor). Other parameters like Tout, Trem, RCS sensor are not available for RAC units.
HEX temperature	21 ºC	23 ºC	Read only	Value from Heat Exchanger temp. sensor of RAC indoor unit (Indoor unit liquid & gas temp. values are reporting the same Hex temperature)
Expansion valve opening	43%	46%	Read only	Expansion value opening for the related RAC indoor unit (exp. valve is physically located into the outdoor unit)
Alarm	0	0	Read only	Alarm code (the error code displayed on airCloud Pro is not matching with the real RAC alarm code)

This table is listing all the relevant data for RAC units through airCloud Pro.

Data available only if the RAC adapter is connected to one HLINK system with at least one native HLINK unit (VRF or Utopia / IVX).

NEW HLINK ADAPTER + BACnet gateways: available data

HI-AC-BAC-16 and **HI-AC-BAC-64** will be compatible with RAC units through SPX-RAMHLK, an update is pending.

Standard BACnet registers table for RAC units (using SPX-RAMHLK) with HI-AC-BAC-16 or HI-AC-BAC-64

#	Description	Name	Availability	Read/Write
1	0-Off,1-On	On/Off (all units)	Yes	Read/Write
2	1-Heat,2-Cool,3-Fan,4-Dry,5-Auto	Mode (all units)	Yes	Read/Write
3	1-Auto,2-Low,3-Mid,4-High,5-High+	FanSpeed (all units)	Yes (Low, Med, High, Auto)	Read/Write
4	1-Auto,2-Pos1..8-Pos7	Air louver Position (all units)	No	-
5	Cool:19..30 ºC; Heat:17..30 ºC	Temperature Setpoint (all units)	Yes	Read/Write
22	-50..99 ºC	O08Outdoor Air Temp.	Yes	Read
23	0..200 ºC	O08Comp.Top Temp.	Yes	Read
24	0..255 Hz	O08Total Real Comp. Freq.	Yes	Read
25	0..255 A	O08Total Comp. Current	Yes	Read
26	0..100 %	O08Out Exp. Valve 1 Open	No	-
27	-5.0..9.9 MPa	O08Discharge Pressure	No	-
28	-5.0..9.9 MPa	O08Suction Pressure	No	-
29	0-Not Exist, 1-Exist	O08Communication Status	Yes	Read
30	0-Off,1-On	O08U01_On/Off_S	Yes	Read
31	0-Off,1-On	O08U01_On/Off_C	Yes	Write
32	1-Heat,2-Cool,3-Fan,4-Dry,5-Auto	O08U01_Mode_S	Yes	Read
33	1-Heat,2-Cool,3-Fan,4-Dry,5-Auto	O08U01_Mode_C	Yes	Write
34	Cool:19..30 ºC; Heat:17..30 ºC	O08U01_Setpoint_S	Yes	Read
35	Cool:19..30 ºC; Heat:17..30 ºC	O08U01_Setpoint_C	Yes	Write
36	1-Auto,2-Low,3-Mid,4-High,5-High+	O08U01_FanSpeed_S	Yes (Low, Med, High, Auto)	Read
37	1-Auto,2-Low,3-Mid,4-High,5-High+	O08U01_FanSpeed_C	Yes	Write
38	1-Auto,2-Pos1..8-Pos7	O08U01_Air louver Position_S	No	-
39	1-Auto,2-Pos1..8-Pos7	O08U01_Air louver Position_C	No	-
40	-63..63 ºC	O08U01_Remote Sensor Temp.	No	-
41	-63..63 ºC	O08U01_Inlet Temp.	Yes	Read
42	-63..63 ºC	O08U01_Outlet Temp.	No	-
43	-63..63 ºC	O08U01_GasPipe Temp.	No	Read
44	-63..63 ºC	O08U01_LiquidPipe Temp.	No	Read
45	Error code	O08U01_Unit Error code	Yes but not correct value	Read
46	0-Normal, 1-Alarm	O08U01_FilterSign	No	-
47	1-Reset	O08U01_FilterReset	No	-
48	0-Not Exit, 1-Exist	O08U01_Communication Status	Yes	-
49	0-Allowed, 1-Not allowed	O08U01_Allow On/Off from RC_S	Yes Caution: RAC RCS can be fully locked, an update is ongoing to improve this RCS control.	Read
50	0-Allowed, 1-Not allowed	O08U01_Allow On/Off from RC_C		Write
51	0-Allowed, 1-Not allowed	O08U01_Allow Mode from RC_S		Read
52	0-Allowed, 1-Not allowed	O08U01_Allow Mode from RC_C		Write
53	0-Allowed, 1-Not allowed	O08U01_Allow Setpoint from RC_S		Read
54	0-Allowed, 1-Not allowed	O08U01_Allow Setpoint from RC_C		Write
55	0-Allowed, 1-Not allowed	O08U01_Allow Fan from RC_S		Read
56	0-Allowed, 1-Not allowed	O08U01_Allow Fan from RC_C		Write
57	1:Not Defined,2-SS,3-FC,4-VRF,5-IU,6-ES	O08U01_Unit type	No	-
58	0..63	O08U01_Unit Address	Yes	Read
59	0..63	O08U01_System Address	Yes	Read
60	0-Disabled, 1-Enabled	O08U01_Dehumidification	No	-
61	1-0, 2-(-1), 3-(-2)	O08U01_Dehum. Correction_S	No	-
62	1-0, 2-(-1), 3-(-2)	O08U01_Dehum. Correction_C	No	-
63	255-Operation Off, Other-See manual	O08U01_Comp. Stop Cause	No	-
64	0..100	O08U01_IDU expansion valve	Yes	Read
65	1-Off, 2-Thermo Off, 3-Thermo On, 4-Alarm	O08U01_Operat. Condition	Yes	Read
66	-63..63 ºC	O08U01_RC SW Temp.	No	-
67	0-Without RCS, 1-With RCS	O08U01_RC SW Config	No	-

An update of the BACnet devices is pending and expected for FY22-Q1, to improve the management of the RAC controller (RCS lock settings), as currently the RAC RCS is always fully locked. Orders can be submitted and read from the BACnet devices, but the user cannot submit orders on the RAC individual wired controller. This is a strong limitation to the compatibility, so it is recommended to wait for the update of the BACnet gateways before combining these devices.

NEW HLINK ADAPTER + KNX gateways: available data

HI-AC-KNX-16 and **HI-AC-KNX-64** will be compatible with RAC units through SPX-RAMHLK, an update is pending.

Standard KNX registers table for RAC units (using SPX-RAMHLK) with HI-AC-KNX-16 or HI-AC-KNX-64				
#	Description	Object Function	Availability	Read/Write
1	On/Off (all units)	0-Off, 1-On	Yes	Write
2	Operating Mode (all units)	0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry	Yes	Write
3	Fan Speed (all units)	1-Low, 2-Mid, 3-High, 4-High+	Yes (Low, Med, High)	Write
4	Fan Speed AUTO (all units)	1-Set auto fan; 0-Stop auto fan	Yes	Write
5	Air louver position (all units)	1-Position 1..7-Position 7	No	Write
6	Temperature Setpoint (ºC) (all units)	Cool:19..30 ºC; Heat:17..30 ºC	Yes	Write
7	Status_Communication Error OU	0-No error, 1-Error	Yes	Read
8	Status_Outdoor Air Temperature (ºC)	-50..99 ºC	Yes	Read
9	Status_Compresor Top Temperature (ºC)	0..200 ºC	Yes	Read
10	Status_Total Real Compresor Freq.	0..255 Hz	Yes	Read
11	Status_Total Compresor Current	0..255 A	Yes	Read
12	Status_Out Exp. Valve 1 Open	0..100 %	No	Read
13	Status_Discharge Pressure	-5.0..9.9 Mpa	No	Read
14	Status_Suction Pressure	-5.0..9.9 Mpa	No	Read
87	Control_On/Off	0-Off,1-On	Yes	Write
88	Status_On/Off	0-Off,1-On	Yes	Read
89	Control_Operation mode	0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry	Yes	Write
90	Status_Operation mode	0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry	Yes	Read
91	Control_Fan speed scaling	Thresholds (0%..38%; 39%..63%; 64%..88%; 89%..100%)	Yes (TBC)	Write
92	Status_Fan speed scaling	Thresholds (25%; 50%; 75%; 100%)	Yes (TBC)	Read
93	Control_Fan speed Man/Auto	0-Manual; 1-Auto	Yes (TBC)	Write
94	Status_Fan speed Man/Auto	0-Manual; 1-Auto	Yes (TBC)	Read
95	Control_Air louver position scaling	Thresholds (0..21%;...)	No	Write
96	Status_Air louver position scaling	Thresholds (14%; 29%; 43%; 57%; 71%; 86%; 100%)	No	Read
97	Control_Temperature Setpoint (ºC)	Cool:19..30 ºC; Heat:17..30 ºC	Yes	Write
98	Status_Temperature Setpoint (ºC)	Cool:19..30 ºC; Heat:17..30 ºC	Yes	Read
99	Status_AC Ambient Temperature (ºC)	-63..63 ºC	Yes	Read
100	Status_Remote Sensor Temperature (ºC)	-63..63 ºC	No	Read
101	Status_Outlet Temperature (ºC)	-63..63 ºC	No	Read

NEW HLINK ADAPTER + KNX gateways: available data

HI-AC-KNX-16 and **HI-AC-KNX-64** will be compatible with RAC units through SPX-RAMHLK, an update is pending.

102	Status_GasPipe Temperature (ºC)	-63..63 ºC	Yes	Read
103	Status_LiquidPipe Temperature (ºC)	-63..63 ºC	Yes	Read
104	Status_Unit error	0-No error, 1-Error	Yes	Read
105	Status_Unit error code	0-No Error, X-Error (100..999)	Yes but not correct value	Read
106	Status_FilterSign	0-Normal, 1-Alarm	No	Read
107	Control_FilterReset	0-No reset, 1-Reset	No	Write
108	Status_Communication status	0-Not exist, 1-Exist	Yes	Read
109	Control_Allow On/Off from RC	0-Allowed, 1-Not allowed	Yes Caution: RAC RCS can be fully locked, an update is ongoing to improve this RCS control.	Write
110	Status_Allow On/Off from RC	0-Allowed, 1-Not allowed		Read
111	Control_Allow Mode from RC	0-Allowed, 1-Not allowed		Write
112	Status_Allow Mode from RC	0-Allowed, 1-Not allowed		Read
113	Control_Allow Setpoint from RC	0-Allowed, 1-Not allowed		Write
114	Status_Allow Setpoint from RC	0-Allowed, 1-Not allowed		Read
115	Control_Allow Fan Speed from RC	0-Allowed, 1-Not allowed		Write
116	Status_Allow Fan Speed from RC	0-Allowed, 1-Not allowed		Read
117	Status_Unit type	1-SS, 2-FC, 3-VRF, 4-IU, 5-ES, 13:Not Defined	No	Read
118	Status_Unit adress	0..63	Yes	Read
119	Status_System adress	0..63	Yes	Read
120	Status_Dehumidification	0-Off,1-On	No	Read
121	Control_Dehumidification correction	0..2	No	Write
122	Status_Dehumidification correction	0..2	No	Read
123	Status_Compresor stop cause	X-Cause (0-254), 255-Operation Off	No	Read
124	Status_IDU expansion valve	0..100 %	Yes	Read
125	Status_Operation condition	0-Off, 1-Thermo Off, 2-Thermo On, 3-Alarm	Yes	Read
126	Status_RC SW Temperature (ºC)	-63..63 ºC	No	Read
127	Status_RC SW Configuration	0-Without RCS, 1-With RCS	No	Read

An update of the KNX devices is pending and expected for FY24-Q3, to improve the management of the RAC controller (RCS lock settings), as currently the RAC RCS is always fully locked. Orders can be submitted and read from the BACnet devices, but the user cannot s ubmit orders on the RAC individual wired controller. This is a strong limitation to the compatibility, so it is recommended to wait for the u pdate of the BACnet gateways before combining these devices.

Alarms on RAC systems : Available data

Alarm status is well reported through SPX-RAMHLK on all the HLINK central controllers.
However the alarm code translation is not always correct.
In fact only CSNET Manager and CSNET Lite have been updated to properly display the RAC alarm codes.

Examples are given below for the most common RAC alarms:

RAC unit alarms			CSNET Manager, CSNET Lite, Modbus IP output			airCloud Pro			PSC-A32MN & PSC-A64GT		
Unit	Error code	RAC alarm meaning	Alarm detected ?	Error code displayed	Is alarm translation correct?	Alarm detected ?	Error code displayed	Is alarm translation correct?	Alarm detected ?	Error code displayed	Is alarm translation correct?
Indoor	00-009	Room temp. sensor fault	Yes	0009	Yes	Yes	79	No	Yes	79	No
	00-010	Fan motor issue	Yes	0009	Yes	Yes	7A	No	Yes	7A	No
Outdoor	01-004	Compressor startup issue	Yes	0104	Yes	Yes	84	No	Yes	84	No

RAC unit alarms			Modbus gateways HC-A16MB & HC-A64MB			BACnet & KNX gateways		
Unit	Error code	RAC alarm meaning	Alarm detected ?	Error code displayed	Is alarm translation correct?	Alarm detected ?	Error code displayed	Is alarm translation correct?
Indoor	00-009	Room temp. sensor fault	Yes	121	No	Yes	79	Yes
	00-010	Fan motor issue	Yes	122	No	Yes	80	Yes
Outdoor	01-004	Compressor startup issue	Yes	132	No	No	84	x

SPX-RAMHLK HLINK adapter: Summary of possible operations

Operations of RAC units with SPX-RAMHLK and HLINK controllers						
Functions per HLINK Controller	CSNET Manager & CSNET Lite	CSNET Modbus output	Central Stations	airCloud PRO	Modbus gateway	Bacnet & KNX gateways
			PSC-A32MN	HC-IOTGW	HC-A16MB	HI-AC-KNX-16/64
			PSC-A64GT		HC-A64MB	HI-AC-BAC-16/64
Indoor unit detected on HLINK	Yes	Yes	Yes	Yes	Yes	Yes
Ref. Cycle address	Yes	Yes	Yes	Yes	Yes	Yes
Indoor unit address	Yes	Yes	Yes	Yes	Yes	Yes
On/Off operation	Yes	Yes	Yes	Yes	Yes	Yes
Operation mode: Cool, Heat, Dry, Fan, Auto	Yes	Yes	Yes	Yes	Yes	Yes
Fan speed setting: Low, Med, High, Auto	Yes	Yes	Yes	Yes, but settings not matching	Yes	Yes
Temperature setting range for Cooling / Heating	Cool: [19-30]°C Heat: [17-30]°C					
Louver control: Auto Swing on/off	Not available through HLINK					
Individual RCS settings lock	Yes	Yes	x	Yes	Yes	To be confirmed
Full RCS lock setting	Yes	Yes	Yes	Yes	Yes	To be confirmed
Unit operation conditions	On/Off status, Thermo On/Off status and Error status are read properly (when available on the Central Controller used)					
Alarm status	Yes	Yes	Yes	Yes	Yes	Yes
Alarm code reading	Error codes are read but may be reported incorrectly (see detailled table)					
Alarm history	Yes	x	Yes	Yes	x	x
Indoor unit data	Yes	Yes	Yes	Yes	Yes	Yes
Room temperature (Tin)	Yes	Yes	Yes (PSC-A32MN only)	Yes	Yes	Yes
Outdoor unit data	Yes	Yes	No	Yes	Yes	Yes

Notes:
Silent fan speed and auto swing louver operation are not managed by HLINK Central Controllers
IU and OU data that can be available for RAC units with SPX-RAMHLK may change depending on the Central Controller used
For BACnet and KNX gateway (HI-AC-BAC-16/ & HI-AC-KNX-16/64), as of June 2021, an update of these devices is pending in order to properly manage the RCS lock parameters (currently all the settings are locked by default).

Managing R32 Multi or R32 Multi + Yutampo systems

The table below is summarizing the current and coming options to control R32 Multi or R32 Multi + Yutampo systems:

System	Hi-Kumo (radio)	airCloud Home	CSNET Manager		Modbus BMS			KNX BMS			BACNET BMS	
Availability	Available until end of stock	Already available	Already available	New option from FY21-Q4	Already available	New option from FY21-Q4	Available	Already available	Future (FY23 TBC)	Available (FY23-Q1)	Already available	Future (FY23 TBC)
Multi ODU	-	-	-	**SPX-RAMHLK**	-	**SPX-RAMHLK**	-	-	**SPX-RAMHLK**	-	-	**SPX-RAMHLK**
RAC IDU 1	SPX-TAG01	SPX-WFG02	PSC-6RAD	-	PSC-6RAD	-	AZAI6WSHT2	PSC-6RAD	-	AZAI6KNXHT2	PSC-6RAD	-
RAC IDU 2	SPX-TAG01	SPX-WFG02	PSC-6RAD	-	PSC-6RAD	-	AZAI6WSHT2	PSC-6RAD	-	AZAI6KNXHT2	PSC-6RAD	-
RAC IDU 3	SPX-TAG01	SPX-WFG02	PSC-6RAD	Com. issue	PSC-6RAD	Com. issue	AZAI6WSHT2	PSC-6RAD	-	AZAI6KNXHT2	PSC-6RAD	-
RAC IDU 4	SPX-TAG01	SPX-WFG02	PSC-6RAD		PSC-6RAD		AZAI6WSHT2	PSC-6RAD	-	AZAI6KNXHT2	PSC-6RAD	-
YUTAMPO	ATW-HCD-01	Not compatible	ATW-HCD-01	ATW-HCD-01	ATW-HCD-01	ATW-HCD-01	ATW-HCD-01	ATW-HCD-01	ATW-HCD-01	ATW-HCD-01	No gateway available	ATW-HCD-01
	ATW-TAG-02		-	-	-	-	ATW-MBS-02	ATW-KNX-02	-	ATW-KNX-02		-
Additional interfaces	Hi-box AHP-SMB-01	-	CSNET device updated to v2.0	CSNET device updated to v2.0	HC-A16MB or HC-A64MB	HC-A16MB or HC-A64MB	-	HI-AC-KNX-16 or HI-AC-KNX-64 to manage ATA units	HI-AC-KNX-16 HI-AC-KNX-64 Update pending to be compatible with SPX-RAMHLK and with ATW data	-	HI-AC-BAC-16 or HI-AC-BAC-64	HI-AC-BAC-16 HI-AC-BAC-64 Update pending to be compatible with SPX-RAMHLK and with ATW data

Notes:

For **Hi-Kumo**, it is possible to control all the units (ATA + ATW) from the same user's account (first create the account with Hi-box, then add the devices)

airCloud Home is not compatible with ATW systems. airCloud and Hi-Kumo systems are not compatible

As long as there is stock of Hi-Kumo ATW gateways, the YUTAMPO tank will stay controlable from Hi-Kumo: caution from FY23-Q1 with ATW-TAG-02 that is becoming terminated and no longer available.

One possible solution is to use airCloud Home for ATA units and Hi-Kumo for the water tank (one user's account for airLCoud Home, one account for Hi-Kumo)

Modbus gateways for VRF HC-A16MB and HC-A64MB are able to manage ATA and ATW units from May 2020

Current **KNX gateways for VRF HI-AC-KNX-16 / 64** are not fully compatible with SPX-RAMHLK and not managing ATW units.

An update shall be done in FY22 Q1/Q2 to add these compatibilities.

Current **VRF BACNET gateways** are not compatible with ATW units. Currently it is then not possible to control a Multi + YUTAMPO system from a BACNET BMS.

Only RAC ATA units can be controlled from the BACNET BMS.

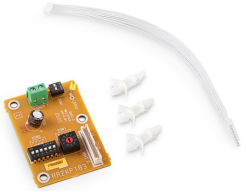
An update of the BACNET gateway is pending to add the compatibility with SPX-RAMHLK and with ATW units.

SPX-RAMHLK and ATW-HCD-01: a non compatibility between these 2 devices has been detected recently.

Combination with CSNET Manager and Modbus gateways are not recommended until this has been clarified and solved.

In case of Multi + Yutampo combination on HLINK, PSC-6RAD RAC HLINK adapter shall be used instead of SPX-RAMHLK.

Marketing and technical documents



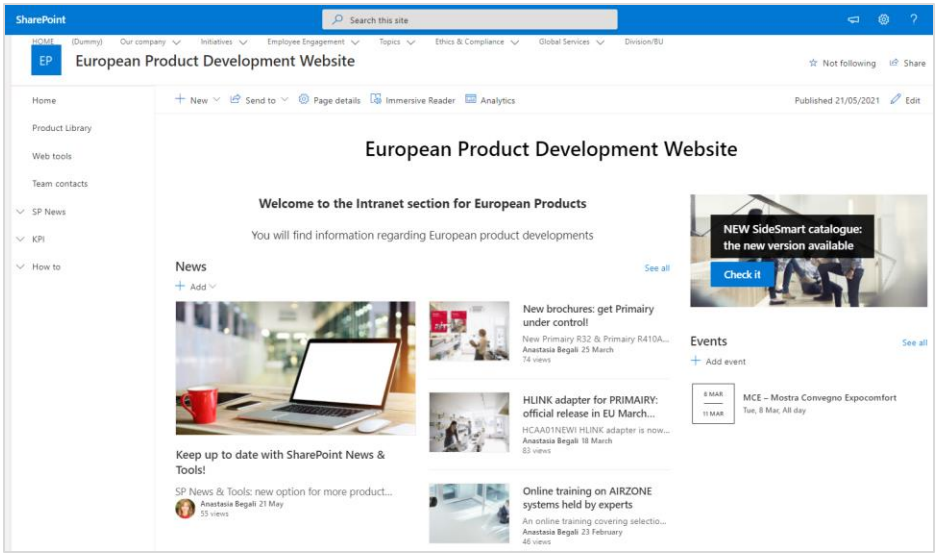
The following documents are available on the EU Product Team Share Point:

Installation & Operation manuals: link

Features and benefits presentation: link

OU PCB Software update documents : link

Pictures: link



APPENDIX

Update of outdoor unit PCB

NEW HLINK adapter SPX-RAMHLK

The HLINK adapter **SPX-RAMHLK** is fully compatible with the **R32 MULTI units** listed below:

Range	Model	Serial number of 1st unit manufactured with the updated software	Manufacturing date & RAC Job number	JCH Factory
R32 Multi	RAM-33NP2E	219221543001	Sep 2021(#221543)	JCH-MY
	RAM-40NP2E	218221536001	Aug 2021 (#221536)	JCH-MY
	RAM-53NP2E	219221547001	Sep 2021 (#221547)	JCH-MY
	RAM-53NP3E	219221565001	Aug 2021 (#221565)	JCH-MY
	RAM-68NP3E	219221561001	Aug 2021 (#221561)	JCH-MY
	RAM-70NP4E	219221568001	Aug 2021 (#221568)	JCH-MY
	RAM-90NP5E	2162303829	July 2021 (#221386)	JCH-MY
	RAM-110NP5E	4549873088648	June 2021(#001218)	JCH-WH
R32 Entry Multi	RAM-40NE2F	219221544001	Sep 2021(#221544)	JCH-MY
	RAM-53NE2F	219221546001	Sep 2021 (#221546)	JCH-MY
	RAM-53NE3F	219221570001	Aug 2021 (#221570)	JCH-MY
R32 YUTAMPO	RAM-53NYP3E	217221456001	July 2021(#221456)	JCH-MY
	RAM-70NYP4E	219221573001	Aug 2021 (#221573)	JCH-MY
	RAM-90NYP5E	2162306009	July 2021 (#221404)	JCH-MY

Notes:

- **Outdoor units** are fully compatible with SPX-RAMHLK from the serial number indicated.
- A technical bulletin will be released in July 2021 to inform about the identification of the updated units (specific mark on carton box).
- For **older outdoor units**, an **update of the main PCB is necessary** to get a full compatibility with SPX-RAMHLK. This update can be done on site **easily** using the dedicated tool. A detailed procedure is available for this job and the tool can be requested to the EU PM Team.
- All the **indoor units** compatible with the outdoor units listed above are compatible with SPX-RAMHLK without any limitation related to their serial number or main PCB software version.

Update of the Outdoor unit main PCB

As commented in the previous slides, an update of the outdoor unit main PCB is necessary to get a correct operation of SPX-RAMHLK HLINK adapter with the HLINK central controllers.

If the main PCB is not updated, the following issues will occur:

- Random lock of the individual RAC wired controllers (end user can no longer use the remote controller)
- Air inlet temperature not read on Tin parameter
- Indoor units expansion valve opening % not read
- Compressor running current not properly displayed (only max value is displayed)

The list of compatible outdoor units with their serial number is indicated on the previous slide. Only these units are delivered from factory with the right software loaded. A technical bulletin will be released in July 2021 to inform about the specific identification mark placed on the carton box of these updated units.

For older units that are already installed or delivered to warehouses, a manual update is possible, using the following tools:

- ISP 310 software update tool with the software updates loaded
- For non installed units, a 12 V power supply is necessary to power on the main PCB during the update

The updates tools can be requested to the EU PM team, a few kits are available and can be sent to the service teams if necessary.

The software update files and the update procedure can be found on the EU Share point: link

June 2021

HITACHI

Thank you for your attention !

PRODUCT DEVELOPMENT EUROPE

Cooling & Heating