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INSTALLATION INSTRUCTION ADDENDUM

for

PROPANE FIRED

RHC21-P

Air Heater Modules

D301383 Issue 0 January 2022

This addendum has been produced for the propane fired (RHC21-P) version of the RHC21 4000 and RHC21 8000 Air Heater Module. This addendum highlights the differences between the RHC21-P and the standard RHC21 4000 and RHC21 8000 Air Heater Module.

This addendum must be read in conjunction with the applicable RHC21 4000 or RHC21 8000 Air Heater Module Installation Manual. Particular attention must be paid to the "Important Notice to Installers" and Health and Safety" Sections of the installation manual.

This addendum does not supersede or replace the applicable RHC21 4000 or RHC21 8000 Air Heater Installation Manual in any way.

RHC21-P air heaters are designed to operate on propane gas (G31). Refer to the technical data given on pages 3 to 6 inclusive of this document and to the data plate on the air heater module for details of supply pressures.

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Technical Data RHC21 4000 Series

This table replaces "Table 1 – Specifications" given on Page 8 of the RHC21 4000 Installation Manual

Model		4024-05-P	4050-06-P	4060-07-P	4075-09-P	4100-12-P
Combustion air & flue type Indoor		B_{23} / B_{53} / C_{13} / C_{33} / C_{53}				
Combustion air & flue type External		Rooftop				
Heat Input High Fire (Hs) [1]	kW	28.80	61.50	77.60	91.50	120.00
Heat Input Low Fire (Hs) [1]	kW	18.60	16.00	23.00	32.00	37.00
Heat Input High Fire (Hi) [2]	kW	26.42	56.42	71.19	83.94	110.09
Heat Input Low Fire (Hi) [2]	kW	17.06	14.68	21.10	29.36	33.94
Heat Output H2 High Fire [4]	kW	24.09	52.43	66.22	78.06	103.05
Heat Output H2 Low Fire [4]	kW	16.45	14.58	20.88	29.02	33.59
Gas Consumption High Fire (Hs) G31 [3]	m^3/h	1.08	2.31	2.92	3.44	4.51
Gas Consumption Low Fire (Hs) G31 [3]	m^3/h	0.70	0.60	0.87	1.20	1.39
Gas Consumption High Fire (Hs) G31 [3]	l/h	4.02	8.58	10.83	12.77	16.75
Gas Consumption Low Fire (Hs) G31 [3]	l/h	2.60	2.23	3.21	4.47	5.16
Gas Consumption High Fire (Hs) G31 [3]	kg/h	2.06	4.40	5.55	6.54	8.58
Gas Consumption Low Fire (Hs) G31 [3]	kg/h	1.33	1.14	1.64	2.29	2.64
Gas Service Connection		1/2"	3/4"	3/4"	3/4"	3/4"
Flue & Combustion Air Connection Collars (Indoor)	Ø mm	100	130	130	130	130
Condensation Connection / Outlet	Ø mm	22 OD				
Minimum V1 Airflow at 15°C with Heat Output H1 [6]	m^3/h	2500	3900	4700	5700	7500
	kW	TBA	TBA	TBA	TBA	TBA
Temperature Rise at V1 Airflow	K	TBA	TBA	TBA	TBA	TBA
Minimum V2 Airflow at 15°C with Heat Output H2 [5]	m^3/h	2880	5950	7150	8800	11700
Temperature Rise at V2 Airflow	K	25	26	28	26	26
Electrical Connection	1 Phase	230V 1N~50Hz				
Total Electric Rating	kW	0.08	0.30	0.30	0.30	0.28
Appliance Weight (net)	kg	31	90	100	120	149
Protection Grade	IP	20 (Indoor) / X4D (External)				

1. Refers to gross calorific value of fuel
2. Refers to net calorific value of fuel
3. Propane gas: G31 Hs 95.65 MJ/m^3 @ 15°C and 1013.25 mbar
4. Heat output depends on airflow – heat output H2 only for airflows above V2.
5. H2 = heat output at airflow V2
6. H1 = heat output at airflow V1.

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Technical Data RHC21 8000 Series

This table replaces "Table 1 – Specifications" given on Page 8 of the RHC21 8000 Installation Manual

Model		8045-09-P	8075-15-P	8075-09-P	8100-12-P	8150M18-P	8200M24-P
Combustion air & flue type Indoor		B_{23} / B_{53} / C_{13} / C_{33} / C_{53}					
Combustion air & flue type External		Rooftop					
Heat Input High Fire (Hs) [1]	kW	56.00	91.50	91.50	120.00	183.00	240.00
Heat Input Low Fire (Hs) [1]	kW	16.80	32.00	32.00	37.00	64.00	79.00
Heat Input High Fire (Hi) [2]	kW	51.38	83.94	83.94	110.09	167.89	220.18
Heat Input Low Fire (Hi) [2]	kW	15.41	29.36	29.36	33.94	58.72	72.48
Heat Output H2 High Fire [4]	kW	46.74	77.04	78.09	103.67	156.73	204.92
Heat Output H2 Low Fire [4]	kW	15.13	28.77	28.94	33.71	57.93	71.61
Gas Consumption High Fire (Hs) G31 [3]	m^3/h	2.11	3.44	3.44	4.51	6.88	9.03
Gas Consumption Low Fire (Hs) G31 [3]	m^3/h	0.63	1.20	1.20	1.39	2.41	2.97
Gas Consumption High Fire (Hs) G31 [3]	l/h	7.82	12.77	12.77	16.75	25.54	33.50
Gas Consumption Low Fire (Hs) G31 [3]	l/h	2.35	4.47	4.47	5.16	8.93	11.03
Gas Consumption High Fire (Hs) G31 [3]	kg/h	4.00	6.54	6.54	8.58	13.08	17.15
Gas Consumption Low Fire (Hs) G31 [3]	kg/h	1.20	2.29	2.29	2.64	4.57	5.65
Gas Service Connection		3/4"	3/4"	3/4"	3/4"	1 1/4"	1 1/4"
Flue & Combustion Air Connection Collars (Indoor)	Ø mm	130	130	130	130	130	180
Condensation Connection / Outlet	Ø mm	22 OD					
Minimum V1 Airflow at 15°C with Heat Output H1 [6]	m^3/h	5650	9300	9300	12400	18200	23300
	kW	TBA	TBA	TBA	TBA	TBA	TBA
Temperature Rise at V1 Airflow	K	TBA	TBA	TBA	TBA	TBA	TBA
Minimum V2 Airflow at 15°C with Heat Output H2 [5]	m^3/h	6600	11900	10790	14300	21000	24000
Temperature Rise at V2 Airflow	K	21	19	22	22	22	25
Electrical Connection	1 Phase	230V 1N~50Hz					
Total Electric Rating	kW	0.30	0.30	0.30	0.28	0.60	0.56
Appliance Weight (net)	kg	87	140	110	145	230	305
Protection Grade	IP	20 (Indoor) / X4D (External)					

1. Refers to gross calorific value of fuel
2. Refers to net calorific value of fuel
3. Propane gas: G31 Hs 95.65 MJ/m^3 @ 15°C and 1013.25 mbar
4. Heat output depends on airflow – heat output H2 only for airflows above V2.
5. H2 = heat output at airflow V2
6. H1 = heat output at airflow V1.

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Nominal Combustion Values RHC21 4000 Series

This table replaces "Table 2 – Nominal Combustion Values and Flue Gas Properties" given on Page 9 of the RHC21 4000 Installation Manual

Model		4024-05-P	4050-06-P	4060-07-P	4075-09-P	4100-12-P
CO2 at High Fire (Throttle) G31	%	9.40	9.40	9.80	9.80	9.80
CO	ppm	< 50 ppm				
CO2 at Low Fire (Offset) G31	%	8.80	8.80	9.00	9.00	9.00
CO	ppm	< 50 ppm				
Flue Gas Temperature High Fire ΔT	°C	168	136	139	140	129
Flue Gas Temperature Low Fire ΔT	°C	67	17	24	24	26
Mass Flow Rate Flue Gases High Fire G31	kg/h	30.57	64.67	71.93	84.00	109.10
Flue Pressure at Maximum Flue Resistance	Pa	5	8	9	14	14
Thermal Efficiency High Fire NCV	%	91.19	92.93	93.02	92.99	93.60
Thermal Efficiency Low Fire NCV	%	96.42	99.30	98.95	98.84	98.96
Gas Valve Orifice Size	mm	4.4	6.0	6.8	6.8	7.4

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Nominal Combustion Values RHC21 8000 Series

This table replaces "Table 2 – Nominal Combustion Values and Flue Gas Properties" given on Page 9 of the RHC21 8000 Installation Manual

Model		8045-09-P	8075-15-P	8075-09-P	8100-12-P	8150M18-P	8200M24-P
CO2 at High Fire (Throttle) G31	%	9.40	9.80	9.60	9.70	9.70	9.70
CO	ppm	< 50 ppm					
CO2 at Low Fire (Offset) G31	%	8.60	8.90	8.80	8.90	8.90	8.80
CO	ppm	< 50 ppm					
Flue Gas Temperature High Fire ΔT	°C	171	162	137	116	132	138
Flue Gas Temperature Low Fire ΔT	°C	36	40	30	17	29	26
Thermal Efficiency High Fire NCV	%	90.98	93.02	91.78	94.17	93.35	93.07
Thermal Efficiency Low Fire NCV	%	98.18	98.59	97.99	99.31	98.66	98.80
Mass Flow Rate Flue Gases High Fire G31	kg/h	59.81	86.19	90.40	116.00	175.16	227.53
Flue Pressure at Maximum Flue Resistance	Pa	2	6	9	18	23	9
Gas Valve Orifice Size	mm	6.0	6.8	6.8	7.4	6.8 x 2	7.4 x 2

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Gas Supply - Propane

This information replaces the information given in "Section 4.10 Gas Supply" of the RHC21 4000 and RHC21 8000 Installation Manual regarding Gas Types

RHC21-P 4000 and 8000 heaters are designed to operate on propane gas (G31). Check that the gas supply, gas category and gas inlet pressure is in accordance with the information given on the unit data plate. To let the unit function at maximal heat output, the gas supply pipe MUST be correctly sized.

Gas Supply Details – Propane Gas

This table details the gas supply properties and is to be read in conjunction with the information given in "Section 4.10 Gas Supply" of the RHC21 4000 and RHC21 8000 Installation Manual regarding Gas Types

Country	Gas Category	Gas Type	Nominal Supply Pressure (mbar)	Minimum Supply Pressure (mbar)	Maximum Supply Pressure (mbar)
CZ, DK, HU, MT, NL, RO	I_{3P} (30)	Propane Gas (G31)	30	25	35
BE, CH, CZ, ES, FR, GB, GR, HR, IE, IT, LU, PL, PT, SI, SK, TR	I_{3P} (37)	Propane Gas (G31)	37	25	45
AT, BE, CH, CZ, DE, ES, FR, GB, GR, HU, NL, SK	I_{3P} (50)	Propane Gas (G31)	50	42.5	57.5

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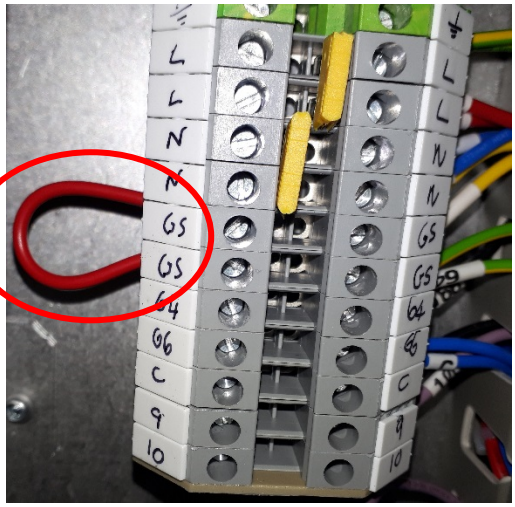
Pre-Start Checks – Propane Gas

This information must be read in addition to the information given in "Section 5.3 - Pre-Start Checks" of the RHC21 4000 and RHC21 8000 Installation Manual

Ensure RHC21 heaters have a link cable fitted between internal wiring terminals GS / GS. Do not proceed if this link is missing.

Propane wiring link



Verify ignition controller program key matches the resistance value as shown in nominal combustion value table.

Note: model 8200 has a different program key when converted for use on propane gas. All other models use the same program key for both natural and propane gas.

Gas Conversion - Propane

This information replaces in its entirety the information given in "Section 5.8 – Gas Conversion" of the RHC21 4000 and RHC21 8000 Installation Manual

RHC21-P heaters are designed to operate on propane gas type G31. To modify for use on an alternative listed gas type, contact the appliance manufacturer for further information.

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Nominal Combustion Values with Service Door Closed – Propane RHC21 4000

This table replaces "Table 10 - Nominal Combustion Values with Service Door Closed" given in the RHC21 4000 Installation Manual

Model		4024-05-P	4050-06-P	4060-07-P	4075-09-P	4100-12-P
CO2 at High Fire (Throttle) G31	%	9.40	9.40	9.80	9.80	9.80
CO	ppm	< 50 ppm				
Throttle turns from closed		2.25 out	3.5 out	4.5 out	4.5 out	14 in
CO2 at Low Fire (Offset) G31	%	8.80	8.80	9.00	9.00	9.00
CO	ppm	< 50 ppm				
Low Fire Offset Pressure G31	Pa	-50	-5	-19	-44	-9
Flue Gas Temperature High Fire ΔT	°C	168	136	139	140	129
Flue Gas Temperature Low Fire ΔT	°C	67	17	24	24	26
Flue Pressure at Maximum Flue Resistance	Pa	5	8	9	14	14
Mass Flow Rate Flue Gases High Fire G31	kg/h	30.57	64.67	71.93	84.00	109.10
Thermal Efficiency High Fire NCV	%	91.19	92.93	93.02	92.99	93.60
Thermal Efficiency Low Fire NCV	%	96.42	99.30	98.95	98.84	98.96
Ignition Controller Program Key Top Burner	Ω	N/A	N/A	N/A	N/A	N/A
Ignition Controller Program Key Bottom Burner	Ω	1,000	3,300	4,700	6,800	10,000
Gas Valve Orifice Size	mm	4.4	6.0	6.8	6.8	7.4

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Nominal Combustion Values with Service Door Closed – Propane RHC21 8000

This table replaces "Table 10 - Nominal Combustion Values with Service Door Closed" given in the RHC21 8000 Installation Manual

Model		8045-09-P	8075-15-P	8075-09-P	8100-12-P	8150M18-P	8200M24-P
CO2 at High Fire (Throttle) G31	%	9.40	9.80	9.60	9.70	9.70	9.70
CO	ppm	< 50 ppm					
Throttle turns from closed Top Burner		N/A	N/A	N/A	N/A	4 out	34 in
Throttle turns from closed Bottom / Single Burner		3 out	5 out	4 out	21 in	4 out	34 in
CO2 at Low Fire (Offset) G31	%	8.60	8.90	8.80	8.90	8.90	8.80
CO	ppm	< 50 ppm					
Low Fire Offset Pressure (G31) Top Burner	Pa	N/A	N/A	N/A	N/A	-55	-34
Low Fire Offset Pressure (G31) Bottom / Single Burner	Pa	-10	-58	-46	-14	-62	-23
Flue Gas Temperature High Fire ΔT	°C	171	162	137	116	132	138
Flue Gas Temperature Low Fire ΔT	°C	36	40	30	17	29	26
Thermal Efficiency High Fire NCV	%	90.98	93.02	91.78	94.17	93.35	93.07
Thermal Efficiency Low Fire NCV	%	98.18	98.59	97.99	99.31	98.66	98.80
Flue Pressure at Maximum Flue Resistance	Pa	2	6	9	18	23	9
Mass Flow Rate Flue Gases High Fire G31	kg/h	59.81	86.19	90.40	116.00	175.16	227.53
Ignition Controller Program Key Top Burner	Ω	N/A	N/A	N/A	N/A	22,000	56,000
Ignition Controller Program Key Bottom Burner	Ω	1,000	4,700	3,300	6,800	22,000	56,000
Gas Valve Orifice Size	mm	6.0	6.8	6.8	7.4	6.8 x 2	7.4 x 2

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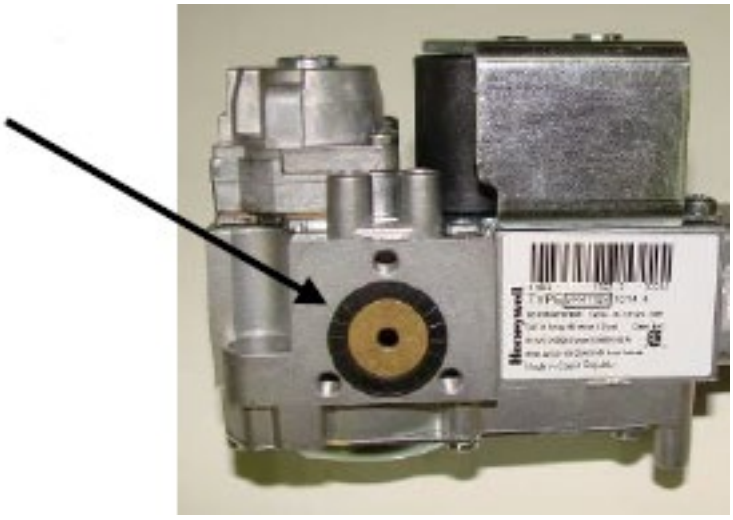
Maintenance - Propane

This information must be read in addition to the information given in "Section 7.1 – Replacement of Gas Valve" of the RHC21 4000 and RHC21 8000 Installation Manual

RHC21-P models have an orifice fitted between the gas valve and venturi. This orifice should be retained and refitted when replacing the gas valve or venturi to ensure correct appliance operation.

Propane Gas Valve Orifice



Cleaning and Replacement of Burner Probes - Propane

This information must be read in addition to the information given in "Section 7.6 – Cleaning and Replacement of Burner Probes" of the RHC21 4000 and RHC21 8000 Installation Manual

RHC21-P models 4100-12-P, 8075-15-P, 8100-12-P and 8200M24-P have a special spark probe assembly. Dimensions for checking are as follows: -

Length of probe = 79.4mm long probe, 43.2mm short probe.
4.1mm +/- 0.5mm gap between probes.
Angle of probes 22.3°

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Spare Parts - Propane

This information must be read in addition to the information given in "Section 9 – Parts Listing" of the RHC21 4000 and RHC21 8000 Installation Manual

Description	Part Number	Application
4.4mm gas valve orifice	1037652	4024-05-P
6.0mm gas valve orifice	03-25800-02	4050-06-P, 8045-09-P
6.8mm gas valve orifice	1037654	4060-07-P, 4075-09-P, 8075-09-P, 8150M18-P x 2
7.4mm gas valve orifice & O-ring	1037655	4100-12-P, 8100-12-P, 8200M24-P x 2
Propane Gas Selection (GS) Jumper	1030922	All
Spark Probe c/w Lead	1037848	4100-12-P, 8075-15-P 8100-12-P, 8200M24-P x 2

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ErP Table – G31 Propane RHC21 4000

This information replaces the information given in "Section 11 – ErP Tables" of the RHC21 4000 Installation Manual

Model	**RHC21**		**4024-05-P**	**4050-06-P**	**4060-07-P**	**4075-09-P**	**4100-12-P**			
Item	Symbol	Units								
Capacity										
Rated heating capacity	Pnom	kW	24.1	52.4	66.2	78.1	103.0			
Minimum capacity	Pmin	kW	16.5	14.6	20.9	29.0	33.6			
Electrical Power consumption										
At rated heating capacity	elmax	kW	0.040	0.123	0.115	0.151	0.174			
At minimal capacity	elmin	kW	0.008	0.012	0.018	0.021	0.029			
In standby mode	elsb	kW	0.001	0.001	0.001	0.001	0.001			
Useful efficiency										
Useful efficiency at rated heating capacity	η th, nom	%	83.7	85.3	85.3	85.3	85.9			
Useful efficiency at minimum capacity	η th, min	%	88.5	91.1	90.8	90.7	90.8			
Other items										
Envelope loss factor	Fenv	%	0.0	0.0	0.0	0.0	0.0			
Flame consumption	Pign	kW	0.0	0.0	0.0	0.0	0.0			
Emissions of nitrogen oxides (input energy GCV	NOx	Mg/kWh	62	67	68	59	66			
Emission efficiency	η s, flow	%	93.9	96.7	96.2	96.0	96.3			
ErP seasonal space heating energy efficiency	η s	%	79.5	87.1	86.3	85.6	86.4			
Thermal efficiency at rated heating capacity NCV	η	%	91.2	92.9	93.0	93.0	93.6			

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ErP Table – G31 Propane RHC21 8000

This information replaces the information given in "Section 11 – ErP Tables" of the RHC21 8000 Installation Manual

Model	RHC21		8045-09-P	8075-09-P	80750 15-P	8100-12-P	8150 M18-P	8200 M24-P		
Item	Symbol	Units								
Capacity										
Rated heating capacity	Pnom	kW	46.7	78.1	77.0	103.7	156.7	204.9		
Minimum capacity	Pmin	kW	15.1	28.9	28.8	33.7	57.9	71.6		
Electrical Power consumption										
At rated heating capacity	elmax	kW	0.113	0.187	0.162	0.187	0.39	0.43		
At minimal capacity	elmin	kW	0.014	0.021	0.022	0.016	0.050	0.056		
In standby mode	elsb	kW	0.001	0.001	0.001	0.001	0.001	0.001		
Useful efficiency										
Useful efficiency at rated heating capacity	η th, nom	%	83.5	85.3	84.2	86.4	85.6	85.4		
Useful efficiency at minimum capacity	η th, min	%	90.1	90.4	89.9	91.1	90.5	90.6		
Other items										
Envelope loss factor	Fenv	%	0.0	0.0	0.0	0.0	0.0	0.0		
Flame consumption	Pign	kW	0.0	0.0	0.0	0.0	0.0	0.0		
Emissions of nitrogen oxides (input energy GCV	NOx	Mg/kWh	60	56	69	58	68	65		
Emission efficiency	η s, flow	%	97.1	96.7	97.1	97.0	96.6	96.3		
ErP seasonal space heating energy efficiency	η s	%	86.2	86.1	85.8	87.4	86.1	86.0		
Thermal efficiency at rated heating capacity NCV	η	%	91.0	93.0	91.8	94.2	93.4	93.1		

REZNOR®

NORTEK GLOBAL HVAC (UK) LTD
Fens Pool Avenue
Brierley Hill
West Midlands DY5 1QA
United Kingdom
Tel +44 (0)1384 489700
Fax +44 (0)1384 489707
reznorsales@nortek.com
www.reznor.eu

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