

Subtype M thermal A series 12 14 16 kW

Certificate Holder	GD Midea Heating & Ventilating Equipment Co., Ltd.
Address	Penglai Industry Road
ZIP	528311
City	Beijiao, Shunde, Foshan
Country	CN
Certification Body	BRE Global Limited
Subtype title	M thermal A series 12 14 16 kW
Registration number	041-K007-09
Heat Pump Type	Outdoor Air/Water
Refrigerant	R32
Mass of Refrigerant	1.84 kg
Certification Date	02.12.2020
Testing basis	HP Keymark Scheme Rules Rev 08

Model MHA-V12W/D2N8-B+HB-A160/C****GN8-B

Model name	MHA-V12W/D2N8-B+HB-A160/C****GN8-B
Application	Heating (medium temp)
Units	Indoor, Outdoor
Climate zone (for heating)	Warmer Climate, Colder Climate
Reversibility	Yes
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

General data

Power supply	1x230V 50Hz
Off-peak product	n/a

Outdoor Air/Water

EN 14511-4 | Heating

Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

EN 12102-1 | Average Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	64 dB(A)	64 dB(A)

EN 14825 | Average Climate

	Low temperature	Medium temperature
η_s	189 %	135 %
Prated	12.00 kW	11.58 kW
SCOP	4.81	3.45
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	10.61 kW	10.25 kW
COP Tj = -7°C	2.88	2.01
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	6.69 kW	6.52 kW
COP Tj = +2°C	4.65	3.44
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	4.44 kW	4.36 kW
COP Tj = +7°C	6.62	4.59
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.74 kW	3.30 kW
COP Tj = 12°C	8.47	6.05
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	10.61 kW	10.25 kW

COP Tj = Tbiv	2.88	2.01
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	10.75 kW	9.10 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.77	1.79
WTOL	65 °C	65 °C
Poff	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	1.26 kW	2.50 kW
Annual energy consumption Qhe	5152 kWh	6927 kWh

EN 12102-1 | Colder Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	64 dB(A)	64 dB(A)

EN 14825 | Colder Climate

	Low temperature	Medium temperature
η_s	160 %	118 %
Prated	11.38 kW	10.32 kW
SCOP	4.08	3.02
Tbiv	-15 °C	-15 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	7.05 kW	6.63 kW
COP Tj = -7°C	3.48	2.63
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	4.68 kW	4.07 kW
COP Tj = +2°C	4.96	3.60
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	3.14 kW	2.78 kW
COP Tj = +7°C	6.10	4.54
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.57 kW	3.33 kW
COP Tj = 12°C	7.87	6.25
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	9.28 kW	8.42 kW
COP Tj = Tbiv	2.59	1.84
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	7.01 kW	4.20 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	1.98	1.13
WTOL	65 °C	65 °C
Poff	14 W	14 W

PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	4.37 kW	6.12 kW
Annual energy consumption Q _{he}	6870 kWh	8419 kWh
P _{dh} T _j = -15°C (if TOL	9.28	8.42
COP T _j = -15°C (if TOL	2.59	1.84
C _{dh} T _j = -15 °C	0.90	0.90

EN 12102-1 | Warmer Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	64 dB(A)	64 dB(A)

EN 14825 | Warmer Climate

	Low temperature	Medium temperature
η _s	256 %	174 %
Prated	11.11 kW	12.51 kW
SCOP	6.53	4.43
T _{biv}	7 °C	7 °C
TOL	2 °C	2 °C
P _{dh} T _j = +2°C	11.11 kW	12.08 kW
COP T _j = +2°C	3.59	2.31
C _{dh} T _j = +2 °C	0.900	0.900
P _{dh} T _j = +7°C	7.14 kW	8.04 kW
COP T _j = +7°C	5.87	3.86
C _{dh} T _j = +7 °C	0.900	0.900
P _{dh} T _j = 12°C	3.56 kW	3.75 kW
COP T _j = 12°C	7.94	5.70
C _{dh} T _j = +12 °C	0.900	0.900
P _{dh} T _j = T _{biv}	7.14 kW	8.04 kW
COP T _j = T _{biv}	5.87	3.86
P _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}	11.11 kW	12.08 kW
COP T _j = TOL or COP T _j = T _{designh} if TOL < T _{designh}	3.59	2.31
C _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}		
WTOL	65 °C	65 °C
P _{off}	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity

Supplementary Heater: PSUP	0.00 kW	0.44 kW
Annual energy consumption Q _{he}	2292 kWh	3776 kWh

Model MHA-V16W/D2N8-B+HB-A160/C****GN8-B

Model name	MHA-V16W/D2N8-B+HB-A160/C****GN8-B
Application	Heating (medium temp)
Units	Indoor, Outdoor
Climate zone (for heating)	Warmer Climate, Colder Climate
Reversibility	Yes
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

General data

Power supply	1x230V 50Hz
Off-peak product	n/a

Outdoor Air/Water

EN 14511-4 | Heating

Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

EN 12102-1 | Average Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	68 dB(A)	68 dB(A)

EN 14825 | Average Climate

	Low temperature	Medium temperature
η_s	182 %	133 %
Prated	15.21 kW	13.02 kW
SCOP	4.62	3.41
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	13.45 kW	11.52 kW
COP Tj = -7°C	2.72	1.99
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	8.57 kW	7.18 kW
COP Tj = +2°C	4.41	3.34
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	5.70 kW	4.68 kW
COP Tj = +7°C	6.56	4.61
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.78 kW	3.32 kW
COP Tj = 12°C	8.51	6.07
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	13.45 kW	11.52 kW

COP Tj = Tbiv	2.72	1.99
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	12.52 kW	10.33 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.48	1.80
WTOL	65 °C	65 °C
Poff	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	2.68 kW	2.67 kW
Annual energy consumption Qhe	6804 kWh	7895 kWh

EN 12102-1 | Colder Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	68 dB(A)	68 dB(A)

EN 14825 | Colder Climate

	Low temperature	Medium temperature
η_s	158 %	122 %
Prated	13.76 kW	11.79 kW
SCOP	4.02	3.12
Tbiv	-15 °C	-15 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	8.31 kW	7.64 kW
COP Tj = -7°C	3.37	2.65
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	5.27 kW	4.43 kW
COP Tj = +2°C	4.86	3.79
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	3.62 kW	2.98 kW
COP Tj = +7°C	6.49	4.81
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.35 kW	3.43 kW
COP Tj = 12°C	7.40	6.29
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	11.22 kW	9.62 kW
COP Tj = Tbiv	2.43	1.86
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	8.89 kW	5.22 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	1.97	1.23
WTOL	65 °C	65 °C
Poff	14 W	14 W

PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	4.87 kW	6.57 kW
Annual energy consumption Q _{he}	8431 kWh	9309 kWh
P _{dh} T _j = -15°C (if TOL	11.22	9.62
COP T _j = -15°C (if TOL	2.43	1.86
C _{dh} T _j = -15 °C	0.90	0.90

EN 12102-1 | Warmer Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	68 dB(A)	68 dB(A)

EN 14825 | Warmer Climate

	Low temperature	Medium temperature
η _s	249 %	176 %
Prated	13.09 kW	14.17 kW
SCOP	6.33	4.48
T _{biv}	7 °C	7 °C
TOL	2 °C	2 °C
P _{dh} T _j = +2°C	13.09 kW	13.38 kW
COP T _j = +2°C	3.35	2.29
C _{dh} T _j = +2 °C	0.900	0.900
P _{dh} T _j = +7°C	8.42 kW	9.11 kW
COP T _j = +7°C	5.36	3.89
C _{dh} T _j = +7 °C	0.900	0.900
P _{dh} T _j = 12°C	3.88 kW	4.06 kW
COP T _j = 12°C	8.11	5.86
C _{dh} T _j = +12 °C	0.900	0.900
P _{dh} T _j = T _{biv}	8.42 kW	9.11 kW
COP T _j = T _{biv}	5.36	3.89
P _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}	13.09 kW	13.38 kW
COP T _j = TOL or COP T _j = T _{designh} if TOL < T _{designh}	3.35	2.29
C _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}		
WTOL	65 °C	65 °C
P _{off}	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity

Supplementary Heater: PSUP	0.00 kW	0.79 kW
Annual energy consumption Q _{he}	2781 kWh	4231 kWh

Model MHC-V12W/D2N8-B****

Model name	MHC-V12W/D2N8-B****
Application	Heating (medium temp)
Units	Outdoor
Climate zone (for heating)	Warmer Climate, Colder Climate
Reversibility	Yes
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

General data

Power supply	1x230V 50Hz
Off-peak product	n/a

Outdoor Air/Water

EN 14511-4 | Heating

Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

EN 12102-1 | Average Climate

	Low temperature	Medium temperature
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Average Climate

	Low temperature	Medium temperature
η_s	189 %	135 %
Prated	12.00 kW	11.58 kW
SCOP	4.81	3.45
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	10.61 kW	10.25 kW
COP Tj = -7°C	2.88	2.01
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	6.69 kW	6.52 kW
COP Tj = +2°C	4.65	3.44
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	4.44 kW	4.36 kW
COP Tj = +7°C	6.62	4.59
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.74 kW	3.30 kW
COP Tj = 12°C	8.47	6.05
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	10.61 kW	10.25 kW
COP Tj = Tbiv	2.88	2.01

Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	10.75 kW	9.10 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.77	1.79
WTOL	65 °C	65 °C
Poff	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	1.26 kW	2.50 kW
Annual energy consumption Qhe	5152 kWh	6927 kWh

EN 12102-1 | Colder Climate

	Low temperature	Medium temperature
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Colder Climate

	Low temperature	Medium temperature
η_s	160 %	118 %
Prated	11.38 kW	10.32 kW
SCOP	4.08	3.02
Tbiv	-15 °C	-15 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	7.05 kW	6.63 kW
COP Tj = -7°C	3.48	2.63
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	4.68 kW	4.07 kW
COP Tj = +2°C	4.96	3.60
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	3.14 kW	2.78 kW
COP Tj = +7°C	6.10	4.54
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.57 kW	3.33 kW
COP Tj = 12°C	7.87	6.25
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	9.28 kW	8.42 kW
COP Tj = Tbiv	2.59	1.84
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	7.01 kW	4.20 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	1.98	1.13
WTOL	65 °C	65 °C
Poff	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W

PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	4.37 kW	6.12 kW
Annual energy consumption Q _{he}	6870 kWh	8419 kWh
P _{dh} T _j = -15°C (if TOL	9.28	8.42
COP T _j = -15°C (if TOL	2.59	1.84
C _{dh} T _j = -15 °C	0.90	0.90

EN 12102-1 | Warmer Climate

	Low temperature	Medium temperature
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Warmer Climate

	Low temperature	Medium temperature
η _s	256 %	174 %
Prated	11.11 kW	12.51 kW
SCOP	6.53	4.43
T _{biv}	7 °C	7 °C
TOL	2 °C	2 °C
P _{dh} T _j = +2°C	11.11 kW	12.08 kW
COP T _j = +2°C	3.59	2.31
C _{dh} T _j = +2 °C	0.900	0.900
P _{dh} T _j = +7°C	7.14 kW	8.04 kW
COP T _j = +7°C	5.87	3.86
C _{dh} T _j = +7 °C	0.900	0.900
P _{dh} T _j = 12°C	3.56 kW	3.75 kW
COP T _j = 12°C	7.94	5.70
C _{dh} T _j = +12 °C	0.900	0.900
P _{dh} T _j = T _{biv}	7.14 kW	8.04 kW
COP T _j = T _{biv}	5.87	3.86
P _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}	11.11 kW	12.08 kW
COP T _j = TOL or COP T _j = T _{designh} if TOL < T _{designh}	3.59	2.31
C _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}		
WTOL	65 °C	65 °C
P _{off}	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.00 kW	0.44 kW
Annual energy consumption Q _{he}	2292 kWh	3776 kWh

Model MHC-V14W/D2N8-B****

Model name	MHC-V14W/D2N8-B****
Application	Heating (medium temp)
Units	Outdoor
Climate zone (for heating)	Warmer Climate, Colder Climate
Reversibility	Yes
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

General data

Power supply	1x230V 50Hz
Off-peak product	n/a

Outdoor Air/Water

EN 14511-4 | Heating

Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

EN 12102-1 | Average Climate

	Low temperature	Medium temperature
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Average Climate

	Low temperature	Medium temperature
η_s	186 %	136 %
Prated	13.73 kW	12.08 kW
SCOP	4.72	3.47
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	12.14 kW	10.69 kW
COP Tj = -7°C	2.79	2.01
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	7.95 kW	6.86 kW
COP Tj = +2°C	4.52	3.43
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	5.20 kW	4.64 kW
COP Tj = +7°C	6.68	4.66
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.76 kW	3.32 kW
COP Tj = 12°C	8.52	6.13
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	12.14 kW	10.69 kW
COP Tj = Tbiv	2.79	2.01

Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	11.48 kW	9.19 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.59	1.76
WTOL	65 °C	65 °C
Poff	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	2.23 kW	2.91 kW
Annual energy consumption Qhe	6012 kWh	7202 kWh

EN 12102-1 | Colder Climate

	Low temperature	Medium temperature
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Colder Climate

	Low temperature	Medium temperature
ηs	160 %	119 %
Prated	12.64 kW	10.97 kW
SCOP	4.07	3.05
Tbiv	-15 °C	-15 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	7.97 kW	6.89 kW
COP Tj = -7°C	3.44	2.66
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	5.05 kW	4.32 kW
COP Tj = +2°C	4.92	3.66
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	3.16 kW	3.06 kW
COP Tj = +7°C	6.11	4.72
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.58 kW	3.33 kW
COP Tj = 12°C	7.82	6.25
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	10.31 kW	8.95 kW
COP Tj = Tbiv	2.53	1.79
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	7.57 kW	4.20 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	1.92	1.13
WTOL	65 °C	65 °C
Poff	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W

PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	5.07 kW	6.77 kW
Annual energy consumption Q _{he}	7667 kWh	8866 kWh
P _{dh} T _j = -15°C (if TOL	10.31	8.95
COP T _j = -15°C (if TOL	2.53	1.79
C _{dh} T _j = -15 °C	0.90	0.90

EN 12102-1 | Warmer Climate

	Low temperature	Medium temperature
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Warmer Climate

	Low temperature	Medium temperature
η _s	260 %	175 %
Prated	12.11 kW	14.17 kW
SCOP	6.63	4.45
T _{biv}	7 °C	7 °C
TOL	2 °C	2 °C
P _{dh} T _j = +2°C	12.04 kW	13.05 kW
COP T _j = +2°C	3.44	2.20
C _{dh} T _j = +2 °C	0.900	0.900
P _{dh} T _j = +7°C	7.78 kW	9.11 kW
COP T _j = +7°C	5.84	3.89
C _{dh} T _j = +7 °C	0.900	0.900
P _{dh} T _j = 12°C	3.75 kW	4.09 kW
COP T _j = 12°C	8.25	5.90
C _{dh} T _j = +12 °C	0.900	0.900
P _{dh} T _j = T _{biv}	7.78 kW	9.11 kW
COP T _j = T _{biv}	5.84	3.89
P _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}	12.04 kW	13.05 kW
COP T _j = TOL or COP T _j = T _{designh} if TOL < T _{designh}	3.44	2.20
C _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}		
WTOL	65 °C	65 °C
P _{off}	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.07 kW	1.13 kW
Annual energy consumption Q _{he}	2457 kWh	4258 kWh

Model MHC-V16W/D2N8-B****

Model name	MHC-V16W/D2N8-B****
Application	Heating (medium temp)
Units	Outdoor
Climate zone (for heating)	Warmer Climate, Colder Climate
Reversibility	Yes
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

General data

Power supply	1x230V 50Hz
Off-peak product	n/a

Outdoor Air/Water

EN 14511-4 | Heating

Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

EN 12102-1 | Average Climate

	Low temperature	Medium temperature
Sound power level outdoor	68 dB(A)	68 dB(A)

EN 14825 | Average Climate

	Low temperature	Medium temperature
η_s	182 %	133 %
Prated	15.21 kW	13.02 kW
SCOP	4.62	3.41
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	13.45 kW	11.52 kW
COP Tj = -7°C	2.72	1.99
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	8.57 kW	7.18 kW
COP Tj = +2°C	4.41	3.34
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	5.70 kW	4.68 kW
COP Tj = +7°C	6.56	4.61
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.78 kW	3.32 kW
COP Tj = 12°C	8.51	6.07
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	13.45 kW	11.52 kW
COP Tj = Tbiv	2.72	1.99

Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	12.52 kW	10.33 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.48	1.80
WTOL	65 °C	65 °C
Poff	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	2.68 kW	2.67 kW
Annual energy consumption Qhe	6804 kWh	7895 kWh

EN 12102-1 | Colder Climate

	Low temperature	Medium temperature
Sound power level outdoor	68 dB(A)	68 dB(A)

EN 14825 | Colder Climate

	Low temperature	Medium temperature
ηs	158 %	122 %
Prated	13.76 kW	11.79 kW
SCOP	4.02	3.12
Tbiv	-15 °C	-15 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	8.31 kW	7.64 kW
COP Tj = -7°C	3.37	2.65
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	5.27 kW	4.43 kW
COP Tj = +2°C	4.86	3.79
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	3.62 kW	2.98 kW
COP Tj = +7°C	6.49	4.81
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.35 kW	3.43 kW
COP Tj = 12°C	7.40	6.29
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	11.22 kW	9.62 kW
COP Tj = Tbiv	2.43	1.86
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	8.89 kW	5.22 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	1.97	1.23
WTOL	65 °C	65 °C
Poff	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W

PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	4.87 kW	6.57 kW
Annual energy consumption Q _{he}	8431 kWh	9309 kWh
P _{dh} T _j = -15°C (if TOL	11.22	9.62
COP T _j = -15°C (if TOL	2.43	1.86
C _{dh} T _j = -15 °C	0.90	0.90

EN 12102-1 | Warmer Climate

	Low temperature	Medium temperature
Sound power level outdoor	68 dB(A)	68 dB(A)

EN 14825 | Warmer Climate

	Low temperature	Medium temperature
η _s	249 %	176 %
Prated	13.09 kW	14.17 kW
SCOP	6.33	4.48
T _{biv}	7 °C	7 °C
TOL	2 °C	2 °C
P _{dh} T _j = +2°C	13.09 kW	13.38 kW
COP T _j = +2°C	3.35	2.29
C _{dh} T _j = +2 °C	0.900	0.900
P _{dh} T _j = +7°C	8.42 kW	9.11 kW
COP T _j = +7°C	5.36	3.89
C _{dh} T _j = +7 °C	0.900	0.900
P _{dh} T _j = 12°C	3.88 kW	4.06 kW
COP T _j = 12°C	8.11	5.86
C _{dh} T _j = +12 °C	0.900	0.900
P _{dh} T _j = T _{biv}	8.42 kW	9.11 kW
COP T _j = T _{biv}	5.36	3.89
P _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}	13.09 kW	13.38 kW
COP T _j = TOL or COP T _j = T _{designh} if TOL < T _{designh}	3.35	2.29
C _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}		
WTOL	65 °C	65 °C
P _{off}	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.00 kW	0.79 kW
Annual energy consumption Q _{he}	2781 kWh	4231 kWh

Model MHA-V12W/D2RN8-B+HB-A160/C****GN8-B

Model name	MHA-V12W/D2RN8-B+HB-A160/C****GN8-B
Application	Heating (medium temp)
Units	Indoor, Outdoor
Climate zone (for heating)	Warmer Climate, Colder Climate
Reversibility	Yes
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

General data

Power supply	3x400V 50Hz
Off-peak product	n/a

Outdoor Air/Water

EN 14511-4 | Heating

Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

EN 12102-1 | Average Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	64 dB(A)	64 dB(A)

EN 14825 | Average Climate

	Low temperature	Medium temperature
η_s	189 %	135 %
Prated	12.00 kW	11.58 kW
SCOP	4.81	3.45
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	10.61 kW	10.25 kW
COP Tj = -7°C	2.88	2.01
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	6.69 kW	6.52 kW
COP Tj = +2°C	4.65	3.44
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	4.44 kW	4.36 kW
COP Tj = +7°C	6.62	4.59
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.74 kW	3.30 kW
COP Tj = 12°C	8.47	6.05
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	10.61 kW	10.25 kW

COP $T_j = T_{biv}$	2.88	2.01
$P_{dh} T_j = TOL$ or $P_{dh} T_j = T_{designh}$ if $TOL < T_{designh}$	10.75 kW	9.10 kW
COP $T_j = TOL$ or COP $T_j = T_{designh}$ if $TOL < T_{designh}$	2.77	1.79
WTOL	65 °C	65 °C
P _{off}	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	1.26 kW	2.50 kW
Annual energy consumption Q _{he}	5153 kWh	6928 kWh

EN 12102-1 | Colder Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	64 dB(A)	64 dB(A)

EN 14825 | Colder Climate

	Low temperature	Medium temperature
η_s	160 %	118 %
Prated	11.38 kW	10.32 kW
SCOP	4.08	3.02
T_{biv}	-15 °C	-15 °C
TOL	-22 °C	-22 °C
$P_{dh} T_j = -7^{\circ}C$	7.05 kW	6.63 kW
COP $T_j = -7^{\circ}C$	3.48	2.63
$C_{dh} T_j = -7^{\circ}C$	0.90	0.90
$P_{dh} T_j = +2^{\circ}C$	4.68 kW	4.07 kW
COP $T_j = +2^{\circ}C$	4.96	3.60
$C_{dh} T_j = +2^{\circ}C$	0.90	0.90
$P_{dh} T_j = +7^{\circ}C$	3.14 kW	2.78 kW
COP $T_j = +7^{\circ}C$	6.10	4.54
$C_{dh} T_j = +7^{\circ}C$	0.90	0.90
$P_{dh} T_j = 12^{\circ}C$	3.57 kW	3.33 kW
COP $T_j = 12^{\circ}C$	7.87	6.25
$C_{dh} T_j = +12^{\circ}C$	0.90	0.90
$P_{dh} T_j = T_{biv}$	9.28 kW	8.42 kW
COP $T_j = T_{biv}$	2.59	1.84
$P_{dh} T_j = TOL$ or $P_{dh} T_j = T_{designh}$ if $TOL < T_{designh}$	7.01 kW	4.20 kW
COP $T_j = TOL$ or COP $T_j = T_{designh}$ if $TOL < T_{designh}$	1.98	1.13
WTOL	65 °C	65 °C
P _{off}	20 W	20 W

PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	4.37 kW	6.12 kW
Annual energy consumption Q _{he}	6871 kWh	8420 kWh
P _{dh} T _j = -15°C (if TOL	9.28	8.42
COP T _j = -15°C (if TOL	2.59	1.84
C _{dh} T _j = -15 °C	0.90	0.90

EN 12102-1 | Warmer Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	64 dB(A)	64 dB(A)

EN 14825 | Warmer Climate

	Low temperature	Medium temperature
η _s	256 %	174 %
Prated	11.11 kW	12.51 kW
SCOP	6.53	4.42
T _{biv}	7 °C	7 °C
TOL	2 °C	2 °C
P _{dh} T _j = +2°C	11.11 kW	12.08 kW
COP T _j = +2°C	3.59	2.31
C _{dh} T _j = +2 °C	0.900	0.900
P _{dh} T _j = +7°C	7.14 kW	8.04 kW
COP T _j = +7°C	5.87	3.86
C _{dh} T _j = +7 °C	0.900	0.900
P _{dh} T _j = 12°C	3.56 kW	3.75 kW
COP T _j = 12°C	7.94	5.70
C _{dh} T _j = +12 °C	0.900	0.900
P _{dh} T _j = T _{biv}	7.14 kW	8.04 kW
COP T _j = T _{biv}	5.87	3.86
P _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}	11.11 kW	12.08 kW
COP T _j = TOL or COP T _j = T _{designh} if TOL < T _{designh}	3.59	2.31
C _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}		
WTOL	65 °C	65 °C
P _{off}	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity

Supplementary Heater: PSUP	0.00 kW	0.44 kW
Annual energy consumption Q _{he}	2296 kWh	3780 kWh

Model MHA-V14W/D2RN8-B+HB-A160/C****GN8-B

Model name	MHA-V14W/D2RN8-B+HB-A160/C****GN8-B
Application	Heating (medium temp)
Units	Indoor, Outdoor
Climate zone (for heating)	Warmer Climate, Colder Climate
Reversibility	Yes
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

General data

Power supply	3x400V 50Hz
Off-peak product	n/a

Outdoor Air/Water

EN 14511-4 | Heating

Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

EN 12102-1 | Average Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Average Climate

	Low temperature	Medium temperature
η_s	186 %	136 %
Prated	13.73 kW	12.08 kW
SCOP	4.72	3.47
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	12.14 kW	10.69 kW
COP Tj = -7°C	2.79	2.01
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	7.95 kW	6.86 kW
COP Tj = +2°C	4.52	3.43
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	5.20 kW	4.64 kW
COP Tj = +7°C	6.68	4.66
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.76 kW	3.32 kW
COP Tj = 12°C	8.52	6.13
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	12.14 kW	10.69 kW

COP Tj = Tbiv	2.79	2.01
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	11.48 kW	9.19 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.59	1.76
WTOL	65 °C	65 °C
Poff	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	2.23 kW	2.91 kW
Annual energy consumption Qhe	6013 kWh	7203 kWh

EN 12102-1 | Colder Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Colder Climate

	Low temperature	Medium temperature
η_s	160 %	119 %
Prated	12.64 kW	10.97 kW
SCOP	4.06	3.05
Tbiv	-15 °C	-15 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	7.97 kW	6.89 kW
COP Tj = -7°C	3.44	2.66
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	5.05 kW	4.32 kW
COP Tj = +2°C	4.92	3.66
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	3.16 kW	3.06 kW
COP Tj = +7°C	6.11	4.72
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.58 kW	3.33 kW
COP Tj = 12°C	7.82	6.25
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	10.31 kW	8.95 kW
COP Tj = Tbiv	2.53	1.79
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	7.57 kW	4.20 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	1.92	1.13
WTOL	65 °C	65 °C
Poff	20 W	20 W

PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	5.07 kW	6.77 kW
Annual energy consumption Q _{he}	7667 kWh	8867 kWh
P _{dh} T _j = -15°C (if TOL	10.31	8.95
COP T _j = -15°C (if TOL	2.53	1.79
C _{dh} T _j = -15 °C	0.90	0.90

EN 12102-1 | Warmer Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Warmer Climate

	Low temperature	Medium temperature
η _s	260 %	175 %
Prated	12.11 kW	14.17 kW
SCOP	6.63	4.44
T _{biv}	7 °C	7 °C
TOL	2 °C	2 °C
P _{dh} T _j = +2°C	12.04 kW	13.05 kW
COP T _j = +2°C	3.44	2.20
C _{dh} T _j = +2 °C	0.900	0.900
P _{dh} T _j = +7°C	7.78 kW	9.11 kW
COP T _j = +7°C	5.84	3.89
C _{dh} T _j = +7 °C	0.900	0.900
P _{dh} T _j = 12°C	3.75 kW	4.09 kW
COP T _j = 12°C	8.25	5.90
C _{dh} T _j = +12 °C	0.900	0.900
P _{dh} T _j = T _{biv}	7.78 kW	9.11 kW
COP T _j = T _{biv}	5.84	3.89
P _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}	12.04 kW	13.05 kW
COP T _j = TOL or COP T _j = T _{designh} if TOL < T _{designh}	3.44	2.20
C _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}		
WTOL	65 °C	65 °C
P _{off}	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity

Supplementary Heater: PSUP	0.07 kW	1.13 kW
Annual energy consumption Q _{he}	2462 kWh	4262 kWh

Model MHA-V16W/D2RN8-B+HB-A160/C****GN8-B

Model name	MHA-V16W/D2RN8-B+HB-A160/C****GN8-B
Application	Heating (medium temp)
Units	Indoor, Outdoor
Climate zone (for heating)	Warmer Climate, Colder Climate
Reversibility	Yes
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

General data

Power supply	3x400V 50Hz
Off-peak product	n/a

Outdoor Air/Water

EN 14511-4 | Heating

Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

EN 12102-1 | Average Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	68 dB(A)	68 dB(A)

EN 14825 | Average Climate

	Low temperature	Medium temperature
η_s	182 %	133 %
Prated	15.21 kW	13.02 kW
SCOP	4.62	3.41
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	13.45 kW	11.52 kW
COP Tj = -7°C	2.72	1.99
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	8.57 kW	7.18 kW
COP Tj = +2°C	4.41	3.34
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	5.70 kW	4.68 kW
COP Tj = +7°C	6.56	4.61
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.78 kW	3.32 kW
COP Tj = 12°C	8.51	6.07
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	13.45 kW	11.52 kW

COP $T_j = T_{biv}$	2.72	1.99
$P_{dh} T_j = TOL$ or $P_{dh} T_j = T_{designh}$ if $TOL < T_{designh}$	12.52 kW	10.33 kW
COP $T_j = TOL$ or COP $T_j = T_{designh}$ if $TOL < T_{designh}$	2.48	1.80
WTOL	65 °C	65 °C
P _{off}	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	2.68 kW	2.67 kW
Annual energy consumption Q _{he}	6805 kWh	7896 kWh

EN 12102-1 | Colder Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	68 dB(A)	68 dB(A)

EN 14825 | Colder Climate

	Low temperature	Medium temperature
η_s	158 %	122 %
Prated	13.76 kW	11.79 kW
SCOP	4.02	3.12
T_{biv}	-15 °C	-15 °C
TOL	-22 °C	-22 °C
$P_{dh} T_j = -7^\circ\text{C}$	8.31 kW	7.64 kW
COP $T_j = -7^\circ\text{C}$	3.37	2.65
$C_{dh} T_j = -7^\circ\text{C}$	0.90	0.90
$P_{dh} T_j = +2^\circ\text{C}$	5.27 kW	4.43 kW
COP $T_j = +2^\circ\text{C}$	4.86	3.79
$C_{dh} T_j = +2^\circ\text{C}$	0.90	0.90
$P_{dh} T_j = +7^\circ\text{C}$	3.62 kW	2.98 kW
COP $T_j = +7^\circ\text{C}$	6.49	4.81
$C_{dh} T_j = +7^\circ\text{C}$	0.90	0.90
$P_{dh} T_j = 12^\circ\text{C}$	3.35 kW	3.43 kW
COP $T_j = 12^\circ\text{C}$	7.40	6.29
$C_{dh} T_j = +12^\circ\text{C}$	0.90	0.90
$P_{dh} T_j = T_{biv}$	11.22 kW	9.62 kW
COP $T_j = T_{biv}$	2.43	1.86
$P_{dh} T_j = TOL$ or $P_{dh} T_j = T_{designh}$ if $TOL < T_{designh}$	8.89 kW	5.22 kW
COP $T_j = TOL$ or COP $T_j = T_{designh}$ if $TOL < T_{designh}$	1.97	1.23
WTOL	65 °C	65 °C
P _{off}	20 W	20 W

PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	4.87 kW	6.57 kW
Annual energy consumption Q _{he}	8431 kWh	9310 kWh
P _{dh} T _j = -15°C (if TOL	11.22	9.62
COP T _j = -15°C (if TOL	2.43	1.86
C _{dh} T _j = -15 °C	0.90	0.90

EN 12102-1 | Warmer Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	68 dB(A)	68 dB(A)

EN 14825 | Warmer Climate

	Low temperature	Medium temperature
η _s	248 %	176 %
Prated	13.09 kW	14.17 kW
SCOP	6.33	4.47
T _{biv}	7 °C	7 °C
TOL	2 °C	2 °C
P _{dh} T _j = +2°C	13.09 kW	13.38 kW
COP T _j = +2°C	3.35	2.29
C _{dh} T _j = +2 °C	0.900	0.900
P _{dh} T _j = +7°C	8.42 kW	9.11 kW
COP T _j = +7°C	5.36	3.89
C _{dh} T _j = +7 °C	0.900	0.900
P _{dh} T _j = 12°C	3.88 kW	4.06 kW
COP T _j = 12°C	8.11	5.86
C _{dh} T _j = +12 °C	0.900	0.900
P _{dh} T _j = T _{biv}	8.42 kW	9.11 kW
COP T _j = T _{biv}	5.36	3.89
P _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}	13.09 kW	13.38 kW
COP T _j = TOL or COP T _j = T _{designh} if TOL < T _{designh}	3.35	2.29
C _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}		
WTOL	65 °C	65 °C
P _{off}	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity

Supplementary Heater: PSUP	0.00 kW	0.79 kW
Annual energy consumption Q _{he}	2786 kWh	4236 kWh

Model MHC-V12W/D2RN8-B****

Model name	MHC-V12W/D2RN8-B****
Application	Heating (medium temp)
Units	Outdoor
Climate zone (for heating)	Warmer Climate, Colder Climate
Reversibility	Yes
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

General data

Power supply	3x400V 50Hz
Off-peak product	n/a

Outdoor Air/Water

EN 14511-4 | Heating

Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

EN 12102-1 | Average Climate

	Low temperature	Medium temperature
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Average Climate

	Low temperature	Medium temperature
η_s	189 %	135 %
Prated	12.00 kW	11.58 kW
SCOP	4.81	3.45
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	10.61 kW	10.25 kW
COP Tj = -7°C	2.88	2.01
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	6.69 kW	6.52 kW
COP Tj = +2°C	4.65	3.44
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	4.44 kW	4.36 kW
COP Tj = +7°C	6.62	4.59
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.74 kW	3.30 kW
COP Tj = 12°C	8.47	6.05
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	10.61 kW	10.25 kW
COP Tj = Tbiv	2.88	2.01

Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	10.75 kW	9.10 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.77	1.79
WTOL	65 °C	65 °C
Poff	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	1.26 kW	2.50 kW
Annual energy consumption Qhe	5153 kWh	6928 kWh

EN 12102-1 | Colder Climate

	Low temperature	Medium temperature
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Colder Climate

	Low temperature	Medium temperature
ηs	160 %	118 %
Prated	11.38 kW	10.32 kW
SCOP	4.08	3.02
Tbiv	-15 °C	-15 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	7.05 kW	6.63 kW
COP Tj = -7°C	3.48	2.63
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	4.68 kW	4.07 kW
COP Tj = +2°C	4.96	3.60
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	3.14 kW	2.78 kW
COP Tj = +7°C	6.10	4.54
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.57 kW	3.33 kW
COP Tj = 12°C	7.87	6.25
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	9.28 kW	8.42 kW
COP Tj = Tbiv	2.59	1.84
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	7.01 kW	4.20 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	1.98	1.13
WTOL	65 °C	65 °C
Poff	14 W	14 W
PTO	30 W	30 W
PSB	20 W	20 W

PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	4.37 kW	6.12 kW
Annual energy consumption Q _{he}	6871 kWh	8420 kWh
P _{dh} T _j = -15°C (if TOL	9.28	8.42
COP T _j = -15°C (if TOL	2.59	1.84
C _{dh} T _j = -15 °C	0.90	0.90

EN 12102-1 | Warmer Climate

	Low temperature	Medium temperature
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Warmer Climate

	Low temperature	Medium temperature
η _s	256 %	174 %
Prated	11.11 kW	12.51 kW
SCOP	6.53	4.42
T _{biv}	7 °C	7 °C
TOL	2 °C	2 °C
P _{dh} T _j = +2°C	11.11 kW	12.08 kW
COP T _j = +2°C	3.59	2.31
C _{dh} T _j = +2 °C	0.900	0.900
P _{dh} T _j = +7°C	7.14 kW	8.04 kW
COP T _j = +7°C	5.87	3.86
C _{dh} T _j = +7 °C	0.900	0.900
P _{dh} T _j = 12°C	3.56 kW	3.75 kW
COP T _j = 12°C	7.94	5.70
C _{dh} T _j = +12 °C	0.900	0.900
P _{dh} T _j = T _{biv}	7.14 kW	8.04 kW
COP T _j = T _{biv}	5.87	3.86
P _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}	11.11 kW	12.08 kW
COP T _j = TOL or COP T _j = T _{designh} if TOL < T _{designh}	3.59	2.31
C _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}		
WTOL	65 °C	65 °C
P _{off}	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.00 kW	0.44 kW
Annual energy consumption Q _{he}	2296 kWh	3780 kWh

Model MHC-V14W/D2RN8-B****

Model name	MHC-V14W/D2RN8-B****
Application	Heating (medium temp)
Units	Outdoor
Climate zone (for heating)	Warmer Climate, Colder Climate
Reversibility	Yes
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

General data

Power supply	3x400V 50Hz
Off-peak product	n/a

Outdoor Air/Water

EN 14511-4 | Heating

Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

EN 12102-1 | Average Climate

	Low temperature	Medium temperature
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Average Climate

	Low temperature	Medium temperature
η_s	186 %	136 %
Prated	13.73 kW	12.08 kW
SCOP	4.72	3.47
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	12.14 kW	10.69 kW
COP Tj = -7°C	2.79	2.01
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	7.95 kW	6.86 kW
COP Tj = +2°C	4.52	3.43
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	5.20 kW	4.64 kW
COP Tj = +7°C	6.68	4.66
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.76 kW	3.32 kW
COP Tj = 12°C	8.52	6.13
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	12.14 kW	10.69 kW
COP Tj = Tbiv	2.79	2.01

Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	11.48 kW	9.19 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.59	1.76
WTOL	65 °C	65 °C
Poff	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	2.23 kW	2.91 kW
Annual energy consumption Qhe	6013 kWh	7203 kWh

EN 12102-1 | Colder Climate

	Low temperature	Medium temperature
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Colder Climate

	Low temperature	Medium temperature
ηs	160 %	119 %
Prated	12.64 kW	10.97 kW
SCOP	4.06	3.05
Tbiv	-15 °C	-15 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	7.97 kW	6.89 kW
COP Tj = -7°C	3.44	2.66
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	5.05 kW	4.32 kW
COP Tj = +2°C	4.92	3.66
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	3.16 kW	3.06 kW
COP Tj = +7°C	6.11	4.72
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.58 kW	3.33 kW
COP Tj = 12°C	7.82	6.25
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	10.31 kW	8.95 kW
COP Tj = Tbiv	2.53	1.79
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	7.57 kW	4.20 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	1.92	1.13
WTOL	65 °C	65 °C
Poff	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W

PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	5.07 kW	6.77 kW
Annual energy consumption Q _{he}	7667 kWh	8867 kWh
P _{dh} T _j = -15°C (if TOL	10.31	8.95
COP T _j = -15°C (if TOL	2.53	1.79
C _{dh} T _j = -15 °C	0.90	0.90

EN 12102-1 | Warmer Climate

	Low temperature	Medium temperature
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Warmer Climate

	Low temperature	Medium temperature
η _s	260 %	175 %
Prated	12.11 kW	14.17 kW
SCOP	6.63	4.44
T _{biv}	7 °C	7 °C
TOL	2 °C	2 °C
P _{dh} T _j = +2°C	12.04 kW	13.05 kW
COP T _j = +2°C	3.44	2.20
C _{dh} T _j = +2 °C	0.900	0.900
P _{dh} T _j = +7°C	7.78 kW	9.11 kW
COP T _j = +7°C	5.84	3.89
C _{dh} T _j = +7 °C	0.900	0.900
P _{dh} T _j = 12°C	3.75 kW	4.09 kW
COP T _j = 12°C	8.25	5.90
C _{dh} T _j = +12 °C	0.900	0.900
P _{dh} T _j = T _{biv}	7.78 kW	9.11 kW
COP T _j = T _{biv}	5.84	3.89
P _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}	12.04 kW	13.05 kW
COP T _j = TOL or COP T _j = T _{designh} if TOL < T _{designh}	3.44	2.20
C _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}		
WTOL	65 °C	65 °C
P _{off}	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.07 kW	1.13 kW
Annual energy consumption Q _{he}	2462 kWh	4262 kWh

Model MHC-V16W/D2RN8-B****

Model name	MHC-V16W/D2RN8-B****
Application	Heating (medium temp)
Units	Outdoor
Climate zone (for heating)	Warmer Climate, Colder Climate
Reversibility	Yes
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

General data

Power supply	3x400V 50Hz
Off-peak product	n/a

Outdoor Air/Water

EN 14511-4 | Heating

Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

EN 12102-1 | Average Climate

	Low temperature	Medium temperature
Sound power level outdoor	68 dB(A)	68 dB(A)

EN 14825 | Average Climate

	Low temperature	Medium temperature
η_s	182 %	133 %
Prated	15.21 kW	13.02 kW
SCOP	4.62	3.41
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	13.45 kW	11.52 kW
COP Tj = -7°C	2.72	1.99
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	8.57 kW	7.18 kW
COP Tj = +2°C	4.41	3.34
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	5.70 kW	4.68 kW
COP Tj = +7°C	6.56	4.61
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.78 kW	3.32 kW
COP Tj = 12°C	8.51	6.07
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	13.45 kW	11.52 kW
COP Tj = Tbiv	2.72	1.99

Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	12.52 kW	10.33 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.48	1.80
WTOL	65 °C	65 °C
Poff	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	2.68 kW	2.67 kW
Annual energy consumption Qhe	6805 kWh	7896 kWh

EN 12102-1 | Colder Climate

	Low temperature	Medium temperature
Sound power level outdoor	68 dB(A)	68 dB(A)

EN 14825 | Colder Climate

	Low temperature	Medium temperature
η_s	158 %	122 %
Prated	13.76 kW	11.79 kW
SCOP	4.02	3.12
Tbiv	-15 °C	-15 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	8.31 kW	7.64 kW
COP Tj = -7°C	3.37	2.65
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	5.27 kW	4.43 kW
COP Tj = +2°C	4.86	3.79
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	3.62 kW	2.98 kW
COP Tj = +7°C	6.49	4.81
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.35 kW	3.43 kW
COP Tj = 12°C	7.40	6.29
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	11.22 kW	9.62 kW
COP Tj = Tbiv	2.43	1.86
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	8.89 kW	5.22 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	1.97	1.23
WTOL	65 °C	65 °C
Poff	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W

PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	4.87 kW	6.57 kW
Annual energy consumption Q _{he}	8431 kWh	9310 kWh
P _{dh} T _j = -15°C (if TOL	11.22	9.62
COP T _j = -15°C (if TOL	2.43	1.86
C _{dh} T _j = -15 °C	0.90	0.90

EN 12102-1 | Warmer Climate

	Low temperature	Medium temperature
Sound power level outdoor	68 dB(A)	68 dB(A)

EN 14825 | Warmer Climate

	Low temperature	Medium temperature
η _s	248 %	176 %
Prated	13.09 kW	14.17 kW
SCOP	6.33	4.47
T _{biv}	7 °C	7 °C
TOL	2 °C	2 °C
P _{dh} T _j = +2°C	13.09 kW	13.38 kW
COP T _j = +2°C	3.35	2.29
C _{dh} T _j = +2 °C	0.900	0.900
P _{dh} T _j = +7°C	8.42 kW	9.11 kW
COP T _j = +7°C	5.36	3.89
C _{dh} T _j = +7 °C	0.900	0.900
P _{dh} T _j = 12°C	3.88 kW	4.06 kW
COP T _j = 12°C	8.11	5.86
C _{dh} T _j = +12 °C	0.900	0.900
P _{dh} T _j = T _{biv}	8.42 kW	9.11 kW
COP T _j = T _{biv}	5.36	3.89
P _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}	13.09 kW	13.38 kW
COP T _j = TOL or COP T _j = T _{designh} if TOL < T _{designh}	3.35	2.29
C _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}		
WTOL	65 °C	65 °C
P _{off}	20 W	20 W
PTO	30 W	30 W
PSB	20 W	20 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.00 kW	0.79 kW
Annual energy consumption Q _{he}	2786 kWh	4236 kWh

Model MHA-V14W/D2N8-B+HB-A160/C****GN8-B

Model name	MHA-V14W/D2N8-B+HB-A160/C****GN8-B
Application	Heating (medium temp)
Units	Indoor, Outdoor
Climate zone (for heating)	Warmer Climate, Colder Climate
Reversibility	Yes
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

General data

Power supply	1x230V 50Hz
Off-peak product	n/a

Outdoor Air/Water

EN 14511-4 | Heating

Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

EN 12102-1 | Average Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Average Climate

	Low temperature	Medium temperature
η_s	186 %	136 %
Prated	13.73 kW	12.08 kW
SCOP	4.72	3.47
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	12.14 kW	10.69 kW
COP Tj = -7°C	2.79	2.01
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	7.95 kW	6.86 kW
COP Tj = +2°C	4.52	3.43
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	5.20 kW	4.64 kW
COP Tj = +7°C	6.68	4.66
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.76 kW	3.32 kW
COP Tj = 12°C	8.52	6.13
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	12.14 kW	10.69 kW

COP Tj = Tbiv	2.79	2.01
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	11.48 kW	9.19 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.59	1.76
WTOL	65 °C	65 °C
Poff	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	2.23 kW	2.91 kW
Annual energy consumption Qhe	6012 kWh	7202 kWh

EN 12102-1 | Colder Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Colder Climate

	Low temperature	Medium temperature
η_s	160 %	119 %
Prated	12.64 kW	10.97 kW
SCOP	4.07	3.05
Tbiv	-15 °C	-15 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	7.97 kW	6.89 kW
COP Tj = -7°C	3.44	2.66
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	5.05 kW	4.32 kW
COP Tj = +2°C	4.92	3.66
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	3.16 kW	3.06 kW
COP Tj = +7°C	6.11	4.72
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	3.58 kW	3.33 kW
COP Tj = 12°C	7.82	6.25
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	10.31 kW	8.95 kW
COP Tj = Tbiv	2.53	1.79
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	7.57 kW	4.20 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	1.92	1.13
WTOL	65 °C	65 °C
Poff	14 W	14 W

PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	5.07 kW	6.77 kW
Annual energy consumption Q _{he}	7667 kWh	8866 kWh
P _{dh} T _j = -15°C (if TOL	10.31	8.95
COP T _j = -15°C (if TOL	2.53	1.79
C _{dh} T _j = -15 °C	0.90	0.90

EN 12102-1 | Warmer Climate

	Low temperature	Medium temperature
Sound power level indoor	43 dB(A)	43 dB(A)
Sound power level outdoor	65 dB(A)	65 dB(A)

EN 14825 | Warmer Climate

	Low temperature	Medium temperature
η _s	260 %	175 %
Prated	12.11 kW	14.17 kW
SCOP	6.63	4.45
T _{biv}	7 °C	7 °C
TOL	2 °C	2 °C
P _{dh} T _j = +2°C	12.04 kW	13.05 kW
COP T _j = +2°C	3.44	2.20
C _{dh} T _j = +2 °C	0.900	0.900
P _{dh} T _j = +7°C	7.78 kW	9.11 kW
COP T _j = +7°C	5.84	3.89
C _{dh} T _j = +7 °C	0.900	0.900
P _{dh} T _j = 12°C	3.75 kW	4.09 kW
COP T _j = 12°C	8.25	5.90
C _{dh} T _j = +12 °C	0.900	0.900
P _{dh} T _j = T _{biv}	7.78 kW	9.11 kW
COP T _j = T _{biv}	5.84	3.89
P _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}	12.04 kW	13.05 kW
COP T _j = TOL or COP T _j = T _{designh} if TOL < T _{designh}	3.44	2.20
C _{dh} T _j = TOL or P _{dh} T _j = T _{designh} if TOL < T _{designh}		
WTOL	65 °C	65 °C
P _{off}	14 W	14 W
PTO	24 W	24 W
PSB	14 W	14 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity

Supplementary Heater: PSUP	0.07 kW	1.13 kW
Annual energy consumption Q _{he}	2457 kWh	4258 kWh