

TESTING LABORATORY

Report Ref. **20214000076/20**

TEST REPORT

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APPLIANCE TESTED: Heat Pump
TRADE NAME: MITSUBISHI ELECTRIC
MODEL: ATW-ACS-DV300
SERIAL NUMBER: 72302000018

COMMISSION REGULATION (EU) **No 812/2013 of 18 February 2013** - supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of water heaters, hot water storage tanks and packages of water heater and solar device.
No 814/2013 of 2 August 2013 - implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for water heaters and hot water storage tanks.

STANDARD **EN 16147: 2017+AC2017** – Heat pumps with electrically driven compressors – Testing and requirements for marking of domestic hot water units. (sections 7.7, 7.8, 7.9, 7.10, 7.12 and 7.13)

LOAD PROFILE: XL

HEAT SOURCE: Outdoor ambient air (inlet dry-bulb: 7 °C / inlet wet-bulb: 6 °C)

TEST LOCATION: Rua dos Plátanos, 197 – 4100-414 Porto – Portugal

INQUIRER: MITSUBISHI ELECTRIC

MANUFACTURER: Depósitos Coballes
O Viso Industrial Area
A Cunchada - CP 36770 - O Rosal
Pontevedra - Spain

Date of the reception of the appliance: 2021-01-18

Date of the end of the tests: 2021-01-27

Date of the report: 2021-01-29

CONCLUSION

Energy efficiency class A+.
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2,05$.
For conformity evaluation, measurement uncertainty is not taken into account.

NOTE: -----

Technician:

The Technical Responsible:



(Ricardo Tavares)



(Pedro Castro)




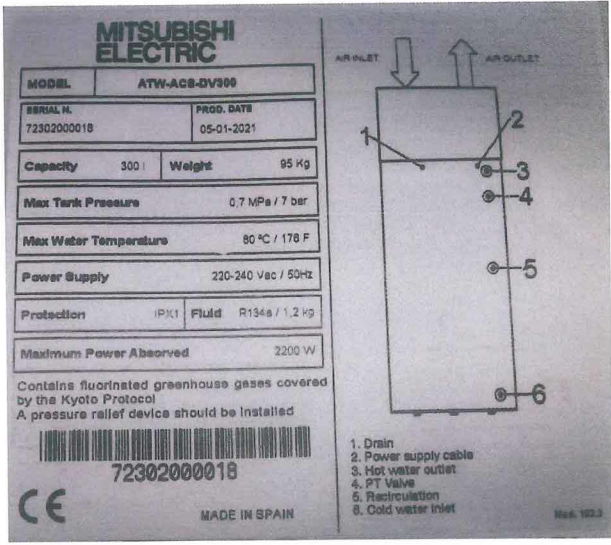
NOMINAL DATA:

Storage tank capacity:	300 L
Power supply voltage:	230 V
Frequency:	50 Hz
Type and mass of refrigerant charge:	R134a / 1,2 Kg
Off-peak product:	No
Software Version Indoor Unit:	No information provided
Software Version Outdoor Unit:	-----
Software Version Programming Unit:	-----

TEST CONDITIONS:

Load profile:	XL
Installation type:	Vertical
Type of heat source:	Outdoor ambient air
Heat source temperature, inlet dry-bulb:	7 °C
Heat source temperature, inlet wet-bulb:	6 °C
Sanitary cold water temperature, inlet:	10 °C
Set-up temperature:	53 °C
Domestic hot water operation mode:	Economy
Ambient temperature for storage tank:	20 °C

Notes:

	
Photos a) - Tested sample	Photos b) - Tested sample

Technician: _____



(Ricardo Tavares)

TEST RESULTS:

Clause	EN 16147:2017			Expanded uncertainty
	Load profile		XL	
	Reference energy of the load profile	Qref	19,070 kWh	-
	Filling and heating up period (stage C)			
7.7	Electrical energy consumption during the test duration	W _{eh-HP}	3,674 kWh	-
	Heating up time (h:min)	th	8:58	-
	Standby power input (stage D)			
7.8	Total electrical energy consumption during the last on-off-cycle	W _{es-HP}	0,478 kWh	±0,062 kWh
	Duration of the last on-off-cycle of the heat pump (h:min:ss)	tes	17:21:43	-
	Standby power input	P _{es}	27,5 W	±3,6 W
	Ambient correction term			
7.12	Conversion coefficient, equal to 2,5	CC	2,5	-
	Coefficient for the determination of ambient correction term	k	0,23	-
	Primary standby heat loss	P _{stby}	0,069 kW	-
	Ambient correction term	Q _{cor}	-0,380 kWh	±0,047 kWh
	Useful energy			
7.9.1	Useful energy during the whole load profile	Σ Q _{HP-tap}	18,973 kWh	±0,004 kWh
	Calculated heat energy produced by electrical resistance heater to reach the required tapping temperature	Q _{EL-LP}	0,102 kWh	±0,36 W
	Overall tapping energy of the load profile	Q _{LP}	19,075 kWh	-
	Electrical energy consumption			
7.9.2	Load profile time (h:min:ss)	t _{TTC}	39:30:54	-
	Total measured electrical energy consumption	W _{EL-M-LP}	6,681 kWh	-
	Total electrical energy consumption during the whole load profile	W _{EL-LP}	6,159 kWh	±0,095 kWh
	Coefficient of performance			
7.9.3	Coefficient of performance for domestic hot water	COP _{DHW}	3,0971	±0,0006
	Water heating energy efficiency			
7.13.2	Smart control factor	SCF	0,0	-
	Smart control (NO = 0 or YES = 1)	smart	0	-
	Daily electrical energy consumption	Q _{elec}	6,157 kWh	±0,097 kWh
	Water heating energy efficiency (%)	η _{wh}	127,0%	±0,02 %
	Annual consumption of electric energy			
7.13.3	Annual electrical energy consumption	AEC	1319 kWh/a	-
	Other performance			
7.14	Reference hot water temperature	θ ['] _{WH}	53,1 °C	-
	Maximum volume of mixed water at 40 °C	V ₄₀	308,9 L	-
	Rated heat output	P _{rated}	1,2 kW	-

Regulation (EU) nº 812/2013		Energy efficiency class		
Energy efficiency measured		Class	A+	-

Technician:



(Ricardo Tavares)

Data acquisition

Note: Draw-offs where peak temperature T_p of 55 °C was not achieved is in grey. The missing temperature difference to the required T_p was assumed by an additional electrical resistance heater. This peak temperature T_p of 55 °C cannot always be achieved by the heat pump alone and is not mandatory.

Cycle	Virtual Time	Tapping duration	QHP-tap (kWh)		QHP-tap total (kWh)		QEL-tap (kWh)	Flow (kg/min)		Outlet Temp. (°C)			Average Inlet Temp. (°C)
			Req.	Mesured	Req.	Mesured		Req.	Mesured Average	Req. T_p *	Mesured Average **	Maximum ***	
Cycle 1	7:00:00	0:00:58	0,105	0,1051	0,1050	0,1051	0,0000	3	2,9	-	52,6	52,9	10,0
Cycle 2	7:15:01	0:06:15	1,820	1,8201	1,9250	1,9252	0,0000	6	5,9	-	52,7	52,8	9,9
Cycle 3	7:26:01	0:00:47	0,105	0,1053	2,0300	2,0305	0,0000	3	2,8	-	52,7	52,7	10,3
Cycle 4	7:45:01	0:09:08	4,420	4,4208	6,4500	6,4513	0,0000	10	9,9	40	52,4	52,7	9,9
Cycle 5	8:01:01	0:00:47	0,105	0,1051	6,5550	6,5564	0,0000	3	2,9	-	52,1	52,2	10,2
Cycle 6	8:15:02	0:00:47	0,105	0,1052	6,6600	6,6616	0,0000	3	2,9	-	51,9	52,1	10,1
Cycle 7	8:30:02	0:00:47	0,105	0,1051	6,7650	6,7667	0,0000	3	2,9	-	51,8	52,0	10,1
Cycle 8	8:45:02	0:00:47	0,105	0,1053	6,8700	6,8720	0,0000	3	2,9	-	51,7	51,9	10,1
Cycle 9	9:00:03	0:00:46	0,105	0,1051	6,9750	6,9770	0,0000	3	2,9	-	51,6	51,7	10,1
Cycle 10	9:30:03	0:00:46	0,105	0,1053	7,0800	7,0823	0,0000	3	3,0	-	51,3	51,6	10,1
Cycle 11	10:00:03	0:00:48	0,105	0,1052	7,1850	7,1876	0,0000	3	2,9	-	51,1	51,3	10,1
Cycle 12	10:30:03	0:00:49	0,105	0,1052	7,2900	7,2927	0,0000	3	3,0	40	50,9	51,2	10,1
Cycle 13	11:00:03	0:00:48	0,105	0,1050	7,3950	7,3977	0,0000	3	3,0	-	50,6	50,9	10,1
Cycle 14	11:30:04	0:00:48	0,105	0,1050	7,5000	7,5028	0,0000	3	3,0	-	50,7	50,8	10,1
Cycle 15	11:45:04	0:00:47	0,105	0,1052	7,6050	7,6080	0,0000	3	2,9	-	51,1	51,2	10,2
Cycle 16	12:45:04	0:03:41	0,735	0,6940	8,3400	8,3432	0,0412	4	3,9	55	52,5	52,7	10,1
Cycle 17	14:30:04	0:00:50	0,105	0,1052	8,4450	8,4483	0,0000	3	2,6	-	52,3	52,5	10,4
Cycle 18	15:00:04	0:00:51	0,105	0,1050	8,5500	8,5534	0,0000	3	2,6	-	52,1	52,4	10,5
Cycle 19	15:30:04	0:00:50	0,105	0,1052	8,6550	8,6585	0,0000	3	2,6	-	52,0	52,3	10,4
Cycle 20	16:00:05	0:00:48	0,105	0,1052	8,7600	8,7638	0,0000	3	2,8	-	52,0	52,2	10,4
Cycle 21	16:30:05	0:00:49	0,105	0,1052	8,8650	8,8690	0,0000	3	2,7	-	51,8	52,1	10,4
Cycle 22	17:00:05	0:00:49	0,105	0,1052	8,9700	8,9742	0,0000	3	2,8	-	51,8	51,9	10,5
Cycle 23	18:00:06	0:00:49	0,105	0,1052	9,0750	9,0793	0,0000	3	2,6	-	51,5	51,7	10,4
Cycle 24	18:15:06	0:00:49	0,105	0,1052	9,1800	9,1846	0,0000	3	2,7	-	51,5	51,7	10,2
Cycle 25	18:30:06	0:00:49	0,105	0,1053	9,2850	9,2899	0,0000	3	2,8	-	51,5	51,6	10,1
Cycle 26	19:00:06	0:00:49	0,105	0,1051	9,3900	9,3950	0,0000	3	2,8	-	51,3	51,5	10,2
Cycle 27	20:30:06	0:03:39	0,735	0,6739	10,1250	10,1300	0,0612	4	3,9	55	51,1	51,2	9,9
Cycle 28	20:46:07	0:09:20	4,420	4,4201	14,5450	14,5501	0,0000	10	9,9	40	51,0	51,2	9,5
Cycle 29	21:15:07	0:00:49	0,105	0,1050	14,6500	14,6552	0,0000	3	2,9	-	50,4	50,5	10,1
Cycle 30	21:30:07	0:11:02	4,420	4,4204	19,0700	19,0756	0,0000	10	9,9	40	44,9	50,2	9,8

* "Peak temperature (T_p) means the minimum water temperature, expressed in degrees Celsius, to be achieved during water draw-off, (...). The peak temperature T_p shall be calculated as a mean value over the water draw-offs with a minimum value as specified in the tapping cycles." in Guidelines accompanying Regulations (EU) No 811 & 812/2013 and Regulations (EU) No 813 & 814/2013 - 2018.

** average outlet temperature registered during the water draw-off;

*** maximum outlet temperature registered during the water draw-off;

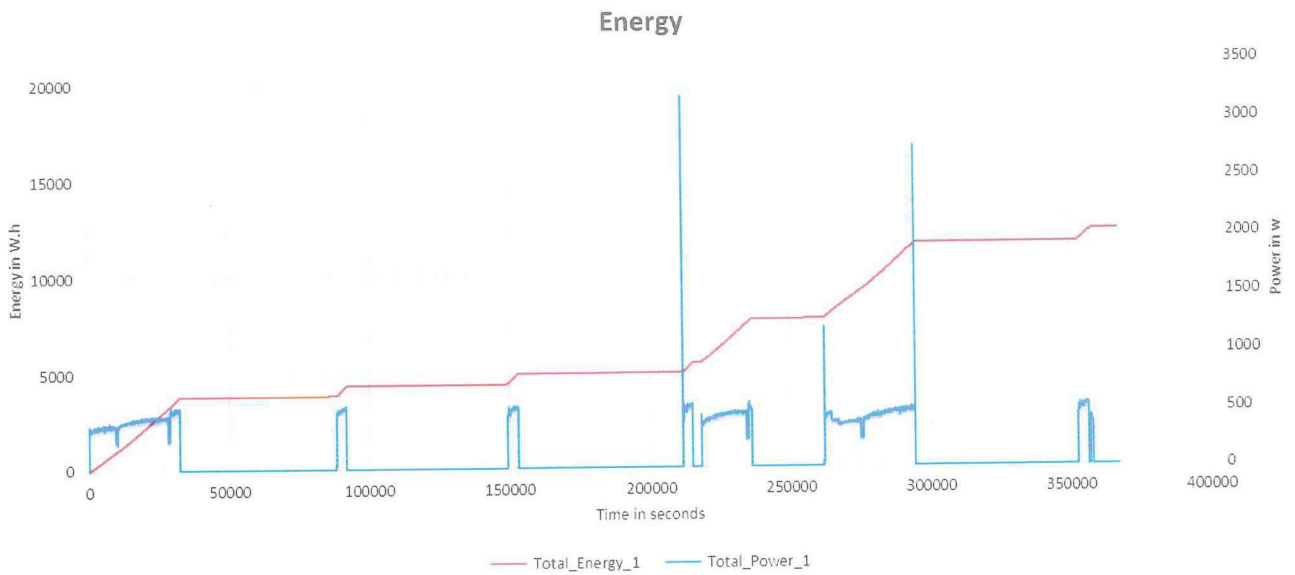
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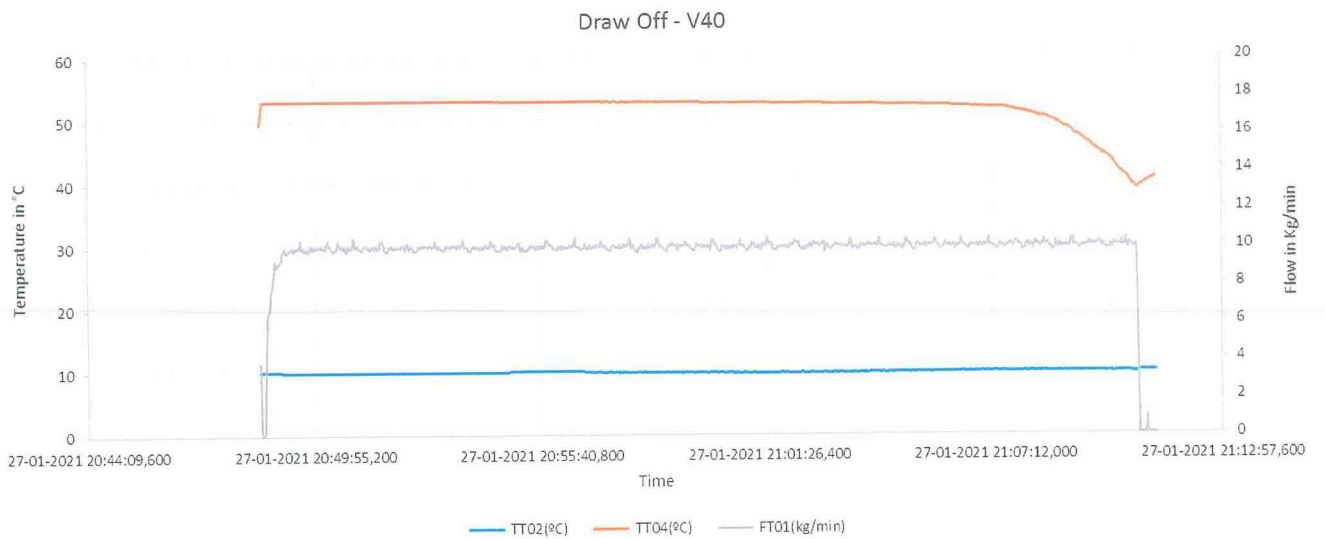
(Ricardo Tavares)

Data acquisition

Energy



V40



Technician:



(Ricardo Tavares)