

**TESTING LABORATORY**

Report Ref. **20214000267/10**

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: 2 °C / inlet wet-bulb: 1 °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:** 2021-02-18

**Date of the end of the tests:** 2021-03-12

**Date of the report:** 2021-03-12

**CONCLUSION**

Conform

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:



(Ricardo Tavares)

The Technical Responsible:



(Pedro Castro)



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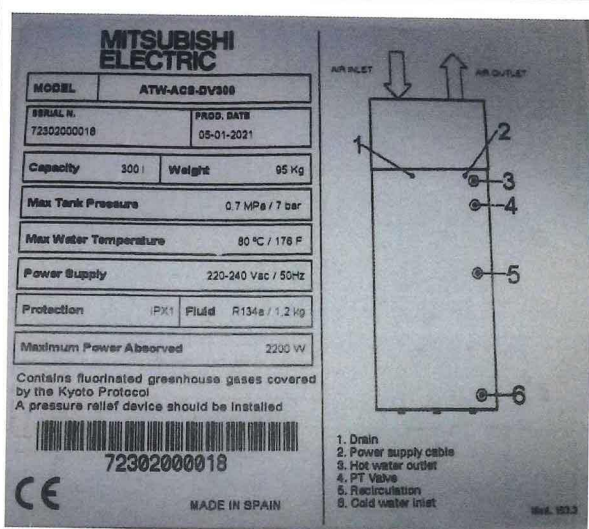
**NOMINAL DATA:**

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:	2 °C
Heat source temperature, inlet wet-bulb:	1 °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:**

	
<b>Photos a) - Tested sample</b>	<b>Photos b) - Tested sample</b>

Technician: \_\_\_\_\_



(Ricardo Tavares)

**TEST RESULTS:**

Clause	EN 16147:2017			Expanded uncertainty
	Load profile		XL	
	Reference energy of the load profile	Qref	19,070 kWh	-
	<b>Filling and heating up period (stage C)</b>			
7.7	Electrical energy consumption during the test duration	W <sub>eh-HP</sub>	4,214 kWh	-
	Heating up time (h:min)	th	10:20	-
	<b>Standby power input (stage D)</b>			
7.8	Total electrical energy consumption during the last on-off-cycle	W <sub>es-HP</sub>	0,309 kWh	±0,028 kWh
	Duration of the last on-off-cycle of the heat pump (h:min:ss)	tes	8:02:28	-
	Standby power input	P <sub>es</sub>	38,4 W	±3,5 W
	<b>Ambient correction term</b>			
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 <sub>stby</sub>	0,096 kW	-
	Ambient correction term	Q <sub>cor</sub>	-0,530 kWh	±0,046 kWh
	<b>Useful energy</b>			
7.9.1	Useful energy during the whole load profile	Σ Q <sub>HP-tap</sub>	18,970 kWh	±0,004 kWh
	Calculated heat energy produced by electrical resistance heater to reach the required tapping temperature	Q <sub>EL-LP</sub>	0,160 kWh	±0,24 W
	Overall tapping energy of the load profile	Q <sub>LP</sub>	19,130 kWh	-
	<b>Electrical energy consumption</b>			
7.9.2	Load profile time (h:min:ss)	t <sub>TTC</sub>	30:20:48	-
	Total measured electrical energy consumption	W <sub>EL-M-LP</sub>	7,347 kWh	-
	Total electrical energy consumption during the whole load profile	W <sub>EL-LP</sub>	7,264 kWh	±0,088 kWh
	<b>Coefficient of performance</b>			
7.9.3	Coefficient of performance for domestic hot water	COP <sub>DHW</sub>	2,6337	±0,0006
	<b>Water heating energy efficiency</b>			
7.13.2	Smart control factor	SCF	0,0	-
	Smart control (NO = 0 or YES = 1)	smart	0	-
	Daily electrical energy consumption	Q <sub>elec</sub>	7,241 kWh	±0,09 kWh
	Water heating energy efficiency (%)	η <sub>wh</sub>	108,5%	±0,01 %
	<b>Annual consumption of electric energy</b>			
7.13.3	Annual electrical energy consumption	AEC	1544 kWh/a	-
	<b>Other performance</b>			
7.14	Reference hot water temperature	θ <sup>WH</sup>	52,5 °C	-
	Maximum volume of mixed water at 40 °C	V <sub>40</sub>	303,9 L	-
	Rated heat output	P <sub>rated</sub>	1,0 kW	-

<b>Regulation (EU) n° 812/2013</b>		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	7:00:01	0:00:50	0,105	0,1053	0,1050	0,1053	0,0000	3	2,6	-	52,4	52,6	9,9
Cycle 2	7:15:01	0:06:22	1,820	1,8207	1,9250	1,9259	0,0000	6	5,9	-	52,5	52,6	9,9
Cycle 3	7:26:01	0:00:53	0,105	0,1052	2,0300	2,0311	0,0000	3	2,6	-	52,4	52,5	10,3
Cycle 4	7:45:01	0:09:12	4,420	4,4205	6,4500	6,4516	0,0000	10	9,8	40	52,2	52,4	9,7
Cycle 5	8:01:01	0:00:54	0,105	0,1052	6,5550	6,5568	0,0000	3	2,6	-	51,9	52,0	10,0
Cycle 6	8:15:01	0:00:54	0,105	0,1053	6,6600	6,6620	0,0000	3	2,6	-	51,7	51,9	10,0
Cycle 7	8:30:01	0:00:53	0,105	0,1051	6,7650	6,7672	0,0000	3	2,7	-	51,6	51,8	10,0
Cycle 8	8:45:03	0:00:51	0,105	0,1051	6,8700	6,8722	0,0000	3	2,7	-	51,5	51,6	10,0
Cycle 9	9:00:03	0:00:51	0,105	0,1052	6,9750	6,9774	0,0000	3	2,7	-	51,4	51,6	9,9
Cycle 10	9:30:03	0:00:53	0,105	0,1053	7,0800	7,0827	0,0000	3	2,7	-	51,1	51,3	10,1
Cycle 11	10:00:03	0:00:51	0,105	0,1053	7,1850	7,1880	0,0000	3	2,7	-	50,9	51,1	9,9
Cycle 12	10:30:03	0:00:53	0,105	0,1050	7,2900	7,2930	0,0000	3	2,7	40	50,6	50,8	9,9
Cycle 13	11:00:03	0:00:55	0,105	0,1051	7,3950	7,3981	0,0000	3	2,7	-	50,4	50,6	10,0
Cycle 14	11:30:03	0:00:57	0,105	0,1051	7,5000	7,5032	0,0000	3	2,7	-	50,1	50,3	10,1
Cycle 15	11:45:03	0:00:55	0,105	0,1052	7,6050	7,6084	0,0000	3	2,7	-	50,0	50,2	10,2
Cycle 16	12:45:03	0:03:47	0,735	0,6624	8,3400	8,3437	0,0729	4	3,9	55	50,3	50,4	9,8
Cycle 17	14:30:04	0:00:56	0,105	0,1053	8,4450	8,4490	0,0000	3	2,7	-	52,6	52,8	10,1
Cycle 18	15:00:04	0:00:53	0,105	0,1051	8,5500	8,5541	0,0000	3	2,6	-	52,5	52,7	10,1
Cycle 19	15:30:04	0:00:52	0,105	0,1053	8,6550	8,6593	0,0000	3	2,6	-	52,4	52,6	10,2
Cycle 20	16:00:05	0:00:51	0,105	0,1052	8,7600	8,7645	0,0000	3	2,6	-	52,3	52,4	10,1
Cycle 21	16:30:05	0:00:52	0,105	0,1053	8,8650	8,8698	0,0000	3	2,6	-	52,2	52,3	10,2
Cycle 22	17:00:05	0:00:52	0,105	0,1050	8,9700	8,9748	0,0000	3	2,6	-	52,0	52,2	10,1
Cycle 23	18:00:05	0:00:52	0,105	0,1053	9,0750	9,0801	0,0000	3	2,6	-	51,8	52,0	10,0
Cycle 24	18:15:06	0:00:52	0,105	0,1052	9,1800	9,1853	0,0000	3	2,6	-	51,8	51,9	10,0
Cycle 25	18:30:06	0:00:51	0,105	0,1050	9,2850	9,2903	0,0000	3	2,7	-	51,7	51,9	10,1
Cycle 26	19:00:06	0:00:52	0,105	0,1052	9,3900	9,3955	0,0000	3	2,6	-	51,6	51,8	10,2
Cycle 27	20:30:06	0:03:50	0,735	0,7017	10,1250	10,1306	0,0334	4	3,8	55	52,9	53,0	10,0
Cycle 28	20:46:06	0:09:05	4,420	4,4204	14,5450	14,5510	0,0000	10	9,8	40	52,7	52,9	9,6
Cycle 29	21:15:07	0:00:51	0,105	0,1053	14,6500	14,6563	0,0000	3	2,6	-	52,3	52,5	9,9
Cycle 30	21:30:07	0:09:24	4,420	4,4206	19,0700	19,0768	0,0000	10	9,8	40	51,2	52,4	9,5

\* "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;

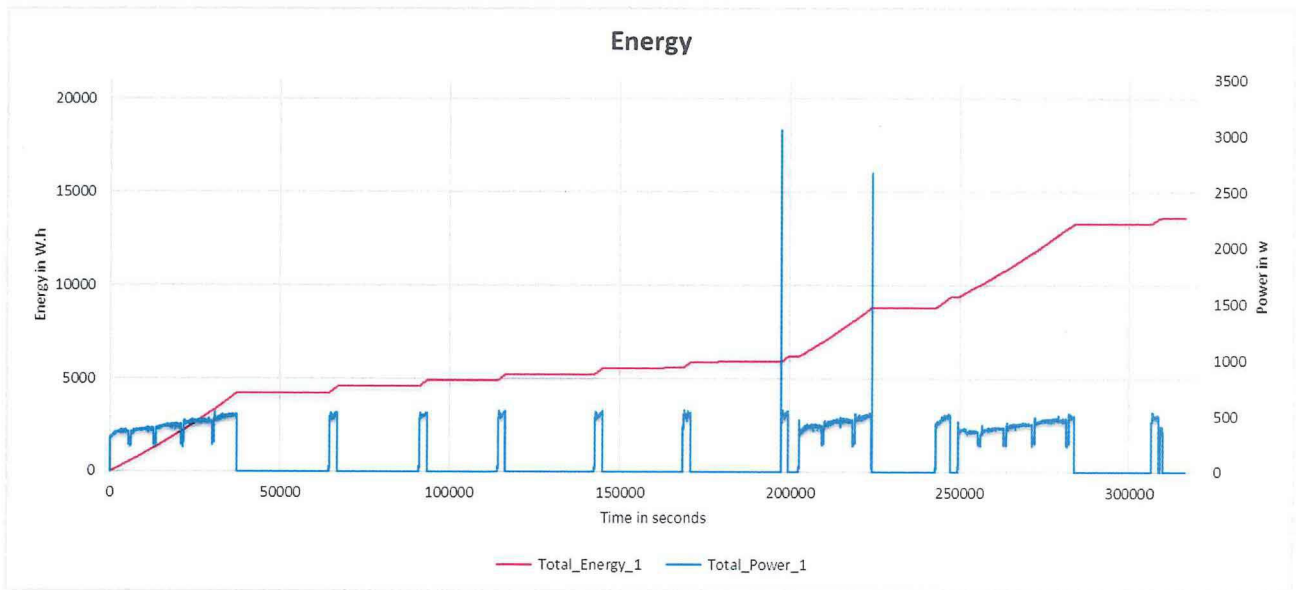
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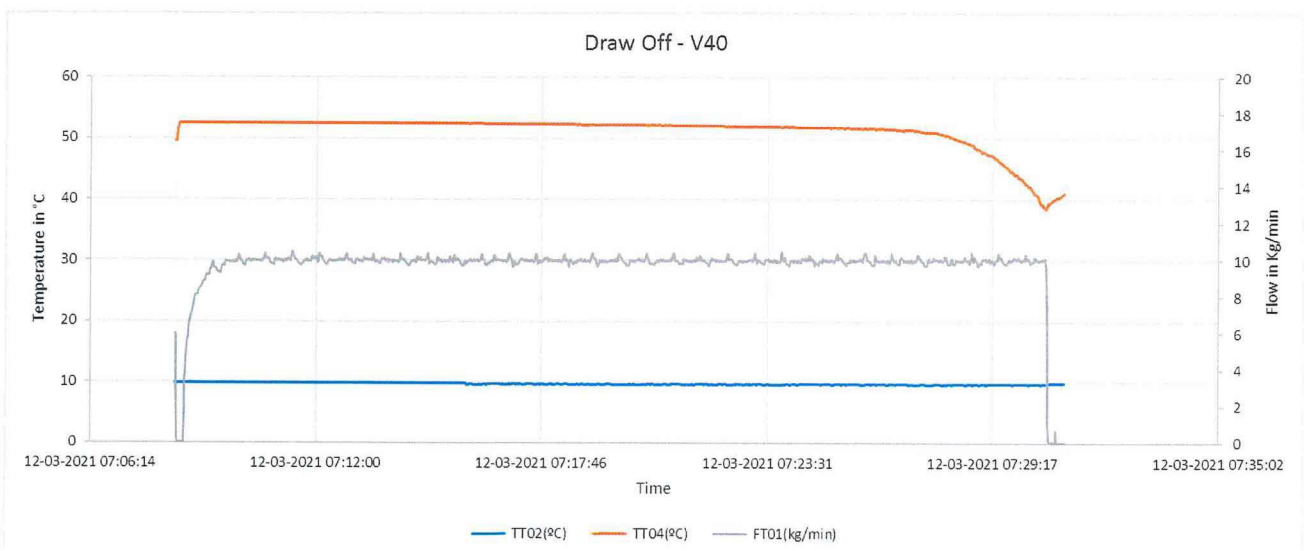
(Ricardo Tavares)

Data acquisition

Energy



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Technician: \_\_\_\_\_



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