




Summary of		EN12977-5		CONTROLLER test results				Licence Number				011-7S2550 S					
Annex to Solar KEYMARK Certificate								Issued				2016-05-24					
Company		BULEX						Country		Belgium							
Brand (optional)		BULEX - Helio Set						Website		<a href="http://www.vaillant.com">www.vaillant.com</a>							
Street		Golden Hopestraat 15						E-mail		<a href="mailto:info@vaillant.com">info@vaillant.com</a>							
Postal Code		1620		DROGENBOS		Tel. / Fax		+49		(0)2191-180							
Solar heating system controller - description and features																	
General control principle/type		Multi-function controller				No. temperature sensors				4							
No. clocks		1				No. irradiance sensors				-							
No. timers		4				No. flow sensorss				1							
No. counters		2				No. pressure sensors				-							
No. differential thermostats		5				No. level sensors				-							
No. output for pumps		1				No. outputs for magnetic valves				-							
No. other outputs		1				No. output for motor valves				1							
Freeze damage protection		Included				Power in W (control box only)				9							
Scald protection		Not included				Input voltage range (V)				207		to		253		V ≈	
High temperature protection		Included				Photovoltaic supply				No							
Solar heating system controller - test results																	
Parameter	Test result	Sensor no:	1	2	3	4	5	6	7	8	9	10					
Clock	Max. tolerance**	min/mon	< 1														
Timer	Max. tolerance**	min/mon	< 1	< 1	< 1	< 1											
Counter	Max. tolerance	%	N.N.	N.N.													
Temperature sensor	Min. temp.****	°C	-10	-10	-15	0											
	Max. temp.****	°C	120	120	150	90											
	Tolerance at max. temp.***	K	1.8	1.8	1.8	1.5											
Irradiance sensor	Max. irradiance***	%															
	Tolerance at max. irradi.***	%															
Flow sensor	Min. flow rate****	%	10														
	Max. flow rate****	%	100														
	Tolerance at max. flow***	m <sup>3</sup> /h	99.9														
Pressure sensor	Min. pressure****	kPa															
	Max. pressure****	kPa															
	Tolerance at max. pres.***	kPa															
Level sensor	Min. level ****																
	Max. level ****																
	Tolerance at max. level***																
**) Tolerance given in minutes per month. ***) Max. tolerance in whole sensor range. ****) Specified by manufacturer																	
Differential thermostats																	
	Solar Drain Back/1				Electrical Aux/2				External Aux/3				Freeze Protection /4				
Range ΔTON	6	-	20		99.9	-	99.9		99.9	-	99.9		0	-	12		
Range ΔTOFF	1	-	5		99.9	-	99.9		99.9	-	99.9		14	-	20		
Temp. level	20°C		70°C		60				60°C				10°C				
SET/MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	
ΔTON	12	11.6	12	11.9	-5	-5.9			-5	-3.3			< 10	< 10			
ΔTOFF	3	2.7	3	2.6	0.5	0.5			0.5	0			> 15	> 15			
Flow rate control																	
	Solar Pump/1																
SET/MEAS	SET*	MEAS	SET*	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	
Flow rate	20%	31%	70%	82%													
Temperature control																	
	Store HX inlet/ 1				Store bottom/ 2				Collector/ 3				Ext. Aux/ 4				
SET/MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	
Temperature	9.9	10.1	89.6	88.6	10.0	10.5	89.6	89.5	9.9	10.4	89.7	90.6	10.0	10.8	89.7	89.5	
Testing Laboratory		TÜV Rheinland Energy GmbH															
Website		<a href="http://www.tuv.com/st">www.tuv.com/st</a>															
Test report id. number		21227422.007															
Date of test report		2016-02-29															



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<b>Company</b>	BULEX								<b>Country</b>	Belgium							
<b>Brand (optional)</b>	BULEX - Helio Set								<b>Website</b>	www.vaillant.com							
<b>Street</b>	Bergensesteenweg 1425								<b>E-mail</b>	info@vaillant.com							
<b>Postal Code</b>	1070		Brussels						<b>Tel. / Fax</b>	+49 (0)2191-180							
<b>Differential thermostats (cont.)</b>																	
	Solar-Aux/5				Solar Pressurized/1-1												
Range $\Delta T_{ON}$	20	-	65		6	-	20										
Range $\Delta T_{OFF}$	99.9	-	99.9		1	-	5										
Temp. level	70°C				50				20°C		90°C		20°C		90°C		
SET/MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	
$\Delta T_{ON}$	-5	65			7	7											
$\Delta T_{OFF}$					3	2.4											
<b>Flow rate controllers (cont.)</b>																	
SET/MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	
Flow rate																	
<b>Temperature controllers (cont.)</b>																	
SET/MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	SET	MEAS	
Temperature																	
<b>Description of controls/functions</b>																	
<b>Testing Laboratory</b>	TÜV Rheinland Energy GmbH																
<b>Website</b>	www.tuv.com/st																
<b>Test report id. number</b>	21227422.007																
<b>Date of test report</b>	2016-02-29																
<b>Comments of test lab</b>																	
As it is not possible to give the exact setting and results for all operation points, it was tried to summarize the working principle in the best way.												 <b>TÜVRheinland®</b> Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln					