

Unit Specification of Thermostat (TMS) for a Heating Device

TMS turns the heating device ON or OFF based on temperature Set-Point Error (diff) from temperature sensor and Ready Flag (ready) from the heating device.

Interface

Name	Type	Unit	Data Type	Dimension	Min	Max
diff	I	C°	int8	1	-128	127
ready	I	n/a	boolean	1	0	1
switch_on	O	n/a	boolean	1	0	1
OFF	P	n/a	boolean	1	0	0
OFF_threshold	P	C°	int8	1	-20	0
ON	P	n/a	boolean	1	1	1
ON_threshold	P	C°	int8	1	0	20

Type and ID	Description in natural language or mathematical notation
TMS_UC1 (natural language)	The heating device in Ready-State (ready) should be switched ON, if the Set-Point Error (diff) is bigger than or equal ($\geq$) to ON_threshold. The heating device in Ready-State (ready) should be switched OFF, if the Set-Point Error (diff) is smaller than or equal ($\leq$) to OFF_threshold. In other cases, the old state of the controller switch_on(k-1) of the controller output should be preserved. The heating device may only be switched ON when the Ready-Flag (ready) is TRUE otherwise it should be switched OFF.
REQ: TMS_UC1_REQ1 (semi-formal notation)	<pre>IF (diff >= ON_threshold) AND (ready == TRUE) THEN switch_on = ON ELSE IF (diff <= OFF_threshold) OR (ready == FALSE) THEN switch_on = OFF ELSE switch_on(k) = switch_on(k-1) END</pre>