



<b>Product</b>	AMD	<b>Type/Series</b>	MS300	<b>Appl. Note Nr.</b>	MS300 Pt100
<b>Issued by</b>	DEN	<b>Author</b>	Arnoud de Bok	<b>Release Date</b>	March 8, 2017
<b>Title</b>	<b>PT100 FUNCTION FOR DELTA MS300</b>				

**Devices and special tools/equipment**

N/A

**Test setup**

N/A

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# 1 PT100

Pt100 is a temperature dependent resistor, made of platinum (hence Pt) and a resistance of  $100\Omega \pm 0.1\Omega$  at  $0^\circ\text{C}$  (hence 100). The temperature coefficient is positive, so with increasing temperature, the resistance increases. ( $138.5\Omega$  at  $100^\circ\text{C}$ ,  $177,0\Omega$  at  $200^\circ\text{C}$ )  
Sometimes they are also called RTD (but not all RTDs are Pt100's).

The sensor values at different temperatures can be found on [http://en.wikipedia.org/wiki/Resistance\\_thermometer](http://en.wikipedia.org/wiki/Resistance_thermometer)

See also page 6.

## 1.1 MS300 Measurement principle

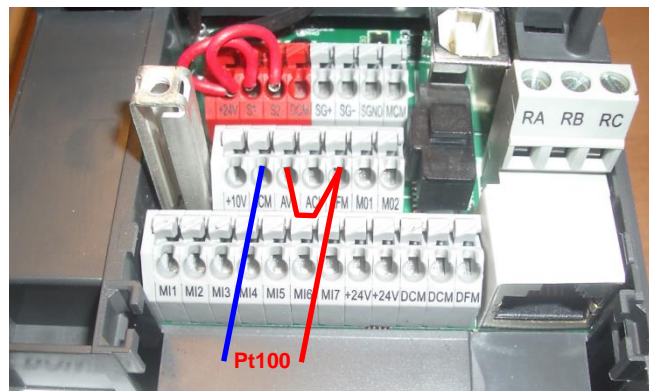
The AFM output, set to constant current, acts as a constant current source. This current goes through the Pt100 sensor. The voltage across the sensor is measured by an analogue input. When the voltage becomes higher than a set value (at a certain temperature) the drive responds.

### 1.1.1 Example

In this application note, AFM is used as the current source and AVI is used as the measuring input.

## 1.2 Wiring

Connect the Pt100 sensor to AFM and ACM.  
Connect AFM to AVI.



## 1.3 Parameters

### 1.3.1 Analogue input

We use AVI, so Pr03-00=11 (Pt100 input value).

When ACI is used, set Pr03-01=11 but also Pr03-29=1 (0~10V) and set SW ACI to 0~10V on the control board.



### 1.3.2 Analogue output

We use AFM, so Pr03-20=23 Constant voltage output. Set Pr03-31=1 for 0~20mA and also set SW AFM to 0~20mA. Then set Pr03-32=45.00% for 9mA.

### 1.3.3 Level 1: (Lower) frequency command

Set Pr06-56 for Level 1. Select at which temperature you want Level 1 to be. In the table acc. to the link in 1.1 you can find the resistance, let's call it  $R_{\text{Level1}}$ . The voltage to set is then  $\text{Pr06-56} = R_{\text{Level1}} * 9\text{mA}$ .

When Level1 is reached, the drive will use Pr06-58 as frequency command value, so it's best to set a low value in order to reduce the temperature.

Pr06-58 Frequency will be used after Pr06-59 Delay.

**Note:** Pr06-58=0 means Pt100 function is disabled.

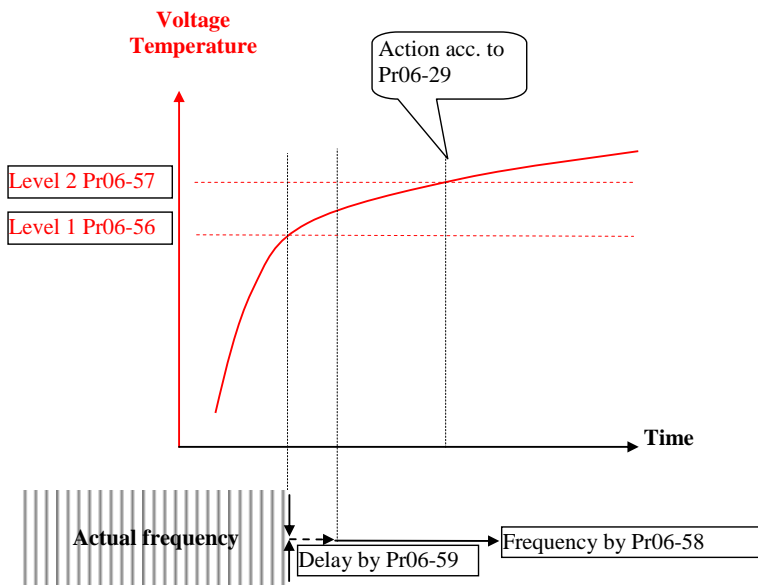
### 1.3.4 Level 2: Alarm

Set Pr06-57 for Level 2. Select at which temperature you want Level 2 to be. In the table acc. to the link in 1.1 you can find the resistance, let's call it  $R_{\text{Level2}}$ . The voltage to set is then  $\text{Pr06-57} = R_{\text{Level2}} * 9\text{mA}$ .  
In general  $\text{Level2} > \text{Level1}$  but e.g. if you don't want to use Level1, you can set  $\text{Level1} > \text{Level2}$ .

### 1.3.5 Action at alarm

In Pr06-29 you can select what should happen when Level2 is reached and alarm [oH3] is shown.

### 1.3.6 Operation diagram

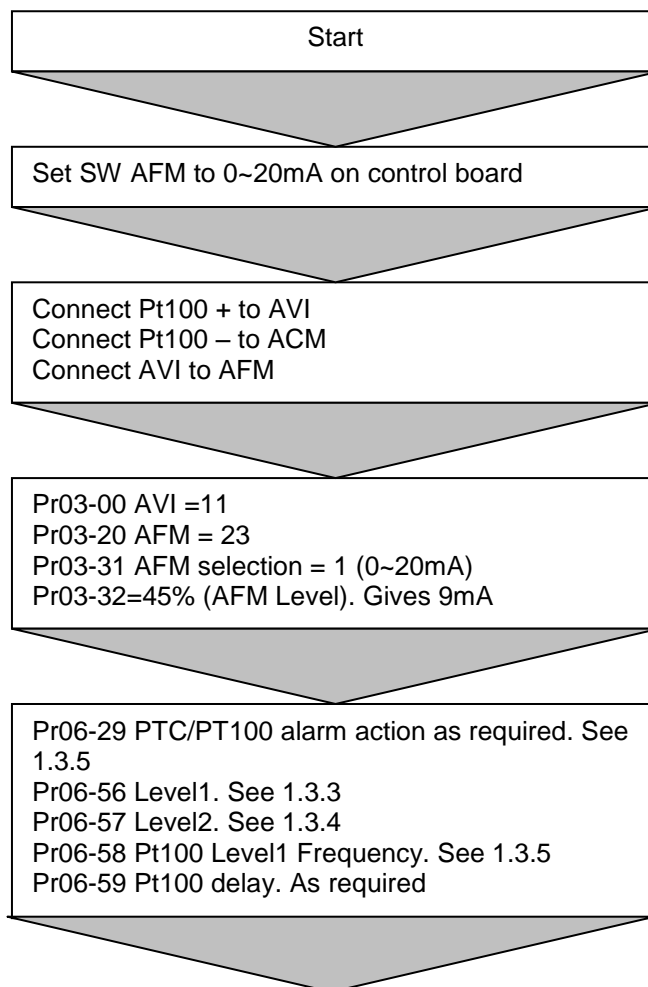


### 1.3.7 Parameter summary

Parameter	Description	Setting	Range	Default
Pr03-00	AVI	11	0~17	1
Pr03-23	AFM	23	0~23	0
SW AFM	Select AFM current or voltage	0~20mA	0~10V/0/4~20mA	0~10V
Pr03-31	AFM output selection	1	0~2	0
Pr03-33	AFM Output Level	45% (=9mA)	0~100%	0%
Pr06-29	PTC/Pt100 Alarm action	See 1.3.5	0~3	0
Pr06-56	Pt100 Level1	See 1.3.3	0~10.000V	5.000V
Pr06-57	Pt100 Level2	See 1.3.4	0~10.000V	7.000V
Pr06-58	Pt100 Level1 Frequency	See 1.3.3	0~600Hz	0Hz
Pr06-59	Pt100 Delay	See 1.3.3	0~6000s	60

For more details, please refer to the user manual.

## 2 SETTING FLOWCHART



## Pt100 resistance table

Temperature in °C		
	ITS-90 Pt100 <sup>[1]</sup>	Pt100 Typ: 404
-50	79.901192	80.31
-45	81.925089	82.29
-40	83.945642	84.27
-35	85.962913	86.25
-30	87.976963	88.22
-25	89.987844	90.19
-20	91.995602	92.16
-15	94.000276	94.12
-10	96.001893	96.09
-5	98.000470	98.04
0	99.996012	100.00
5	101.988430	101.95
10	103.977803	103.90
15	105.964137	105.85
20	107.947437	107.79
25	109.927708	109.73
30	111.904954	111.67
35	113.879179	113.61
40	115.850387	115.54
45	117.818581	117.47
50	119.783766	119.40
55	121.745943	121.32
60	123.705116	123.24
65	125.661289	125.16
70	127.614463	127.07
75	129.564642	128.98
80	131.511828	130.89
85	133.456024	132.80
90	135.397232	134.70
95	137.335456	136.60
100	139.270697	138.50
105	141.202958	140.39
110	143.132242	142.29
150	158.459633	157.31
200	177.353177	175.84