

Dead Band Functions

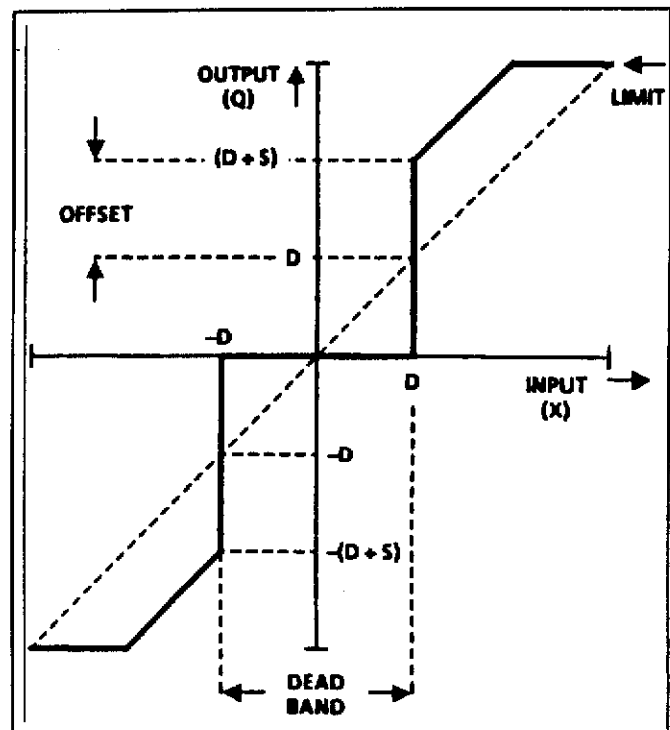
DEDBAND S31

DESCRIPTION

The DEDBAND function provides a unity gain characteristic between input and output, with dead band and offset as illustrated in the graph opposite.

FEATURES

- User programmable dead band and offset values.
- Automatic limiting at full scale output.
- Set of flags detecting in-limit or within dead band.



SPECIFICATION

Control language:-

DEDBAND
 X-----SPEC-----VALUE-----Q
 S31 Zm

Equation:

For $[X] < D$, $Q = 0$

For $[X] \geq D$, $Q = X + S$ if $X > 0$
 $Q = X - S$ if $X < 0$
 Q limited at ± 32767

Table 1 **Program rung data**

Sym	Location	Use	Range
X	Rung Input	Input variable	± 32767
Zm	Value location	Start of parameter list (3 locations)	Any table usable by special functions
Q	Rung output	Output variable	Limited at ± 32767

Table 2 Value data

Sym	Location	Use	Range
F	Zm	Fault code end flags	See table 3,4 and 5
X1*	Zm + 1	Dead band value	0 to 32767
ΔX^*	Zm + 2	Offset value	± 32767

* Data set up by user

Restrictions:-

- (a) $X - X1 \leq 32767$ i.e. positive range of X must be limited if $X1 < 0$.
- (b) $XN - X1 \leq 32767$ i.e. tabulated function cannot exceed $\frac{1}{2}$ total range of X.

Table 3 Fault conditions

Condition	Result (Q)	Code in Zm	
		Numeric Value	States ON
Programming error No VALUE ater SPEC.	0	-	-
Programming error Invalid value location: (a) Number instead of address. (b) Zm in write protected memory. (c) Zm in table not usable by special functions (d) Zm + 2 beyond end of data tables memory area.	0	-	-
Invalid dead band value $D < 0$.	0	5	0 & 2

Table 4 Conditions indicated by Zm flags

Condition	Code in Zm	
	Numeric Value	States ON
Negative limit operative $(X-S) > -32767$	64	6
Positive limit operative $(X+S) > +32767$	128	7
Input within dead band $-D < X < +D$	8192	13

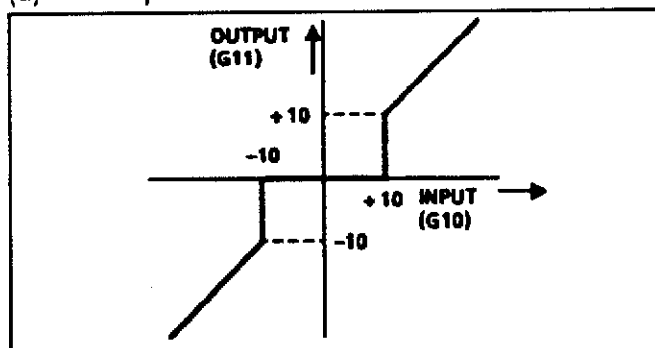
Table 5 Meaning of individual Zm flags

State ON in Zm	Condition indicated
0	Fault
2	Negative dead band $D < 0$
6	Negative limit operative $(X-S) < -32767$
7	Positive limit operative $(X+S) > +32767$
13	Input within dead band $-D < X < +D$

APPLICATION NOTES

1. Example without offset

(a) Required characteristic



(b) Program rung

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|          DEDBAND          |
+---<AND>---SPEC---VALUE---<OUT>---+
|   G10    S31    W100    G11   |

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(c) Value data

W100 flags (output by DEDBAND function)
W101 10 (Dead band value)
W102 0 (Offset value)

(d) Typical use of flags

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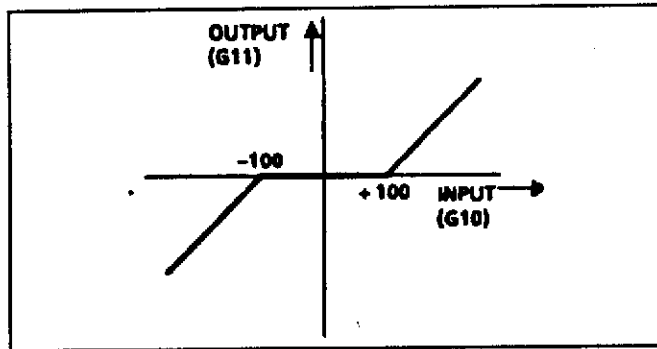
|          ] [----- ( ) -----+
|   W100.13                B0.0   |

```

This rung switches on output B0.0 when input is within deadband i.e. $-10 < G10 < +10$.

2. Example with offset (same rung as 1(b))

Characteristic Value Data
W100 Flags
W101 +100
W102 -100



3. Preset value data

It is usual for some of the 'value' data to be calculated during the design stage of the particular application. Such data would be incorporated in the preset data table so that it can be stored and transported on cassette tape. For controllers with a write protected P table it is necessary for the user to arrange copying of the preset data into a working value table. The data sheet for MOVE function T20 shows a typical program employing LOCATE and MOVE functions for this purpose.



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