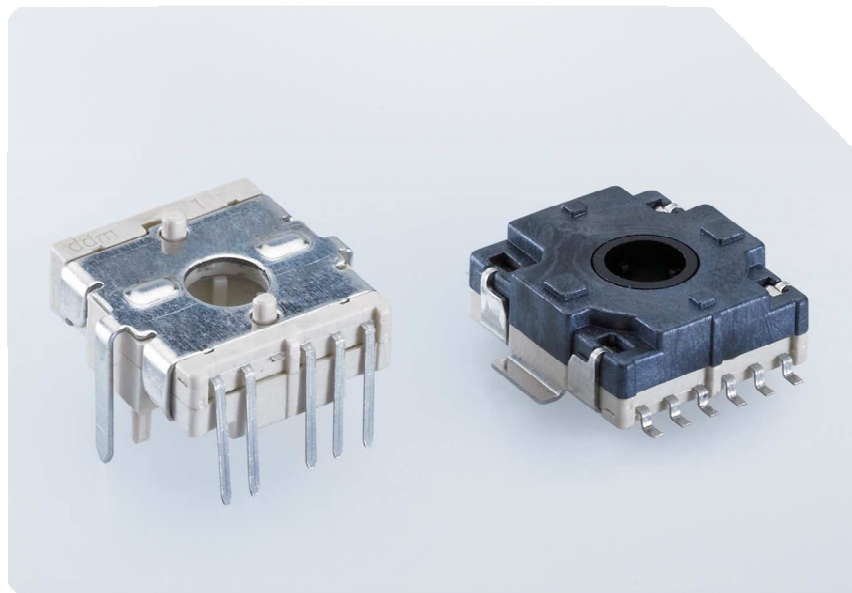


ENCODER | ENCODER



512

Ausführung

- Miniatur-Encoder mit Gray- oder Inkrementalcode
- 16 oder 18 Schaltstellungen
- Vertikale Betätigung
- Verschiedene Drehmomente
- Ohne oder mit Endschalter

Anschlüsse

SMD- oder THT-Ausführung

Abmessungen

18 x 19,5 x 7,6 mm

512

Construction

- Miniature encoder with gray or incremental code
- 16 or 18 positions
- Operated vertically
- Various torques
- Without or with end switch

Pining

SMD or THT design

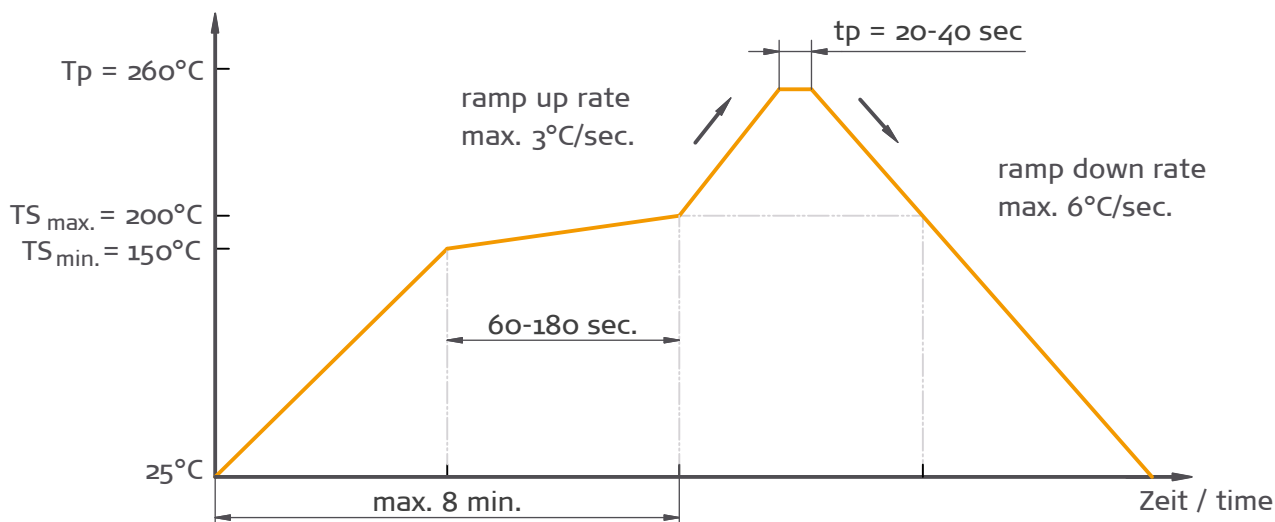
Dimensions

18 x 19,5 x 7,6 mm

Ausführung Construction	Schaltweise Anschlussmaße Abmessungen	interruptive See drawings See drawings	Function Pining Outline Dimensions
Isolierwerkstoffe Insulation Material	Gehäuse Kontaktträger Blechbügel	Thermoplastic-UL-94-Vo Thermoplastic-UL-94-Vo Nirosta	Housing Contact Body metal cover
Kontaktwerkstoffe Contact Material	Festkontakte Schaltkontakte Lötanschlüsse	CuNi gal. min. 0,5 µm Au or silver as an alternative CuSn6 gal. Au flash or silver as an alternative CuNi gal. min 2 µm Sn	Fixed Contacts Sliding Contacts Pins
Elektrische Daten Electrical Data	Schaltspannung Schaltstrom max. Schaltleistung Übergangswiderstand Isolierwiderstand Prellung und Signaleinbruch	max. 24 VDC max. 100 mA 0,6 VA < 100 mOhm > 100 MOhm < 6 ms	Switching Voltage Switching Current Electrical Power Contact Resistance Insulation Resistance Bouncing
Mechanische Daten Mechanical Data	Lebensdauer Betriebstemperatur Lagertemperatur Betätigungskraft Vibrationsfestigkeit Dichtigkeit	> 10000 operations -50 °C to +125 °C -55 °C to +135 °C 1-6 Ncm / 6 N acc. to IEC 60 068-2-6:10g from 30-300 Hz IP54	Life Expectancy Operation Temperature Storage Temperature Operating Force Vibration Resistance Sealing
Lötbedingungen / Art Soldering Time / Conditions	SMD THT	acc. to IPC/JEDEC J-STD-020D Tab. 4-2 (max. peak temperature +260°) JESD22-B106D/single wave	SMD THT

Temperatur
temperature

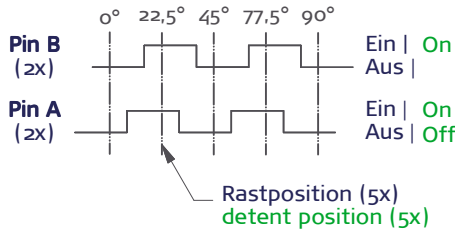
Empfohlene Reflow Temperaturkurve recommended reflow temperature profile



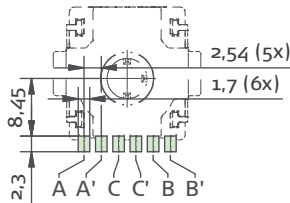


Schaltercodierung | switch coding

2Bit Inkrementalcode 16 Pos.
2Bit incremental code 16 Pos.



Pinbelegung
pin assignment



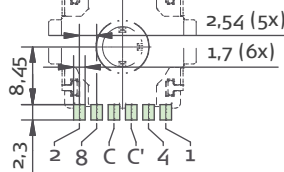
in Silber
silver-plated
in Gold
gold-plated

1	2	Inkremental Code, 16 Pos. incremental code, 16 Pos.
7	5	Graycode, 16 Positions Graycode, 16 Positions
8	6	Graycode, 18 Positions Graycode, 18 Positions

Graycode 16 Pos.
Graycode 16 Pos.

Spur / track					
Pos.	1	2	4	8	
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

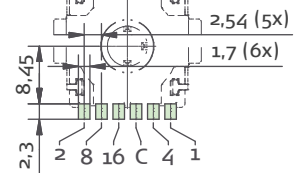
Pinbelegung
pin assignment



Graycode 18 Pos.
Graycode 18 Pos.

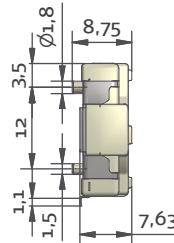
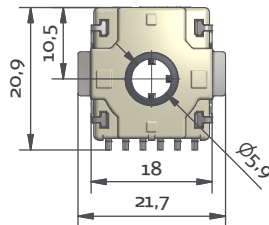
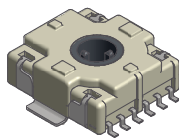
Spur / track						
Pos.	1	2	4	8	16	
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						

Pinbelegung
pin assignment

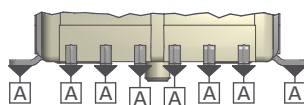
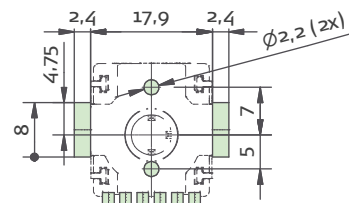


Schalterausführung | switch version

4 Vertikale Betätigung SMD
vertical version SMD



Löt-Pad-Anordnung
SMD soldering pad



8 x A
gemeinsame Toleranzzone
common zone

0,05	A
------	---

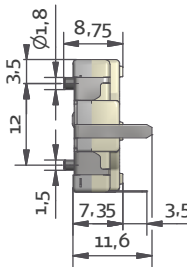
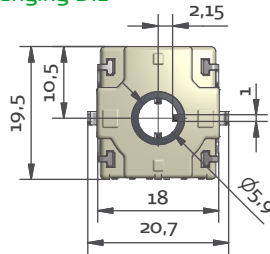
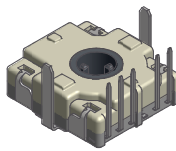


Schalterausführung | switch version

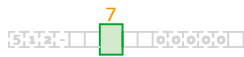
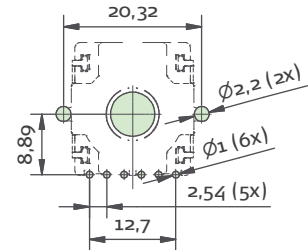
Fortsetzung | prosecution

5

Vertikal hängend DIL
vertically hanging DIL



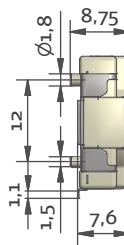
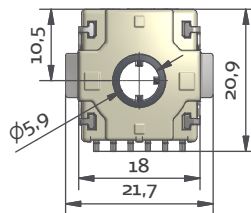
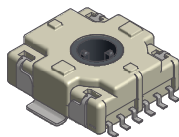
Löt-Pad-Anordnung
SMD soldering pad



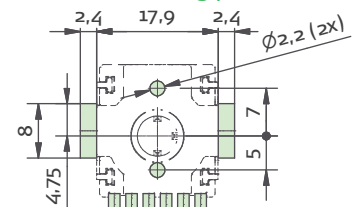
Endschalter | end-switch

0

Ohne Endschalter
without end-switch



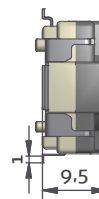
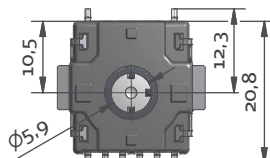
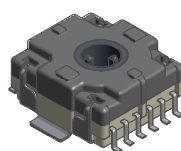
Löt-Pad-Anordnung
SMD soldering pad



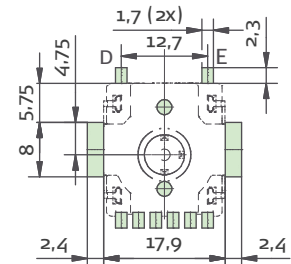
6N Tastkraft
6N actuating force

1

mit Endschalter, ohne durchgehende Öffnung
with end-switch, without throughout opening

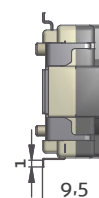
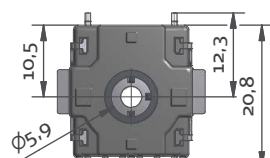
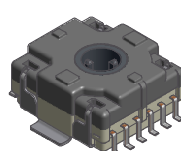


Löt-Pad-Anordnung
SMD soldering pad

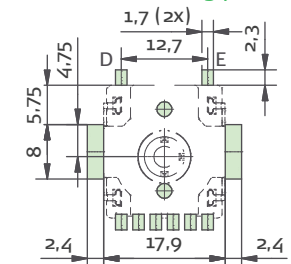


3

mit Endschalter, mit durchgehender Öffnung
with end-switch, with throughout opening



Löt-Pad-Anordnung
SMD soldering pad



Schaltbild des Endschalters
circuit diagram of the end switch

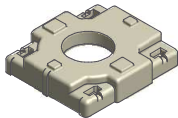


8 Rastung | detent

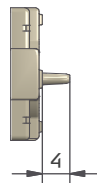
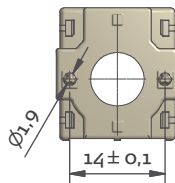
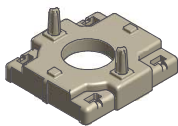
- 1 Rastung 1,5 Ncm
detent 1,5 Ncm
- 2 Rastung 2,5 Ncm
detent 2,5 Ncm
- 5 Rastung 4-5 Ncm
detent 4-5 Ncm
- 6 Rastung 6 Ncm
detent 6 Ncm

9 Gehäuseausführung housing version

- 0 Gehäuse flach | housing flat



- 1 Deckel mit Zentrierzapfen
top with centring pin



Bestell-Schlüssel ordering code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5	1	2	-						0	0	0	0	0	

Code / Auflösung
code / dissolution

Schalterausführung
switch version

Endschalter
end-switch

Rastung
detent

Gehäuseausführung
housing version

Verpackung
packaging

Werkstoffe
Materials

Blistergurt
Abdeckband

PS
PET

Embossed tape
Reel

Zugmoment

min. 10 Nm

Embossed tape pull strength

Abdeckband
Top Cover Tape

Abzugswinkel
Abzugsgeschwindigkeit
Abzugskraft

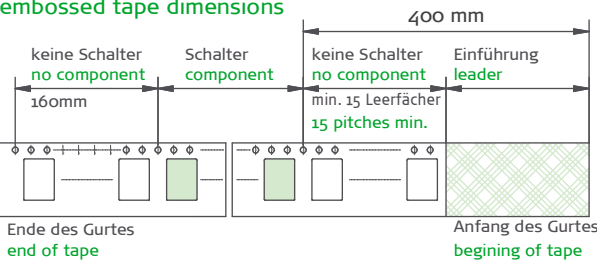
165°C - 180°C
300 mm / min.
0.1 - 0.7 Nm

Peel of angle
Peel speed
Peel force

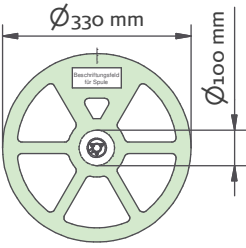
 Verpackung | packaging

2 Gurt (SMD) | embossed tape (SMD)

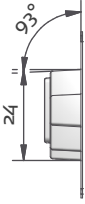
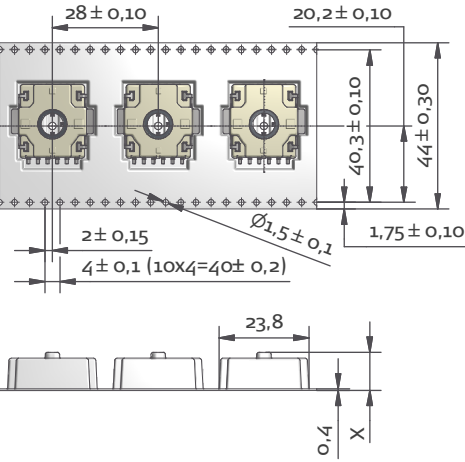
Blistergurtabmessungen
embossed tape dimensions



Spulenabmessungen
reel dimensions



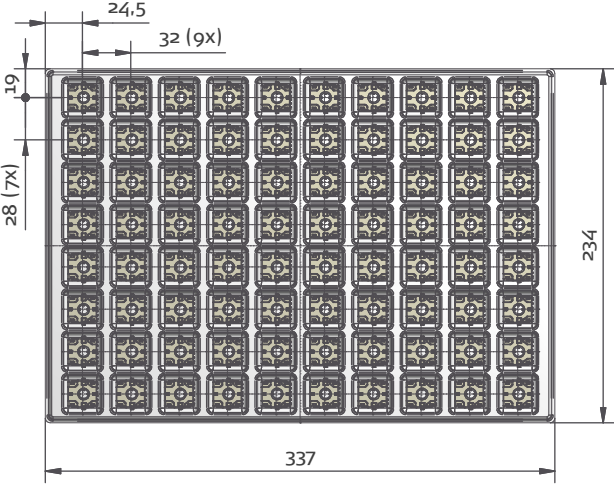
Maß "X" dimension "X"	max. Stückzahl number of pieces	Ausführung version
10,1	250	ohne Endschalter without end-switch
12	200	mit Endschalter with end-switch



Abzugsrichtung | peel direction
Abdeckband
top cover tape

Blistergurt
carrier tape
Vorschubrichtung
direction of feed

1 Palette (THT) | palette (THT)

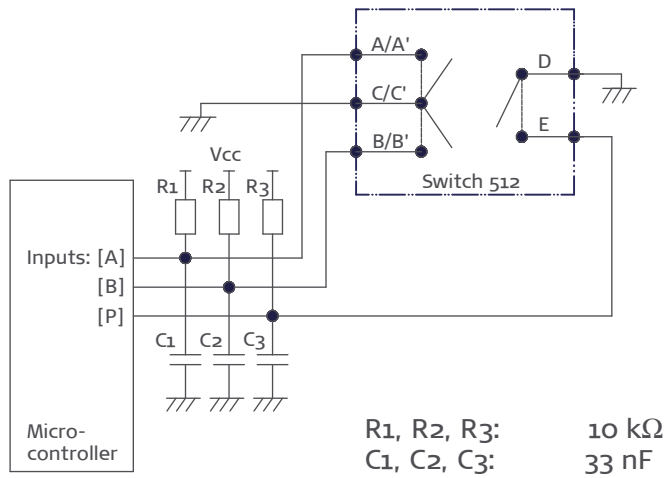


Daten der Palette
properties of the palette

max. Stückzahl number of pieces	Werkstoffe Materials
80	Palette palette PS Deckel cover PVC

Dieses Schema zeigt, wie ein Schalter 512 mit einem Mikrocontroller angeschlossen wird.

In order to minimize effect of spikes or bounds, this schema shows an example with a switch 512 connected to a micro-controller.



Anwendung

Dieser Algorithmus ist ein umfassendes Software Beispiel im Mikrocontroller für die Abfrage der Antriebe, die durch diesen Schalter gegeben werden.

Application notes

This algorithm is a software example to include into a micro-controller for the detection of impulses given by this switch.

CCW ← Direction → CW

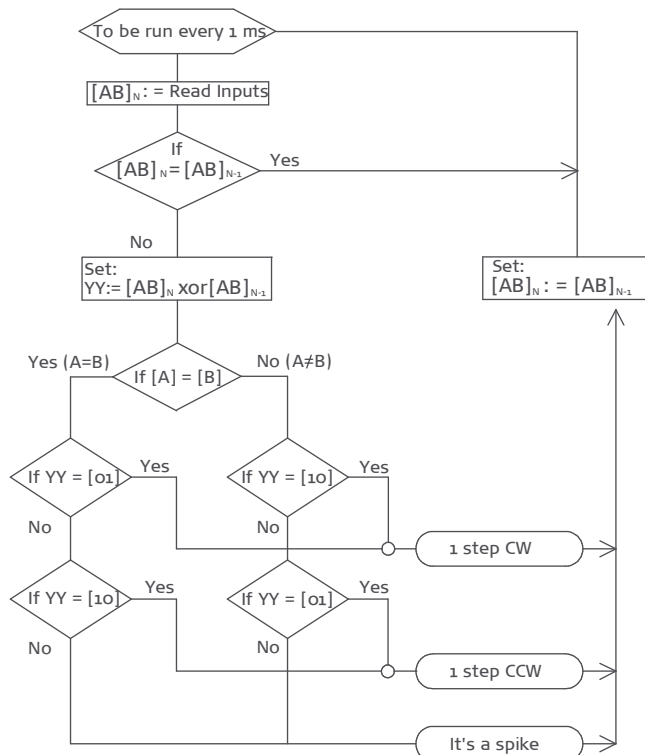
Steps	N-3	N-2	N-1	N	N+1	N+2	N+3	N+4
[AB]	[10]	[11]	[01]	[00]	[10]	[11]	[01]	[00]
A xor B	1	0	1	0	1	0	1	0
[AB] _N xor [AB] _{N-1}	[10]	[01]	[10]	[01]	[10]	[01]	[10]	[01]
[AB] _{N+1} xor [AB] _N	[01]	[10]	[01]	[10]	[01]	[10]	[01]	[10]

Inputzustände:

Wir betrachten hier jeden Step wie
wenn eine Position [AB] = [00] or [AB] = [11]
wenn ein Übergang [AB] = [10] or [AB] = [01]

Input states:

We consider here each step as
a position when [AB] = [00] or [AB] = [11]
a transition when [AB] = [10] or [AB] = [01]

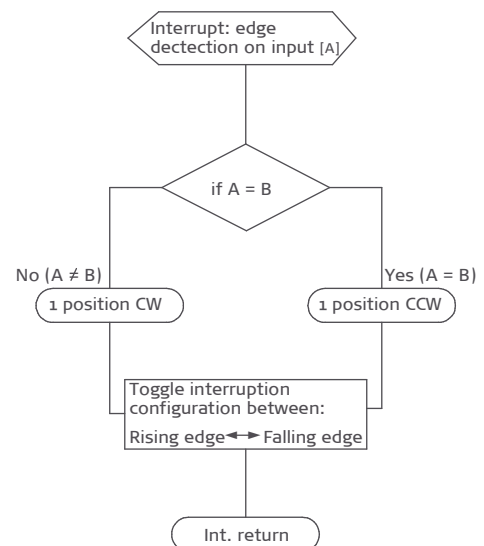


Algorithmus zum Erhalten des Stepzählimpulses und -richtung

Algorithm to get steps count and direction:

Wenn ein Schalterpin an eine Unterbrechung Input des Mikrocontrollers angeschlossen wird und die Unterbrechung an fallender und steigender Flanke konfiguriert werden kann, sollte folgender Algorithmus einfacher einzuführen sein.

If one of the switch pin is connected to an interrupt input of the micro-controller, and the interruption can be configured at both falling and rising edge, the following algorithm should be easier to implement.



Anschrift | Address

Firma:
Company:

Datum:
Date:

Adresse:
Address:

Tel.:
Phone:

Name:
Name:

Fax:
Fax:

Kundennr.:
Customer No.:

E-Mail:
E-Mail:

Bestellschlüssel | ordering code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5	1	2	-						0	0	0	0	0	

Code / Auflösung
code / dissolution

Schalterausführung
switch version

Endschalter
end-switch

Rastung
detent

Gehäuseausführung
housing version

Verpackung
packaging

Notizen | Sketch

Stückzahl:

Number of pieces:

Versandadresse:
address for dispatch:

ddm hopt+schuler GmbH & Co. KG; Königsberger Straße 12, D-78628 Rottweil
e-Mail: ddm@hopt-schuler.com Fax: +49 741 13 398