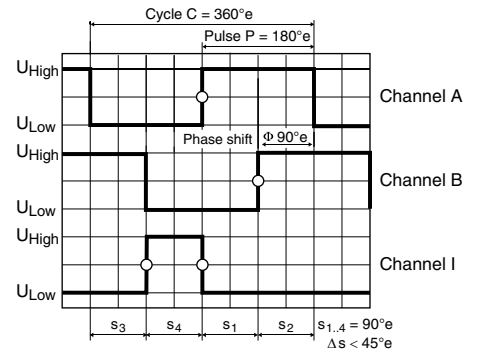


Encoder MR Type M, 128–512 CPT, 2/3 Channels, with Line Driver

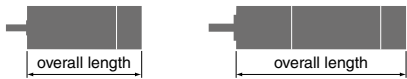


Direction of rotation cw (definition cw p. 60)

- Stock program
- Standard program
- Special program (on request)

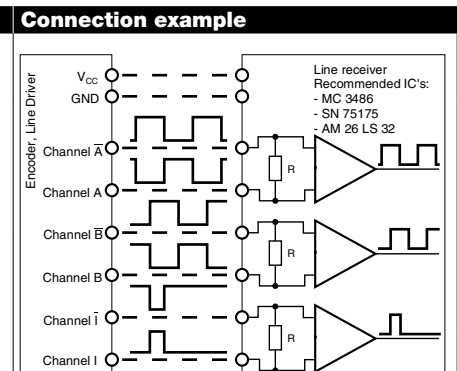
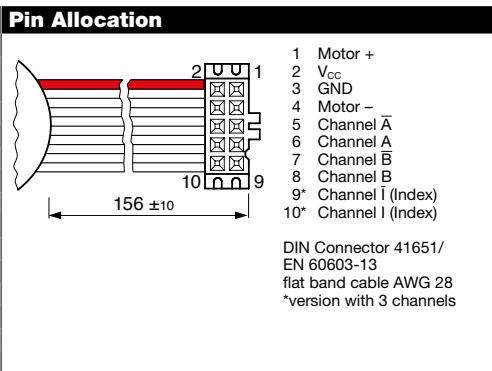
Part Numbers					
228179	228177	228181	228182	201937	201940

Type						
Counts per turn		128	128	256	256	512
Number of channels		2	3	2	3	2
Max. operating frequency (kHz)		80	80	160	160	320
Max. speed (rpm)		37 500	37 500	37 500	37 500	37 500



maxon Modular System										
+ Motor	Page	+ Gearhead	Page	Ø Enc [mm]	Overall length [mm] / ● see Gearhead					
RE 16, 2 W	120			16	28.0	28.0	28.0	28.0	28.0	28.0
RE 16, 2 W	120	GP 16, 0.1 - 0.6 Nm	328/329	16	●	●	●	●	●	●
RE 16, 2 W	120	GP 16 S	369/370	16	●	●	●	●	●	●
RE 16, 3.2 W	122			16	45.4	45.4	45.4	45.4	45.4	45.4
RE 16, 3.2 W	122	GP 16, 0.1 - 0.6 Nm	328/329	16	●	●	●	●	●	●
RE 16, 3.2 W	122	GP 16 S	369/370	16	●	●	●	●	●	●
RE 16, 4.5 W	124			16	48.4	48.4	48.4	48.4	48.4	48.4
RE 16, 4.5 W	124	GP 16, 0.1 - 0.6 Nm	328/329	16	●	●	●	●	●	●
RE 16, 4.5 W	124	GP 16 S	369/370	16	●	●	●	●	●	●
A-max 16	140/142			16	30.4	30.4	30.4	30.4	30.4	30.4
A-max 16	140/142	GS 16, 0.01 - 0.1 Nm	324-327	16	●	●	●	●	●	●
A-max 16	140/142	GP 16, 0.1 - 0.6 Nm	328/329	16	●	●	●	●	●	●
A-max 16	140/142	GP 16 S	369/370	16	●	●	●	●	●	●
A-max 19, 1.5 W	144			19	34.0	34.0	34.0	34.0	34.0	34.0
A-max 19, 1.5 W	144	GP 19, 0.1 - 0.3 Nm	330	19	●	●	●	●	●	●
A-max 19, 1.5 W	144	GP 22, 0.5 - 2.0 Nm	333/335	19	●	●	●	●	●	●
A-max 19, 1.5 W	144	GS 24, 0.1 Nm	339	19	●	●	●	●	●	●
A-max 19, 1.5 W	144	GP 22 S	372/373	19	●	●	●	●	●	●
A-max 19, 2.5 W	146			19	35.8	35.8	35.8	35.8	35.8	35.8
A-max 19, 2.5 W	146	GP 19, 0.1 - 0.3 Nm	330	19	●	●	●	●	●	●
A-max 19, 2.5 W	146	GP 22, 0.5 - 2.0 Nm	333/335	19	●	●	●	●	●	●
A-max 19, 2.5 W	146	GS 24, 0.1 Nm	339	19	●	●	●	●	●	●
A-max 19, 2.5 W	146	GP 22 S	372/373	19	●	●	●	●	●	●
A-max 22	148/150			22	36.9	36.9	36.9	36.9	36.9	36.9
A-max 22	148/150	GP 22, 0.1 - 0.6 Nm	331/332	22	●	●	●	●	●	●
A-max 22	148/150	GP 22, 0.5 - 2.0 Nm	333/335	22	●	●	●	●	●	●
A-max 22	148/150	GS 24, 0.1 Nm	339	22	●	●	●	●	●	●
A-max 22	148/150	GP 22 S	372/373	22	●	●	●	●	●	●

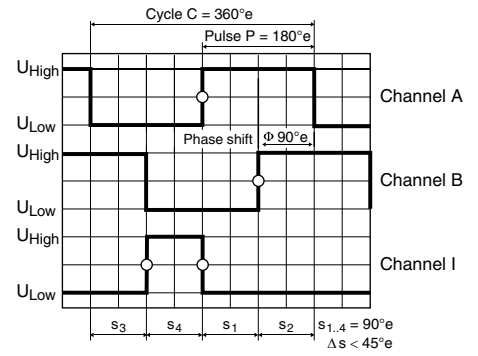
Technical Data	
Supply voltage V_{CC}	5 V ± 5%
Typical current draw 2 channel	11 mA
Typical current draw 3 channel	14 mA
Output signal	TTL compatible
Phase shift Φ	90°e ± 45°e
Index pulse width	90°e ± 45°e
Operating temperature range	-25...+85 °C
Moment of inertia of code wheel	≤ 0.09 gcm ²
Output current per channel	max. 5 mA



The index signal I is synchronized with channel A or B.

Opt. terminal resistance R > 1 kΩ

Encoder MR Type M, 128–512 CPT, 2/3 Channels, with Line Driver



Direction of rotation cw (definition cw p. 60)

- Stock program
- Standard program
- Special program (on request)

Part Numbers						
228179	228177	228181	228182	201937	201940	

Type						
Counts per turn	128	128	256	256	512	512
Number of channels	2	3	2	3	2	3
Max. operating frequency (kHz)	80	80	160	160	320	320
Max. speed (rpm)	37500	37500	37500	37500	37500	37500

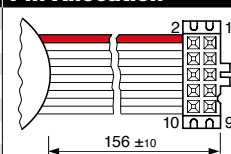
maxon Modular System

+ Motor	Page	+ Gearhead	Page	∅ Enc [mm]	Overall length [mm] / • see Gearhead					
EC-max 16, 5 W	219			16	31.3	31.3	31.3	31.3	31.3	31.3
EC-max 16, 5 W	219	GP 16, 0.1 - 0.6 Nm	328/329	16	•	•	•	•	•	•
EC-max 16, 5 W	219	GP 16 S	369/370	16	•	•	•	•	•	•
EC-max 16, 8 W	221			16	43.3	43.3	43.3	43.3	43.3	43.3
EC-max 16, 8 W	221	GP 16, 0.2 - 0.6 Nm	329	16	•	•	•	•	•	•
EC-max 16, 8 W	221	GP 22, 0.5 - 2.0 Nm	336	16	•	•	•	•	•	•
EC-max 16, 8 W	221	GP 16 S/GP 22 S	369/373	16	•	•	•	•	•	•
EC-max 22, 12 W	222			16	41.7	41.7	41.7	41.7	41.7	41.7
EC-max 22, 12 W	222	GP 22, 0.5 - 2.0 Nm	336/337	16	•	•	•	•	•	•
EC-max 22, 12 W	222	KD 32, 1.0 - 4.5 Nm	352	16	•	•	•	•	•	•
EC-max 22, 12 W	222	GP 22 S	372/373	16	•	•	•	•	•	•
EC-max 22, 25 W	223			16	58.2	58.2	58.2	58.2	58.2	58.2
EC-max 22, 25 W	223	GP 22/GP 32	337/347	16	•	•	•	•	•	•
EC-max 22, 25 W	223	GP 32 S	374-379	16	•	•	•	•	•	•

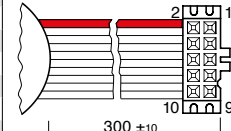
Technical Data

Supply voltage V_{CC}	5 V ± 5%
Typical current draw 2 channel	11 mA
Typical current draw 3 channel	14 mA
Output signal	TTL compatible
Phase shift Φ	90°e ± 45°e
Index pulse width	90°e ± 45°e
Operating temperature range	-25...+85 °C
Moment of inertia of code wheel	≤ 0.09 gcm ²
Output current per channel	max. 5 mA

Pin Allocation



MR Encoder EC-max 16 / EC-max 22

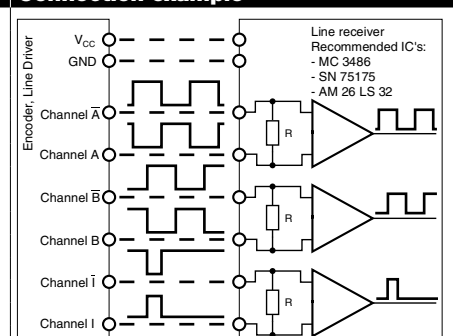


MR Encoder EC 16 / EC 22

- 1 N.C.
- 2 V_{CC}
- 3 GND
- 4 N.C.
- 5 Channel \bar{A}
- 6 Channel A
- 7 Channel \bar{B}
- 8 Channel B
- 9* Channel \bar{I} (Index)
- 10* Channel I (Index)

DIN Connector 41651/
EN 60603-13
flat band cable AWG 28
*version with 3 channels

Connection example



Opt. terminal resistance $R > 1 \text{ k}\Omega$

The index signal I is synchronized with channel A or B.