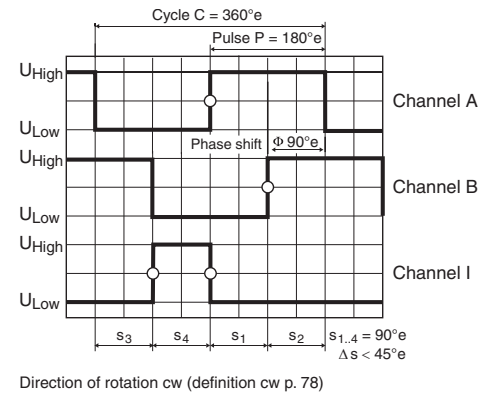


Encoder MR Type M, 128–512 CPT, 2/3 Channels, with Line Driver



maxon sensor

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

Part Numbers

228179	228177	228181	228182	201937	201940
--------	--------	--------	--------	--------	--------

Type	228179	228177	228181	228182	201937	201940
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



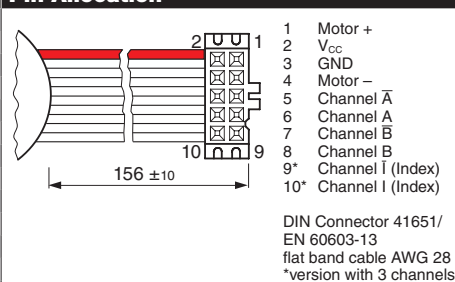
maxon Modular System

+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length [mm] / ● see Gearhead					
RE 16, 2 W	102					28.0	28.0	28.0	28.0	28.0	28.0
RE 16, 2 W	102	GP 16, 0.1 - 0.6 Nm	254/255			●	●	●	●	●	●
RE 16, 2 W	102	GP 16 S	296/297			●	●	●	●	●	●
RE 16, 3.2 W	104					45.4	45.4	45.4	45.4	45.4	45.4
RE 16, 3.2 W	104	GP 16, 0.1 - 0.6 Nm	254/255			●	●	●	●	●	●
RE 16, 3.2 W	104	GP 16 S	296/297			●	●	●	●	●	●
RE 16, 4.5 W	106					48.4	48.4	48.4	48.4	48.4	48.4
RE 16, 4.5 W	106	GP 16, 0.1 - 0.6 Nm	254/255			●	●	●	●	●	●
RE 16, 4.5 W	106	GP 16 S	296/297			●	●	●	●	●	●
A-max 16	122/124					30.4	30.4	30.4	30.4	30.4	30.4
A-max 16	122/124	GS 16, 0.01 - 0.1 Nm	250-253			●	●	●	●	●	●
A-max 16	122/124	GP 16, 0.1 - 0.6 Nm	254/255			●	●	●	●	●	●
A-max 16	122/124	GP 16 S	296/297			●	●	●	●	●	●
A-max 19, 1.5 W	126					34.0	34.0	34.0	34.0	34.0	34.0
A-max 19, 1.5 W	126	GP 19, 0.1 - 0.3 Nm	257			●	●	●	●	●	●
A-max 19, 1.5 W	126	GP 22, 0.5 - 2.0 Nm	262/264			●	●	●	●	●	●
A-max 19, 1.5 W	126	GS 24, 0.1 Nm	269			●	●	●	●	●	●
A-max 19, 1.5 W	126	GP 22 S	299/300			●	●	●	●	●	●
A-max 19, 2.5 W	128					35.8	35.8	35.8	35.8	35.8	35.8
A-max 19, 2.5 W	128	GP 19, 0.1 - 0.3 Nm	257			●	●	●	●	●	●
A-max 19, 2.5 W	128	GS 20 0.06 - 0.25 Nm	259			●	●	●	●	●	●
A-max 19, 2.5 W	128	GP 22, 0.5 - 2.0 Nm	262/264			●	●	●	●	●	●
A-max 19, 2.5 W	128	GS 24, 0.1 Nm	269			●	●	●	●	●	●
A-max 19, 2.5 W	128	GP 22 S	299/300			●	●	●	●	●	●
A-max 22	130/132					36.9	36.9	36.9	36.9	36.9	36.9
A-max 22	130/132	GP 22, 0.1 - 0.6 Nm	260/261			●	●	●	●	●	●
A-max 22	130/132	GP 22, 0.5 - 2.0 Nm	262/264			●	●	●	●	●	●
A-max 22	130/132	GS 24, 0.1 Nm	269			●	●	●	●	●	●
A-max 22	130/132	GP 22 S	299/300			●	●	●	●	●	●
RE-max 17	152/154					30.4	30.4	30.4	30.4	30.4	30.4
RE-max 17	152/154	GP 16, 0.1 - 0.3 Nm	254			●	●	●	●	●	●

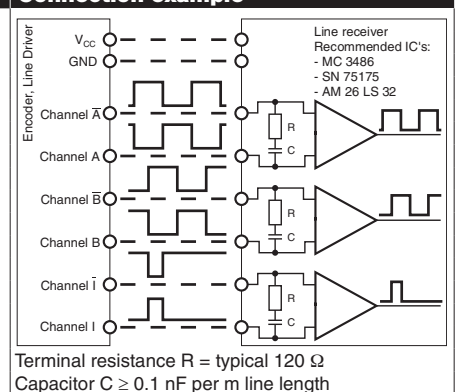
Technical Data

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

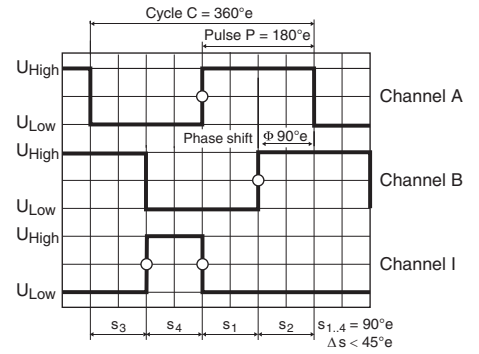
Pin Allocation



Connection example



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



Direction of rotation cw (definition cw p. 78)

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

Part Numbers

228179	228177	228181	228182	201937	201940
--------	--------	--------	--------	--------	--------

Type	228179	228177	228181	228182	201937	201940
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

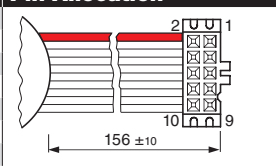
maxon Modular System

+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length [mm] / ● see Gearhead					
RE-max 21, 3.5 W	156					34.0	34.0	34.0	34.0	34.0	34.0
RE-max 21, 3.5 W	156	GP 22, 0.5 - 2.0 Nm	262/264			●	●	●	●	●	●
RE-max 21, 3.5 W	156	GS 38, 0.1 - 0.6 Nm	282			●	●	●	●	●	●
RE-max 21, 3.5 W	156	GP 22 S	299/300			●	●	●	●	●	●
RE-max 21, 6 W	158					35.8	35.8	35.8	35.8	35.8	35.8
RE-max 21, 6 W	158	GP 22, 0.5 - 2.0 Nm	262/264			●	●	●	●	●	●
RE-max 21, 6 W	158	GS 38, 0.1 - 0.6 Nm	282			●	●	●	●	●	●
RE-max 21, 6 W	158	GP 22 S	299/300			●	●	●	●	●	●
RE-max 24	160/162					36.9	36.9	36.9	36.9	36.9	36.9
RE-max 24	160/162	GP 22/GS 38	264/282			●	●	●	●	●	●
RE-max 24	160/162	GP 22 S	299/300			●	●	●	●	●	●
EC 16, 30 W	178					50.7	50.7	50.7	50.7	50.7	50.7
EC 16, 30 W	178	GP 16, 0.1 - 0.6 Nm	254/255			●	●	●	●	●	●
EC 16, 30 W	178	GP 22, 0.5 - 1.0 Nm	262			●	●	●	●	●	●
EC 16, 30 W	178	GP 16 S	296/297			●	●	●	●	●	●
EC 16, 60 W	180					66.7	66.7	66.7	66.7	66.7	66.7
EC 16, 60 W	180	GP 16, 0.2 - 0.6 Nm	255			●	●	●	●	●	●
EC 16, 60 W	180	GP 22, 0.5 - 2.0 Nm	262/265			●	●	●	●	●	●
EC 16, 60 W	180	GP 16 S/GP 22 S	296/300			●	●	●	●	●	●
EC 22, 40 W	185					50.5	50.5	50.5	50.5	50.5	50.5
EC 22, 40 W	185	GP 22, 0.5 - 3.4 Nm	265/266			●	●	●	●	●	●
EC 22, 40 W	185	GP 22 S	299/300			●	●	●	●	●	●
EC 22, 100 W	187					68.7	68.7	68.7	68.7	68.7	68.7
EC 22, 100 W	187	GP 22, 0.5 - 3.4 Nm	265/266			●	●	●	●	●	●
EC 22, 100 W	187	GP 22 S	299/300			●	●	●	●	●	●
EC-max 16, 5 W	199					31.3	31.3	31.3	31.3	31.3	31.3
EC-max 16, 5 W	199	GP 16, 0.1 - 0.6 Nm	254/255			●	●	●	●	●	●
EC-max 16, 5 W	199	GP 16 S	296/297			●	●	●	●	●	●
EC-max 16, 8 W	201					43.3	43.3	43.3	43.3	43.3	43.3
EC-max 16, 8 W	201	GP 16, 0.2 - 0.6 Nm	255			●	●	●	●	●	●
EC-max 16, 8 W	201	GP 22, 0.5 - 2.0 Nm	265			●	●	●	●	●	●
EC-max 16, 8 W	201	GP 16 S/GP 22 S	296/300			●	●	●	●	●	●
EC-max 22, 12 W	202					41.7	41.7	41.7	41.7	41.7	41.7
EC-max 22, 12 W	202	GP 22, 0.5 - 2.0 Nm	265/266			●	●	●	●	●	●
EC-max 22, 12 W	202	KD 32, 1.0 - 4.5 Nm	281			●	●	●	●	●	●
EC-max 22, 12 W	202	GP 22 S	299/300			●	●	●	●	●	●
EC-max 22, 25 W	203					58.2	58.2	58.2	58.2	58.2	58.2
EC-max 22, 25 W	203	GP 22/GP 32	266/277			●	●	●	●	●	●
EC-max 22, 25 W	203	GP 32 S	301-303			●	●	●	●	●	●

Technical Data

Supply voltage V_{CC}	5 V \pm 5%
Output signal	TTL compatible
Phase shift Φ	90°e \pm 45°e
Index pulse width	90°e \pm 45°e
Operating temperature range	-25...+85 °C
Moment of inertia of code wheel	$\leq 0.09 \text{ gcm}^2$
Output current per channel	max. 5 mA

Pin Allocation

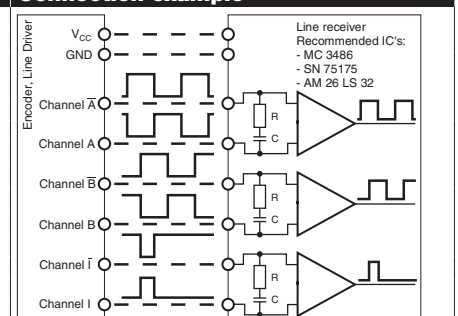


- 1 N.C.
- 2 V_{CC}
- 3 GND
- 4 N.C.
- 5 Channel \bar{A}
- 6 Channel A
- 7 Channel \bar{B}
- 8 Channel B
- 9* Channel I (Index)
- 10* Channel I (Index)

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

Pin assignment for RE-max
see Page 317

Connection example



Terminal resistance R = typical 120 Ω
Capacitor C $\geq 0.1 \text{ nF}$ per m line length