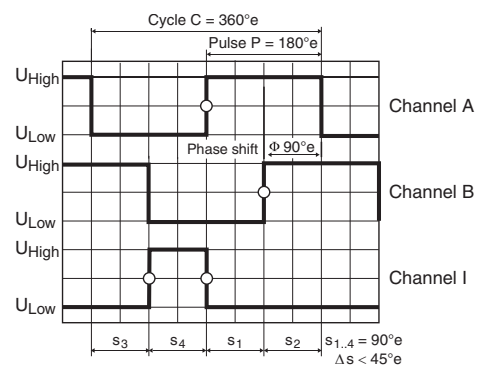


Encoder MR Type M, 128–512 CPT, 2/3 Channels, with Line Driver



Direction of rotation cw (definition cw p. 70)

- 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 |

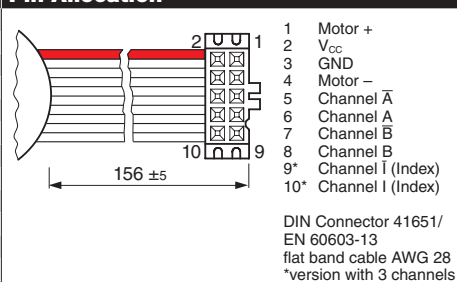


| maxon Modular System | | | | | | Overall length [mm] / • see Gearhead | | | | | |
|----------------------|---------|-----------------------|---------|---------|------|--------------------------------------|------|------|------|------|------|
| + Motor | Page | + Gearhead | Page | + Brake | Page | | | | | | |
| RE 16, 2 W | 94 | | | | | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| RE 16, 2 W | 94 | GP 16, 0.06 - 0.18 Nm | 242 | | | • | • | • | • | • | • |
| RE 16, 2 W | 94 | GP 16, 0.1 - 0.6 Nm | 243/244 | | | • | • | • | • | • | • |
| RE 16, 2 W | 94 | GP 16 S | 281/282 | | | • | • | • | • | • | • |
| RE 16, 3.2 W | 96 | | | | | 45.4 | 45.4 | 45.4 | 45.4 | 45.4 | 45.4 |
| RE 16, 3.2 W | 96 | GP 16, 0.06 - 0.18 Nm | 242 | | | • | • | • | • | • | • |
| RE 16, 3.2 W | 96 | GP 16, 0.1 - 0.6 Nm | 243/244 | | | • | • | • | • | • | • |
| RE 16, 3.2 W | 96 | GP 16 S | 281/282 | | | • | • | • | • | • | • |
| RE 16, 4.5 W | 98 | | | | | 48.4 | 48.4 | 48.4 | 48.4 | 48.4 | 48.4 |
| RE 16, 4.5 W | 98 | GP 16, 0.06 - 0.18 Nm | 242 | | | • | • | • | • | • | • |
| RE 16, 4.5 W | 98 | GP 16, 0.1 - 0.6 Nm | 243/244 | | | • | • | • | • | • | • |
| RE 16, 4.5 W | 98 | GP 16 S | 281/282 | | | • | • | • | • | • | • |
| A-max 16 | 114/116 | | | | | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 |
| A-max 16 | 114/116 | GS 16, 0.01 - 0.1 Nm | 238-241 | | | • | • | • | • | • | • |
| A-max 16 | 114/116 | GP 16, 0.06 - 0.6 Nm | 242-244 | | | • | • | • | • | • | • |
| A-max 16 | 114/116 | GP 16 S | 281/282 | | | • | • | • | • | • | • |
| A-max 19, 1.5 W | 118 | | | | | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 |
| A-max 19, 1.5 W | 118 | GP 19, 0.1 - 0.3 Nm | 246 | | | • | • | • | • | • | • |
| A-max 19, 1.5 W | 118 | GP 22, 0.5 - 2.0 Nm | 250/251 | | | • | • | • | • | • | • |
| A-max 19, 1.5 W | 118 | GS 24, 0.1 Nm | 256 | | | • | • | • | • | • | • |
| A-max 19, 1.5 W | 118 | GP 22 S | 284/285 | | | • | • | • | • | • | • |
| A-max 19, 2.5 W | 120 | | | | | 35.8 | 35.8 | 35.8 | 35.8 | 35.8 | 35.8 |
| A-max 19, 2.5 W | 120 | GP 19, 0.1 - 0.3 Nm | 246 | | | • | • | • | • | • | • |
| A-max 19, 2.5 W | 120 | GS 20 0.06 - 0.25 Nm | 247 | | | • | • | • | • | • | • |
| A-max 19, 2.5 W | 120 | GP 22, 0.5 - 2.0 Nm | 250/251 | | | • | • | • | • | • | • |
| A-max 19, 2.5 W | 120 | GS 24, 0.1 Nm | 256 | | | • | • | • | • | • | • |
| A-max 19, 2.5 W | 120 | GP 22 S | 284/285 | | | • | • | • | • | • | • |
| A-max 22 | 122/124 | | | | | 36.9 | 36.9 | 36.9 | 36.9 | 36.9 | 36.9 |
| A-max 22 | 122/124 | GP 22, 0.1 - 0.6 Nm | 248/249 | | | • | • | • | • | • | • |
| A-max 22 | 122/124 | GP 22, 0.5 - 2.0 Nm | 250/251 | | | • | • | • | • | • | • |
| A-max 22 | 122/124 | GS 24, 0.1 Nm | 256 | | | • | • | • | • | • | • |
| A-max 22 | 122/124 | GP 22 S | 284/285 | | | • | • | • | • | • | • |
| RE-max 17 | 144/146 | | | | | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 |
| RE-max 17 | 144/146 | GP 16, 0.06 - 0.18 Nm | 242 | | | • | • | • | • | • | • |
| RE-max 17 | 144/146 | GP 16, 0.1 - 0.3 Nm | 243 | | | • | • | • | • | • | • |

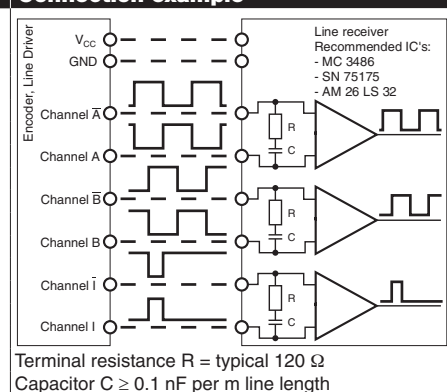
Technical Data

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

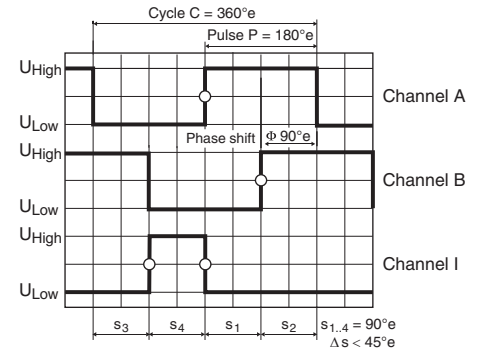
Pin Allocation



Connection example



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



Direction of rotation cw (definition cw p. 70)

- 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 | 3 |
| Max. operating frequency (kHz) | | 80 | 80 | 160 | 160 | 320 |
| Max. speed (rpm) | | 37 500 | 37 500 | 37 500 | 37 500 | 37 500 |

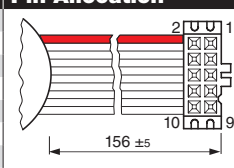
maxon Modular System

| + Motor | Page | + Gearhead | Page | + Brake | Page | Overall length [mm] / • see Gearhead | | | | | |
|------------------|---------|---------------------|---------|---------|------|--------------------------------------|------|------|------|------|------|
| RE-max 21, 3.5 W | 148 | | | | | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 |
| RE-max 21, 3.5 W | 148 | GP 22, 0.5 - 2.0 Nm | 250/251 | | | • | • | • | • | • | • |
| RE-max 21, 3.5 W | 148 | GS 38, 0.1 - 0.6 Nm | 269 | | | • | • | • | • | • | • |
| RE-max 21, 3.5 W | 148 | GP 22 S | 284/285 | | | • | • | • | • | • | • |
| RE-max 21, 6 W | 150 | | | | | 35.8 | 35.8 | 35.8 | 35.8 | 35.8 | 35.8 |
| RE-max 21, 6 W | 150 | GP 22, 0.5 - 2.0 Nm | 250/251 | | | • | • | • | • | • | • |
| RE-max 21, 6 W | 150 | GS 38, 0.1 - 0.6 Nm | 269 | | | • | • | • | • | • | • |
| RE-max 21, 6 W | 150 | GP 22 S | 284/285 | | | • | • | • | • | • | • |
| RE-max 24 | 152/154 | | | | | 36.9 | 36.9 | 36.9 | 36.9 | 36.9 | 36.9 |
| RE-max 24 | 152/154 | GP 22/GS 38 | 251/269 | | | • | • | • | • | • | • |
| RE-max 24 | 152/154 | GP 22 S | 284/285 | | | • | • | • | • | • | • |
| EC 16, 30 W | 169 | | | | | 50.7 | 50.7 | 50.7 | 50.7 | 50.7 | 50.7 |
| EC 16, 30 W | 169 | GP 16, 0.1 - 0.6 Nm | 243/244 | | | • | • | • | • | • | • |
| EC 16, 30 W | 169 | GP 22, 0.5 - 1.0 Nm | 250 | | | • | • | • | • | • | • |
| EC 16, 30 W | 169 | GP 16 S | 281/282 | | | • | • | • | • | • | • |
| EC 16, 60 W | 171 | | | | | 66.7 | 66.7 | 66.7 | 66.7 | 66.7 | 66.7 |
| EC 16, 60 W | 171 | GP 16, 0.2 - 0.6 Nm | 244 | | | • | • | • | • | • | • |
| EC 16, 60 W | 171 | GP 22, 0.5 - 2.0 Nm | 250/252 | | | • | • | • | • | • | • |
| EC 16, 60 W | 171 | GP 16 S/GP 22 S | 281/285 | | | • | • | • | • | • | • |
| EC 22, 40 W | 173 | | | | | 50.5 | 50.5 | 50.5 | 50.5 | 50.5 | 50.5 |
| EC 22, 40 W | 173 | GP 22, 0.5 - 3.4 Nm | 252/253 | | | • | • | • | • | • | • |
| EC 22, 40 W | 173 | GP 22 S | 284/285 | | | • | • | • | • | • | • |
| EC 22, 100 W | 175 | | | | | 68.7 | 68.7 | 68.7 | 68.7 | 68.7 | 68.7 |
| EC 22, 100 W | 175 | GP 22, 0.5 - 3.4 Nm | 252/253 | | | • | • | • | • | • | • |
| EC 22, 100 W | 175 | GP 22 S | 284/285 | | | • | • | • | • | • | • |
| EC-max 16, 5 W | 187 | | | | | 31.3 | 31.3 | 31.3 | 31.3 | 31.3 | 31.3 |
| EC-max 16, 5 W | 187 | GP 16, 0.1 - 0.6 Nm | 243/244 | | | • | • | • | • | • | • |
| EC-max 16, 5 W | 187 | GP 16 S | 281/282 | | | • | • | • | • | • | • |
| EC-max 16, 8 W | 189 | | | | | 43.3 | 43.3 | 43.3 | 43.3 | 43.3 | 43.3 |
| EC-max 16, 8 W | 189 | GP 16, 0.2 - 0.6 Nm | 244 | | | • | • | • | • | • | • |
| EC-max 16, 8 W | 189 | GP 22, 0.5 - 2.0 Nm | 252 | | | • | • | • | • | • | • |
| EC-max 16, 8 W | 189 | GP 16 S/GP 22 S | 281/285 | | | • | • | • | • | • | • |
| EC-max 22, 12 W | 190 | | | | | 41.7 | 41.7 | 41.7 | 41.7 | 41.7 | 41.7 |
| EC-max 22, 12 W | 190 | GP 22, 0.5 - 2.0 Nm | 252/253 | | | • | • | • | • | • | • |
| EC-max 22, 12 W | 190 | KD 32, 1.0 - 4.5 Nm | 268 | | | • | • | • | • | • | • |
| EC-max 22, 12 W | 190 | GP 22 S | 284/285 | | | • | • | • | • | • | • |
| EC-max 22, 25 W | 191 | | | | | 58.2 | 58.2 | 58.2 | 58.2 | 58.2 | 58.2 |
| EC-max 22, 25 W | 191 | GP 22/GP 32 | 253/264 | | | • | • | • | • | • | • |
| EC-max 22, 25 W | 191 | GP 32 S | 286-288 | | | • | • | • | • | • | • |

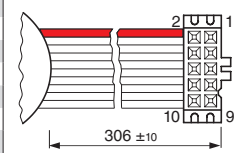
Technical Data

| | |
|---------------------------------|------------------------------|
| 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 | ≤ 0.09 gcm ² |
| Output current per channel | max. 5 mA |

Pin Allocation



MR Encoder EC-max 16 / EC-max 22



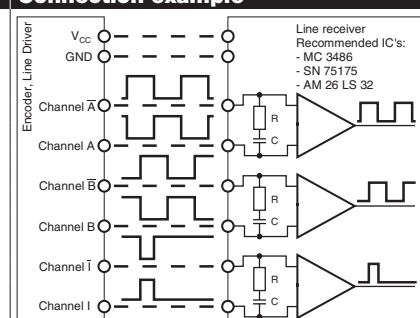
MR Encoder EC 16 / EC 22

- 1 N.C.
- 2 V_{CC}
- 3 GND
- 4 N.C.
- 5 Channel A
- 6 Channel A
- 7 Channel 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 300

Connection example



Terminal resistance R = typical 120 Ω
Capacitor C ≥ 0.1 nF per m line length