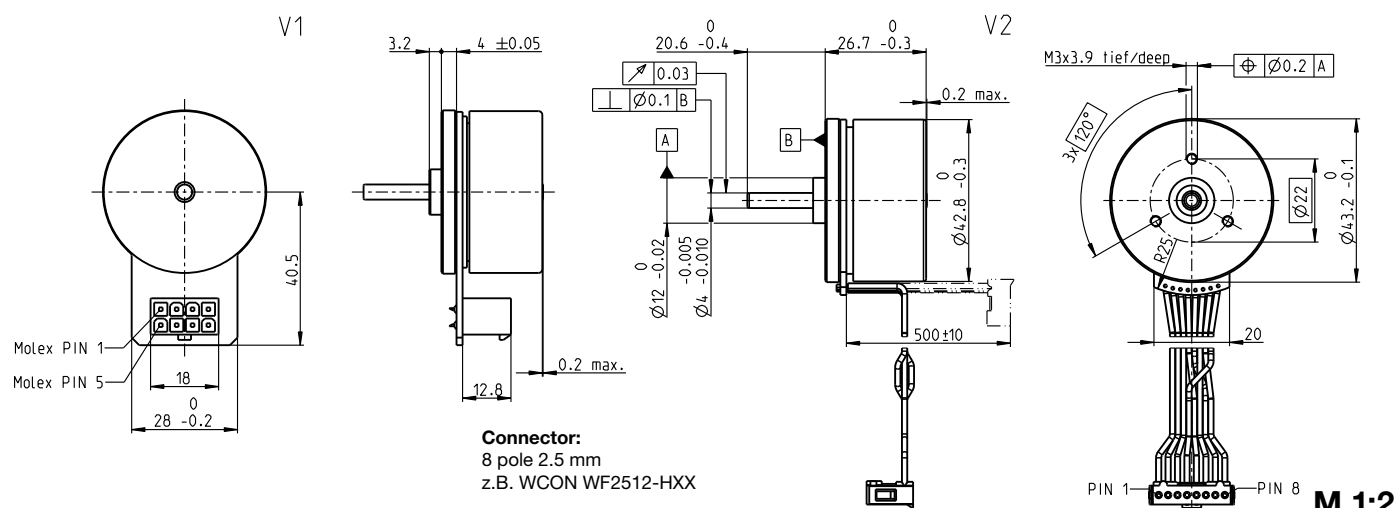


**EC 45 flat** Ø42.8 mm, brushless, 70 Watt



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

## Part Numbers

V1 with Hall sensors	397172	402685	402686	402687
V2 with Hall sensors and cables	411812	411814	411815	411816

**Motor Data** (provisional)

Values at nominal voltage									
1 Nominal voltage	V	24	30	36	48				
2 No load speed	rpm	6110	6230	6330	3440				
3 No load current	mA	234	194	166	48.1				
4 Nominal speed	rpm	4860	4990	5080	2540				
5 Nominal torque (max. continuous torque)	mNm	128	112	108	134				
6 Nominal current (max. continuous current)	A	3.21	2.36	1.93	0.936				
7 Stall torque¹	mNm	1460	1170	1100	915				
8 Stall current	A	39.5	25.8	20.7	6.97				
9 Max. efficiency	%	85	84	83	84				
Characteristics									
10 Terminal resistance phase to phase	Ω	0.608	1.16	1.74	6.89				
11 Terminal inductance phase to phase	mH	0.463	0.691	0.966	5.85				
12 Torque constant	mNm / A	36.9	45.1	53.3	131				
13 Speed constant	rpm / V	259	212	179	72.7				
14 Speed / torque gradient	rpm / mNm	4.26	5.44	5.85	3.82				
15 Mechanical time constant	ms	8.07	10.3	11.1	7.24				
16 Rotor inertia	acm²	181	181	181	181				

## Specifications

### Thermal data

17	Thermal resistance housing-ambient	3.56 K/W
18	Thermal resistance winding-housing	4.1 K/W
19	Thermal time constant winding	29.6 s
20	Thermal time constant motor	178 s
21	Ambient temperature	-40 ... +100°C
22	Max. winding temperature	+125°C

### Mechanical data (preloaded ball bearings)

23	Max. speed	10000 rpm
24	Axial play at axial load	0 mm
	< 4.0 N	0.14 mm
	> 4.0 N	preloaded
25	Radial play	3.8 N
26	Max. axial load (dynamic)	50 N
27	Max. force for press fits (static)	1000 N
	(static, shaft supported)	21 N
28	Max. radial load, 5 mm from flange	

## Other specifications

29	Number of pole pairs	8
30	Number of phases	3
31	Weight of motor	141 g

Values listed in the table are nominal.

### Connection V1

Pin 1	Hall sensor 1*	Motor winding 1
Pin 2	Hall sensor 2*	Motor winding 2
Pin 3	V <sub>Hall</sub> 4.5 ... 18 VDC	Motor winding 3
Pin 4	Motor winding 3	V <sub>Hall</sub> 4.5 ... 18 VDC
Pin 5	Hall sensor 3*	GND
Pin 6	GND	Hall sensor 1*
Pin 7	Motor winding 1	Hall sensor 2*
Pin 8	Motor winding 2	Hall sensor 3*

Wiring diagram for Hall sensors see p. 47

### Cable for V1

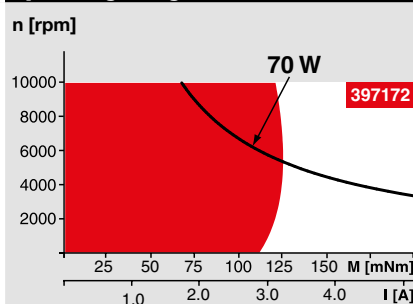
Connection cable Universal, L = 500 mm	<b>339380</b>
Connection cable to EPOS, L = 500 mm	<b>354045</b>

**v2**

21 Ambient temperature -20 ... +100°C

<sup>1</sup>Calculation does not include saturation effect (p. 57/162)

## Operating Range



## Comments

### Continuous operation

In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.

### Short term operation

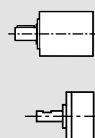
The motor may be briefly overloaded (recurring).

## Assigned power rating

**maxon Modular System**

**Planetary Gearhead**  
 Ø42 mm  
 3 - 15 Nm  
 Page 363

**Spur Gearhead**  
 Ø45 mm  
 0.5 - 2.0 Nm  
 Page 365



### Recommended Electronics:

Notes	Page
ESCON 36/3 EC	455
ESCON Mod. 50/4 EC-S	455
ESCON Module 50/5	455
ESCON 50/5	457
DEC Module 50/5	459
EPOS4 50/5	463
EPOS4 Mod./Comp. 50/5	463
ESOS2 P 24/5	470
MAXPOS 50/5	473

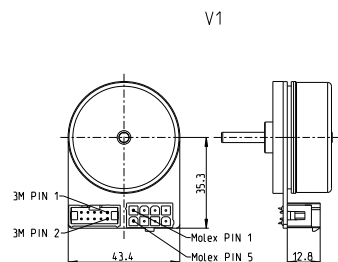
## Details on catalog page 36

**Encoder MILE**  
256 - 2048 CPT,  
2 channels  
Page 412

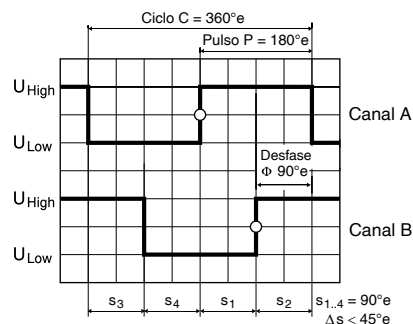
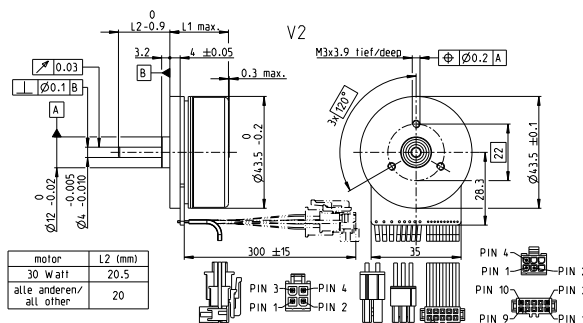
# Encoder MILE 256-2048 ppv, 2 canales, con line driver

Integrado en el motor

sensor



M 1:4



Sentido de rotación cw (Definición cw P. 68)

- Programa Stock
- Programa Estándar
- Programa Especial (previo encargo)

## Referencia

V1 con conector  
V2 con cables y conector

673024	673025	673026	673027
673028	673029	673030	673031

## Tipo

Número de pulsos por vuelta	256	512	1024	2048
Número de canales	2	2	2	2
Máx. frecuencia de funcionamiento (kHz)	1000	1000	1000	1000
Máx. velocidad (rpm)	10 000	10 000	10 000	10 000



## Sistema Modular maxon

+ Motor	Página	+ Reductor	Página	+ Freno	Página	Longitud total [mm] / • ver reductor			
EC 45 flat, 30 W, A 285						18.6	18.6	18.6	18.6
EC 45 flat, 30 W, A 285		GP 42, 3 - 15 Nm 398				•	•	•	•
EC 45 flat, 30 W, A 285		GS 45, 0.5 - 2.0 Nm 400				•	•	•	•
EC 45 flat, 50 W, A 286						22.6	22.6	22.6	22.6
EC 45 flat, 50 W, A 286		GP 42, 3 - 15 Nm 398				•	•	•	•
EC 45 flat, 50 W, A 286		GS 45, 0.5 - 2.0 Nm 400				•	•	•	•
EC 45 flat, 70 W, A 289						28.4	28.4	28.4	28.4
EC 45 flat, 70 W, A 289		GP 42, 3 - 15 Nm 398				•	•	•	•
EC 45 flat, 70 W, A 289		GS 45, 0.5 - 2.0 Nm 400				•	•	•	•
EC 45 flat, 60 W, A 287						22.8	22.8	22.8	22.8
EC 45 flat, 60 W, A 287		GP 42, 3 - 15 Nm 398				•	•	•	•
EC 45 flat, 60 W, A 287		GS 45, 0.5 - 2.0 Nm 400				•	•	•	•
EC 45 flat, 90 W, A 288						28.8	28.8	28.8	28.8
EC 45 flat, 90 W, A 288		GP 42, 3 - 15 Nm 398				•	•	•	•
EC 45 flat, 90 W, A 288		GS 45, 0.5 - 2.0 Nm 400				•	•	•	•
EC 45 flat, 80 W, A 290						27.8	27.8	27.8	27.8
EC 45 flat, 80 W, A 290		GP 42, 3 - 15 Nm 398				•	•	•	•
EC 45 flat, 80 W, A 290		GS 45, 0.5 - 2.0 Nm 400				•	•	•	•
EC 45 flat, 120 W, A 291						33.8	33.8	33.8	33.8
EC 45 flat, 120 W, A 291		GP 42, 3 - 15 Nm 398				•	•	•	•
EC 45 flat, 120 W, A 291		GS 45, 0.5 - 2.0 Nm 400				•	•	•	•

## Datos técnicos

Tensión de alimentación $V_{CC}$	5 V ± 10%
Consumo de corriente nominal	15 mA
Señal de salida	CMOS compatible
Longitud de estado $s_n$ 90°e (1000 rpm)	45...135°e
Tiempo del frente de subida	
(típico con $C_L = 25$ pF, $R_L = 1$ kΩ, 25°C)	100 ns
Tiempo del frente de bajada	
(típico con $C_L = 25$ pF, $R_L = 1$ kΩ, 25°C)	100 ns
Rango de temperaturas	-40...+100°C
Momento de la inercia de la rueda de código ≤ 3.5 gcm <sup>2</sup>	
Corriente de salida por canal	máx. 4 mA
Salida «open collector» de los sensores Hall	
con resistencia «pull-up»	10 kΩ ± 20% integrada
Esquema de conexionado para los sensores Hall	
ver página 49	

## Conexión

### Conexiones V1

Motor + Sensores	
Pin 1 Sensor Hall 1	
Pin 2 Sensor Hall 2	
Pin 3 $V_{Hall}$ 4.5...18 VDC	
Pin 4 Motor winding 3	
Pin 5 Sensor Hall 3	
Pin 6 GND	
Pin 7 Bobinado 1 motor	
Pin 8 Bobinado 2 motor	

### Encoder

Pin 1 N.C.	
Pin 2 $V_{CC}$	
Pin 3 GND	
Pin 4 N.C.	
Pin 5 Canal A	
Pin 6 Canal A	
Pin 7 Canal B	
Pin 8 Canal B	
Pin 9 No conectar	
Pin 10 No conectar	

Conector tipo:  
39-28-1083 Molex  
DIN 41651/EN 60603-13

### Conexiones V2

Sensores (AWG 24)	
Pin 1 Sensor Hall 1	
Pin 2 Sensor Hall 2	
Pin 3 Sensor Hall 3	
Pin 4 GND	
Pin 5 $V_{Hall}$ 4.5...18 VDC	
Pin 6 N.C.	

### Motor (AWG 22)

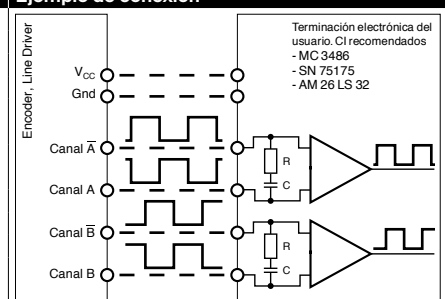
Pin 1 Bobinado 1 motor	
Pin 2 Bobinado 2 motor	
Pin 3 Bobinado 3 motor	
Pin 4 No conectar	

### Encoder (AWG 28)

Pin 1 N.C.	
Pin 2 $V_{CC}$	
Pin 3 GND	
Pin 4 N.C.	
Pin 5 Canal A	
Pin 6 Canal A	
Pin 7 Canal B	
Pin 8 Canal B	
Pin 9 No conectar	
Pin 10 No conectar	

43025-600 Molex  
39-01-2040 Molex  
DIN 41651/EN 60603-13

## Ejemplo de conexión



Resistencia de conexión R op. = típica 120 Ω  
Condensador C ≥ 0.1 nF por cada metro lineal de línea