PREMOTEC





# PRODUCT SPECIFICATION FOR DC MOTOR

**MODEL:** **CL40 Motor**

## 1. TYPE INDICATION

| | | | |
|---|---|---|---|
| 1.1 | Spark suppression | None | |
| 1.2 | Direction of rotation | Reversible | |
| 1.3 | Rotor | Ironless (9x96x150µm]) | |
| 1.4 | Nominal voltage | 24 | V DC |
| 1.5 | Nominal speed | 2690 | rpm |
| 1.6 | Nominal load | 10 | mNm |
| 1.7 | Remarks | | |

## 2 ELECTRICAL DATA

| | | | |
|---|---|---|---|
| 2.1 | EMF at 3000 rpm | 22.6 | V ± 10% |
| 2.2 | Voltage constant | 7.54 | mV/rpm ± 10% |
| 2.3 | Torque constant 72 | mNm/A ± 10% | |
| 2.4 | Terminal resistance | 25.1 | Ohm ± 8% |
| 2.5 | Rotor inductance at 1kHz | 3.9 | mH |

## 3 THERMAL DATA

| | | | |
|---|---|---|---|
| 3.1 | Thermal coefficient of: | | |
| 3.1.1 | Motor EMF | -0.12 | %/K |
| 3.1.2 | Resistance | 0.4 | %/K |
| 3.2 | Thermal resistances: | | |
| 3.2.1 | From winding to housing (Rth1) | 5.5 | K/W |
| 3.2.2 | From housing to ambient (Rth2) | 13.0 | K/W |
| 3.2.3 | From winding to ambient | 18.5 | K/W |
| 3.3 | Thermal time constant of motor without heatsink in free air | 20 | minutes |

## 4 ELECTROMECHANICAL DATA

| | | | | |
|---|---|---|---|---|
| 4.1 | No load | | | |
| 4.1.1 | Voltage | 24 | V | |
| 4.1.2 | Speed | 3150 | rpm ± 10% | |
| 4.1.3 | Current | 17 | mA | max. |
| 4.1.4 | Starting voltage | 0.54 | V | max. |
| 4.2 | Loaded | | | |
| 4.2.1 | Voltage | 24 | V | |
| 4.2.2 | Torque | 10 | mNm | |
| 4.2.3 | Speed | 2690 | rpm | |
| 4.2.4 | Current | 0.150 | A | |

| | | | |
|---|---|---|---|
| | Motor assy | 9904 120 16202 | 08-09-03 KD<br>08-12-16 KD |
| SUPERS. - | SHEET. 190- 1 3 | | |
| NAME. P de Bruin | DATE. 97-03-10 | PROPERTY OF PRECISION MOTOR TECHNOLOGY BV DORDRECHT – THE NETHERLANDS | |
| FILE. 9904 120 16202 190-1 | CHECK. | | |

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|---|---|---|---|
| 4.3 | Starting torque | 68 | mNm ± 18% |
| 4.4 | Starting current | 0.96 | A ± 8% |
| 4.5 | Speed/torque gradient | 46.1 | rpm/mNm |
| 4.6 | Mechanical time constant | 19 | ms typical |
| 4.7 | Typical performance curves | See sheet 112-2 | |
| 4.8 | Insulation resistance between winding and housing according to IEC 335-1 (500 V DC) | >2 | MOhm |

## 5 MECHANICAL DATA

| | | |
|---|---|---|
| 5.1 | Weight | 190 g |
| 5.2 | Housing | steel |
| 5.3 | Operation position | All positions permitted |
| 5.4 | Brushes | Precious metal |
| 5.5 | Bearings | Slide |
| 5.6 | Rotor inertia | $0.9 \times 10^{-6}$ kgm$^2$ |

## 6 NOISE AND VIBRATION

| | | |
|---|---|---|
| 6.1 | Measuring conditions | Motor on vibration isolator (foam) |
| 6.1.1 | Motor position | Shaft horizontal |
| 6.1.2 | Noise level of measuring room | max. 30 dBA |
| 6.1.3 | Microphone position | 10 cm above middle of motor housing |
| 6.1.4 | Load | None |
| 6.1.5 | Speed | 3000 rpm |
| 6.2 | Noise level | 51 dBA max. |

## 7 LIFE

| | | |
|---|---|---|
| 7.1 | Conditions for continuous running with radial load | |
| 7.1.1 | Voltage | 24 V |
| 7.1.2 | Current | 0.150 A |
| 7.1.3 | Torque | 10 mNm (approx.) |
| 7.1.4 | Speed | 2690 rpm (approx.) |
| 7.1.5 | Radial force | 5 N, 10 mm from mounting surface |
| 7.1.6 | Axial force | None |
| 7.1.7 | Motor position | All positions permitted |
| 7.1.8 | Ambient temperature | 22 ± 5 ℃ |
| 7.1.9 | Cycle | 3 hours ON<br>1 hour OFF |
| 7.2 | Life B10 value | 1000 hours min. running hours |

7.3 Criteria for approval: Motor function remains intact.
If the *Warning signal* level (see below) is reached in the life test setup, the motor is regular tested for the criteria 7.3.1 to 7.3.5 that prescribe when motor life is finished

Warning signal: The motor is build out from the life test setup if as warning signal the motor current deviates ± 20% of the initial value as described in item 7.1.2 or the audible noise is dramatically increased or if significantly interruptions occur in the commutation wave form.



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| | | |
|---|---|---|
| 7.3.1 | EMF at 3000 rpm | -10% of zero hour value |
| 7.3.2 | Commutation wave form | No blocked interruptions; Motor should start up in all rotor positions with motor voltage of item 4.1.4 |
| 7.3.3 | No load current | 2 times the no load current from item 4.1.3 |
| 7.3.4 | Noise level | 60 dBA max. |
| 7.3.5 | Bearings | Bearing function and bearing preload remains intact |

## 8 TEMPERATURES

| | | | |
|---|---|---|---|
| 8.1 | Ambient temperature | -10 to 60 | ℃ |
| 8.2 | Max. housing temperature | 80 | ℃ |
| 8.3 | Storage temperature | -40 to 70 | ℃ |

## 9 LIMITING VALUES

9.1 The following maximum values can be applied continuously, however they reduce the life of the motor considerably.

| | | | | |
|---|---|---|---|---|
| 9.1.1 | Voltage | 36 | V | |
| 9.1.2 | Load | 26 | mNm | |
| 9.1.3 | Current | 0.374 | A | |
| 9.1.4 | Peak current | 1.25 | A | |
| 9.1.5 | Speed | 3530 | rpm | |
| 9.1.6 | Output power | 9.6 | W | |
| 9.1.7 | Radial force | 7N, 10 mm from mounting surface | | |
| 9.1.8 | Axial force | 0.5 | N | |
| 9.1.9 | Locked rotor | 12.3 | V | (ambient temp. max 40 ℃) |

9.2 The following maximum values can be applied continuously, however they reduce the life of the motor considerably.

| | | | |
|---|---|---|---|
| 9.2.1 | Voltage | 40 | V |
| 9.2.2 | Load | 35 | mNm |
| 9.2.3 | Peak current | 1.65 | A |
| 9.2.4 | Maximum speed | 5000 | rpm |
| 9.2.5 | Output power | 13 | W |
| 9.2.6 | Axial force | 50 | N |
| 9.2.7 | Radial force | 50 | N |
| 9.2.8 | Winding temperature | 120 | ℃ |
| 9.2.9 | Locked rotor at 24 V and 40 ℃ winding start temp. | 26 | s |

## 10 REMARKS

Unless otherwise specified, the measurements have to be executed under the following conditions:

| | | | |
|---|---|---|---|
| 10.1 | Motor temperature | 22 ± 5 | ℃ |
| 10.2 | Atmospheric pressure | 0.86 – 1.06x10$^5$ | Pa |
| 10.3 | Relative humidity | 45 – 75 | % |
| 10.4 | Radial force | None | |
| 10.5 | Axial force | None | |

## 11 GENERAL SPECIFICATIONS

Unless otherwise specified, general requirements are specified in reference sheet PN40-01-98



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| Motor assy | | 9904 120 16202 | 08-09-03 KD<br>08-12-16 KD |
| SUPERS. - | SHEET. 190- 3 | 3 | |
| NAME. P de Bruin | DATE. 97-03-10 | | |
| FILE. 9904 120 16202 190-1 | CHECK. | | |