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AMKASYN
AC-Servo- and
Main Spindle Motors

AMK

AMK

AMK is a leading international manufacturer of electronic drives and controls. We develop, produce and distribute innovative, intelligent electronic drives. Our product range covers simple, variable speed frequency inverters as well as complete drive solutions with integrated motion control systems.

Decades of experience with solving highly complex drive tasks and continuous research and development into future-oriented technologies make us an expert partner in industrial automation.

The most modern production equipment as well as comprehensive expertise in motor design enable AMK to produce a vast variety of motors from minimum quantity series to large production lots.

To guarantee and maintain our high production quality standards, AMK has implemented quality management as certified by ISO 9001.



AMKASYN Motor Series DS, DV, DH and DW



The modular design of the AMKASYN system provides a flexible and low-cost alternative, which integrate standard components into a powerful motion control system.

The result is a precise drive and control system with all the advantages of digital control, i.e. high accuracy, safe data transfer, extensive diagnostics and exact reproducibility.

Advantages of the AMKASYN motor series

- Maintenance-free
- Sturdy
- Powerful
- Compact
- High efficiency
- Optimum power to weight ratio
- Highly dynamic response
- High overload capacity
- Winding temperature sensors as protection against overload
- Integrated encoder for speed and position control

Today's increasing demands of modern drive technology are driven by new production methods, changing automation requirements, increased demands on plant operational efficiency and highest manufacturing precision. These translate into high expectations in load capacity, performance and dynamic response that are required from a drive system, but especially from the associated motors.

AMK's high-performance motors of the AMKASYN series satisfy these requirements. These motors are engineered to offer high reliability, high dynamic response, small frame size, low rotor inertia and a largely maintenance free design.

The AMKASYN series of motors consists of the compact, highly dynamic AC-servo motor types DS and DV as well as the heavy-duty AC main spindle motor types DH and DW with high power density and precision balanced rotors.

The AMKASYN motors are optimally tuned to be used with the AMKASYN digital AC-servo inverters for multi-motor applications in the power range of 1.3 to 75 kVA and with the AMKASYN digital compact servo drives in the power range of 0.7 to 50 kVA.

Together the motors and inverters form an intelligent, digital drive system for servo and main spindle applications, which satisfies every demand.

Areas of application

The AMKASYN motors are especially suitable for use as servo and main drive motors in:

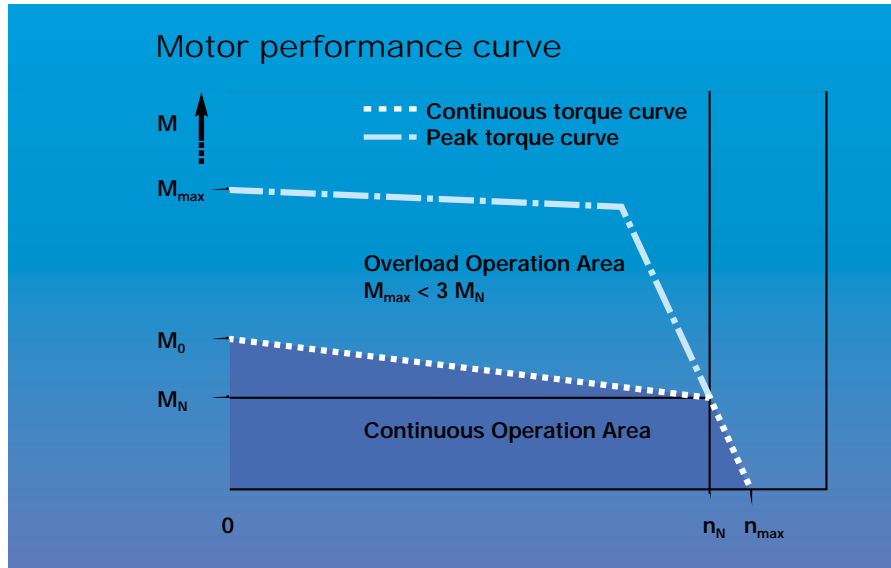
- Plant construction
- Elevator technology
- Printing machines
- Woodworking machines
- Plastic processing machines
- Warehousing and conveyor technology
- Test stands
- Process engineering
- Textile machines
- Packaging machines
- Machine tools

AMKASYN. Servo Motors DS



The synchronous servo motors DS feature compact frame sizes, high dynamic response and wide speed range. These brushless, permanent magnet AC servo motors are available in 4 and 6-pole versions. The use of rare-earth magnets provides especially high energy density and permits short term high overload for the highest demand on dynamic response. These motors can be used for speed control, positioning tasks, synchronous and stepping motor operation in combination with the digital AMK inverters type AMKASYN.

Servo Motors DS



Standard version

| | |
|-----------------------|---------------------------------|
| Mounting: | B5-Metric flange |
| Degree of protection: | IP 54 |
| Connections: | Plug style connector systems |
| Position feedback: | Resolver |
| Keyway: | Standard |

Features

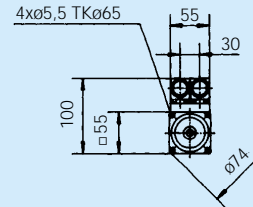
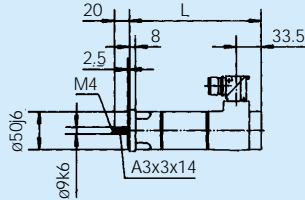
- Low maintenance
- Compact
- Lifetime lubricated bearings
- TENV (totally enclosed non-ventilated) or
- TEFC (totally enclosed fan cooled)
- High overload capacity
- High peak torque
- Sinusoidal commutation

Options

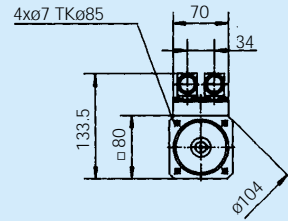
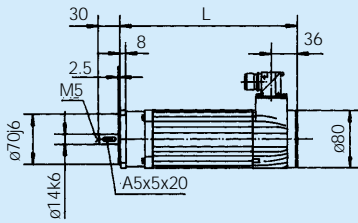
- Holding brake
- Optical position encoder
- Smooth shaft

Dimensions DS

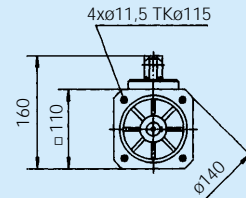
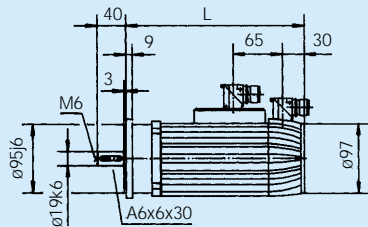
DS 3



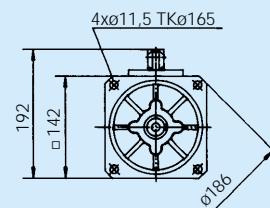
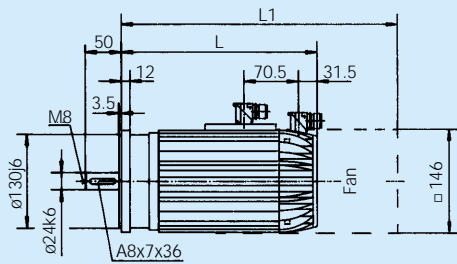
DS 4



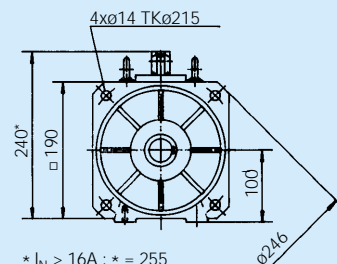
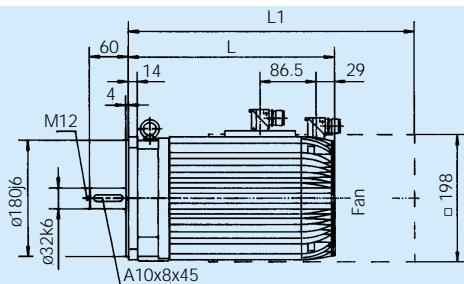
DS 5



DS 7



DS 10



* I_N > 16A : * = 255

All dimensions in millimeter

Technical Data DS

Rated voltage 190 V, TENV (Totally Enclosed Non-ventilated)

| Motor type | M _O [Nm] | M _N [Nm] | P _N [kW] | I _N [A] | n _N [1/min] | n _{max} [1/min] | k _T [Nm/A] | J [kgm ² · 10 ⁻³] | m [kg] | L [mm] | L _{BR} [mm] |
|---------------------|------------------------|------------------------|------------------------|-----------------------|---------------------------|-----------------------------|--------------------------|---|-----------|-----------|-------------------------|
| DS 3-0.3-4-..0-6000 | 0.4 | 0.35 | 0.24 | 1.1 | 6600 | 7400 | 0.33 | 0.02 | 2.5 | 195 | ---- |
| DS 4-1-6-..0- 4000 | 1.6 | 1.2 | 0.53 | 2 | 4200 | 4500 | 0.6 | 0.11 | 3 | 170 | 206 |
| DS 4-2-6-..0- 4000 | 3.2 | 2.5 | 1.1 | 4 | 4100 | 4400 | 0.63 | 0.22 | 5 | 230 | 266 |
| DS 5-3-6-..0- 4000 | 3.5 | 3.1 | 1.3 | 5.3 | 4100 | 4300 | 0.6 | 0.25 | 8.5 | 220 | 272 |

Rated voltage 350 V, TENV (Totally Enclosed Non-ventilated)

| Motor type | M _O [Nm] | M _N [Nm] | P _N [kW] | I _N [A] | n _N [1/min] | n _{max} [1/min] | k _T [Nm/A] | J [kgm ² · 10 ⁻³] | m [kg] | L [mm] | L _{BR} [mm] |
|----------------------|------------------------|------------------------|------------------------|-----------------------|---------------------------|-----------------------------|--------------------------|---|-----------|-----------|-------------------------|
| DS 3-0.3-4-..0-6000 | 0.4 | 0.35 | 0.24 | 0.6 | 6600 | 7400 | 0.62 | 0.02 | 2.5 | 195 | ---- |
| DS 4-1-6-..0- 4000 | 1.6 | 1.2 | 0.53 | 1.1 | 4200 | 4500 | 1.1 | 0.11 | 3 | 170 | 206 |
| DS 4-2-6-..0- 4000 | 3.2 | 2.5 | 1.1 | 2.1 | 4100 | 4400 | 1.2 | 0.22 | 5 | 230 | 266 |
| DS 5-3-6-..0- 4000 | 3.5 | 3.1 | 1.3 | 2.9 | 4100 | 4300 | 1.1 | 0.25 | 8.5 | 220 | 272 |
| DS 5-5-6-..0- 4000 | 5.7 | 5.2 | 2.2 | 4.7 | 4100 | 4200 | 1.1 | 0.42 | 10 | 280 | 332 |
| DS 7- 7- 6-..0- 3000 | 8.5 | 6.5 | 2.1 | 4.1 | 3000 | 3200 | 1.6 | 1.2 | 14 | 265 | 310 |
| DS 7-13-6-..0- 3000 | 15.5 | 12 | 3.8 | 7.1 | 3000 | 3100 | 1.7 | 2.1 | 23 | 355 | 400 |
| DS 10-18-6-..0-3000 | 24 | 17 | 5.4 | 10 | 3050 | 3100 | 1.7 | 9.5 | 35 | 295 | 374 |
| DS 10-30-6-..0-3000 | 35 | 28 | 8.9 | 16 | 3050 | 3100 | 1.8 | 17 | 48 | 375 | 454 |

Rated voltage 350 V, TEFC (Totally Enclosed Fan Cooled)

| Motor type | M _O [Nm] | M _N [Nm] | P _N [kW] | I _N [A] | n _N [1/min] | n _{max} [1/min] | k _T [Nm/A] | J [kgm ² · 10 ⁻³] | m [kg] | L1 [mm] | L1BR [mm] |
|----------------------|------------------------|------------------------|------------------------|-----------------------|---------------------------|-----------------------------|--------------------------|---|-----------|------------|--------------|
| DS 7-11- 6-..F- 3000 | 12 | 11 | 3.5 | 7 | 3050 | 3200 | 1.6 | 1.2 | 19 | 377 | 422 |
| DS 7-19- 6-..F- 3000 | 20 | 19 | 6 | 12 | 3050 | 3100 | 1.6 | 2.1 | 28 | 467 | 512 |
| DS 10-27-6-..F-3000 | 29 | 27 | 8.5 | 16.5 | 3050 | 3100 | 1.6 | 9.5 | 45 | 420 | 499 |
| DS 10-45-6-..F-3000 | 47 | 45 | 14 | 26 | 3050 | 3100 | 1.7 | 17 | 58 | 500 | 579 |

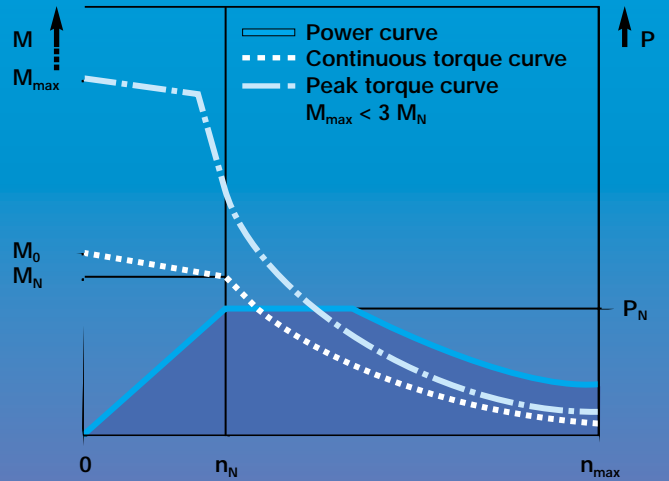
AMKASYN. Servo Motors DV



Servo motors DV are sturdy three-phase induction type asynchronous AC motors. They cannot be demagnetized and feature high overload capacity and smooth running properties. AMKASYN servo motors DV deliver practically constant torque from zero speed up to rated speed. The field weakening range allows constant output power up to 3 times rated speed. The maximum speed extends up to 10,000 rpm, the torque range from 0.3 to 26 Nm. AMKASYN servo motors DV are low-leakage design and permit fast current rise times for high dynamic response. These motors can be used for torque control, speed control, positioning and synchronous control in combination with the digital AMK inverters type AMKASYN.

Servo Motors DV

Motor performance curve



Standard version

| | |
|-----------------------|------------------|
| Mounting: | B5-Metric flange |
| Degree of protection: | IP 54 |
| Connections: | Terminal box |
| Position feedback: | Resolver |
| Keyway: | Standard |

Features

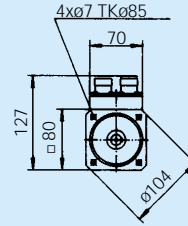
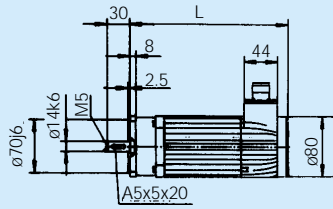
- Low maintenance
- Lifetime lubricated bearings
- TENV (totally enclosed non-ventilated) or
- TEFC (totally enclosed fan cooled)
- Field weakening range up to 3 times rated speed
- High speeds
- High overload capacity
- Smooth running properties

Options

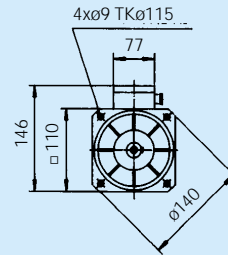
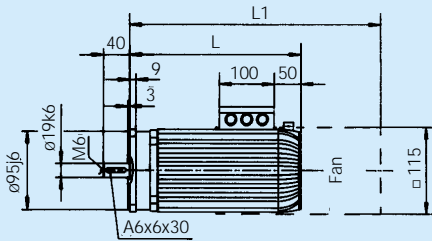
- Holding brake
- Position feedback systems type A, I, T
- Smooth shaft
- Plug type connector for motor leads

Dimensions DV

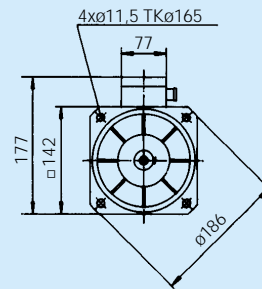
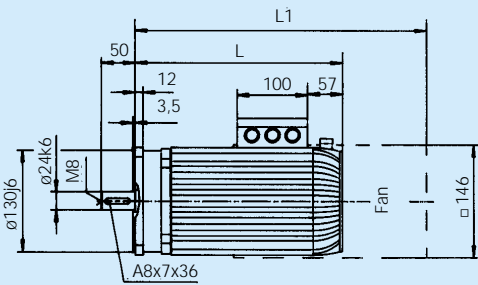
DV 4



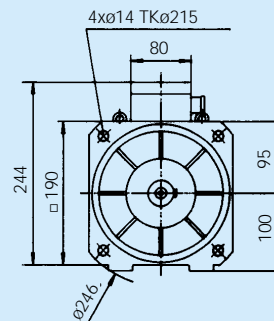
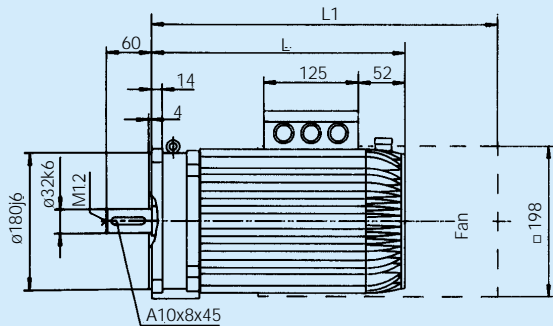
DV 5



DV 7



DV 10



All dimensions in millimeter

Technical Data DV

Rated voltage 190 V, TENV (Totally Enclosed Non-ventilated)

| Motor type | M _O [Nm] | M _N [Nm] | P _N [kW] | I _N [A] | n _N [1/min] | n _{max} [1/min] | J [kgm ² · 10 ⁻³] | m [kg] | L [mm] | L _{BR} [mm] |
|-----------------------|------------------------|------------------------|------------------------|-----------------------|---------------------------|-----------------------------|---|-----------|-----------|-------------------------|
| DV 4-0,5- 4-..0- 4000 | 0.6 | 0.3 | 0.13 | 1 | 4000 | 10000 | 0.05 | 2.5 | 160 | 196 |
| DV 4- 1- 4-..0- 4000 | 0.9 | 0.8 | 0.32 | 2.2 | 4000 | 10000 | 0.09 | 4.5 | 210 | 246 |
| DV 5- 1- 4-..0- 4000 | 1.25 | 1.1 | 0.49 | 2.4 | 4000 | 10000 | 0.2 | 6.5 | 198 | 250 |
| DV 5- 2- 4-..0- 4000 | 2.2 | 2 | 0.83 | 4 | 4000 | 10000 | 0.37 | 7.5 | 248 | 300 |

Rated voltage 190 V, TEFC (Totally Enclosed Fan Cooled)

| Motor type | M _O [Nm] | M _N [Nm] | P _N [kW] | I _N [A] | n _N [1/min] | n _{max} [1/min] | J [kgm ² · 10 ⁻³] | m [kg] | L1 [mm] | L1 _{BR} [mm] |
|----------------------|------------------------|------------------------|------------------------|-----------------------|---------------------------|-----------------------------|---|-----------|------------|--------------------------|
| DV 5- 2- 4-..F- 3000 | 2.2 | 2.1 | 0.7 | 3.7 | 3000 | 10000 | 0.2 | 8.5 | 301 | 353 |
| DV 5- 4- 4-..F- 3000 | 4.1 | 3.9 | 1.2 | 6.1 | 3000 | 10000 | 0.37 | 9.5 | 351 | 403 |

Rated voltage 350 V, TENV (Totally Enclosed Non-ventilated)

| Motor type | M _O [Nm] | M _N [Nm] | P _N [kW] | I _N [A] | n _N [1/min] | n _{max} [1/min] | J [kgm ² · 10 ⁻³] | m [kg] | L [mm] | L _{BR} [mm] |
|----------------------|------------------------|------------------------|------------------------|-----------------------|---------------------------|-----------------------------|---|-----------|-----------|-------------------------|
| DV 4-0,5-4-..0- 4000 | 0.6 | 0.3 | 0.13 | 0.55 | 4000 | 10000 | 0.05 | 2.5 | 160 | 196 |
| DV 4- 1- 4-..0- 4000 | 0.9 | 0.8 | 0.32 | 1.2 | 4000 | 10000 | 0.09 | 4.5 | 210 | 246 |
| DV 5- 1- 4-..0- 4000 | 1.3 | 1.1 | 0.49 | 1.3 | 4000 | 10000 | 0.2 | 6.5 | 198 | 250 |
| DV 5- 2- 4-..0- 4000 | 2.2 | 2 | 0.83 | 2.2 | 4000 | 10000 | 0.37 | 7.5 | 248 | 300 |
| DV 7- 4- 4-..0- 1500 | 4.3 | 4 | 0.63 | 1.7 | 1500 | 8000 | 1.1 | 10 | 216 | 261 |
| -3000 | 4 | 3.4 | 1.1 | 2.6 | 3000 | 8000 | 1.1 | 10 | 216 | 261 |
| DV 7- 6- 4-..0- 1500 | 6.7 | 6 | 0.95 | 2.4 | 1500 | 8000 | 1.8 | 13.5 | 261 | 306 |
| -3000 | 6.1 | 5 | 1.55 | 3.6 | 3000 | 8000 | 1.8 | 13.5 | 261 | 306 |
| DV 10-7- 4..0- 1500 | 9.5 | 9 | 1.4 | 3.1 | 1500 | 5500 | 7.4 | 34 | 271 | 350 |
| 3000 | 7.6 | 7 | 2.2 | 5.5 | 3000 | 5500 | 7.4 | 34 | 271 | 350 |
| DV 10-11-4-..0- 1500 | 15 | 14 | 2.2 | 4.8 | 1500 | 5500 | 10 | 41 | 311 | 390 |
| 3000 | 11.8 | 11 | 3.5 | 7.5 | 3000 | 5500 | 10 | 41 | 311 | 390 |

Rated voltage 350 V, TEFC (Totally Enclosed Fan Cooled)

| Motor type | M _O [Nm] | M _N [Nm] | P _N [kW] | I _N [A] | n _N [1/min] | n _{max} [1/min] | J [kgm ² · 10 ⁻³] | m [kg] | L1 [mm] | L1 _{BR} [mm] |
|-----------------------|------------------------|------------------------|------------------------|-----------------------|---------------------------|-----------------------------|---|-----------|------------|--------------------------|
| DV 5- 2- 4-..F- 3000 | 2.2 | 2.1 | 0.7 | 2 | 3000 | 10000 | 0.2 | 8.5 | 301 | 353 |
| DV 5- 4- 4-..F- 3000 | 4.1 | 3.9 | 1.2 | 3.3 | 3000 | 10000 | 0.37 | 9.5 | 351 | 403 |
| DV 7- 8- 4-..F- 1500 | 7.4 | 7 | 1.1 | 3.5 | 1500 | 8000 | 1.1 | 13 | 328 | 373 |
| -3000 | 7.4 | 6.8 | 2.1 | 5.2 | 3000 | 8000 | 1.1 | 13 | 328 | 373 |
| DV 7-12- 4-..F- 1500 | 11.5 | 10.5 | 1.7 | 4.9 | 1500 | 8000 | 1.8 | 18.5 | 373 | 418 |
| -3000 | 11 | 10 | 3.1 | 7.3 | 3000 | 8000 | 1.8 | 18.5 | 373 | 418 |
| DV 10-19-4-..F- 1500 | 23.5 | 22 | 3.5 | 8.1 | 1500 | 5500 | 7.4 | 44 | 396 | 475 |
| -3000 | 20 | 19 | 6 | 14 | 3000 | 5500 | 7.4 | 44 | 396 | 475 |
| DV 10-26- 4-..F- 1500 | 32 | 30 | 4.6 | 10.5 | 1500 | 5500 | 10 | 51 | 436 | 515 |
| 3000 | 27 | 26 | 8.3 | 19 | 3000 | 5500 | 10 | 51 | 436 | 515 |

AMKASYN. Main Spindle Motors DH

AMKASYN main spindle motors DH are highly dynamic and sturdy three-phase asynchronous motors and are especially suitable as main drives or high power servo drives. These motors feature a constant power speed range of 1:3, with rated power up to 38 kW and rated torque up to 240 Nm. 200 to 300% of rated torque can be delivered briefly up to rated speed. The heavy duty design and strengthened bearings permit high radial loads. AMKASYN main spindle motors DH in addition display outstanding servo properties. They can be used in speed control, position and synchronous control in combination with the digital AMK inverters type AMKASYN.

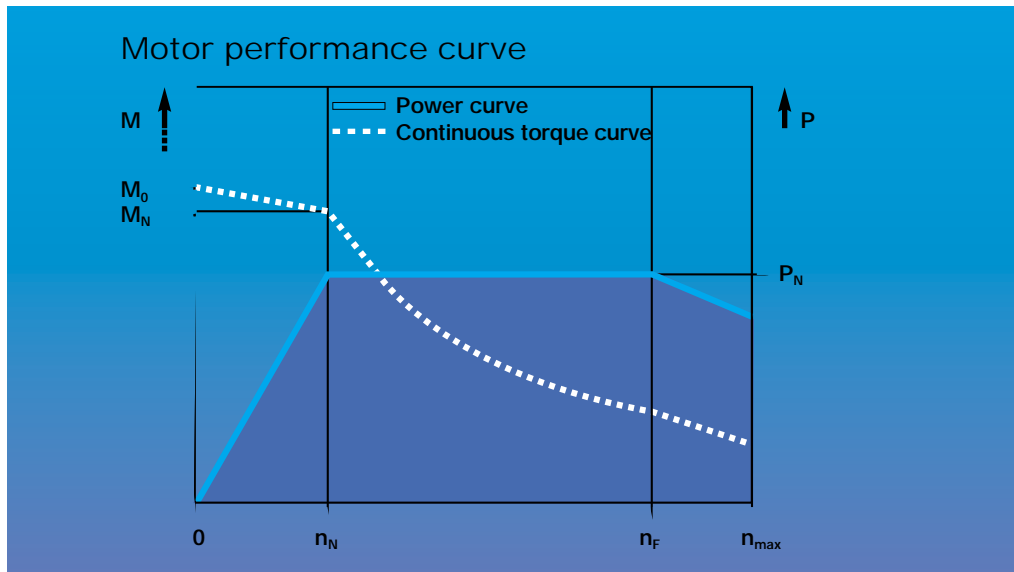


Standard version

Mounting: B5 Metric flange
 Degree of protection: IP 54
 Motor connection: Terminal box
 Position feedback: Optical sine wave encoder, Type I
 Keyway: Standard
 Airflow direction: Towards output shaft

Features

- Low maintenance
- Heavy duty bearings
- TEFC – totally enclosed fan cooled; airflow towards the output shaft (optional reverse airflow)
- High overload capacity
- Outstanding servo properties



Options

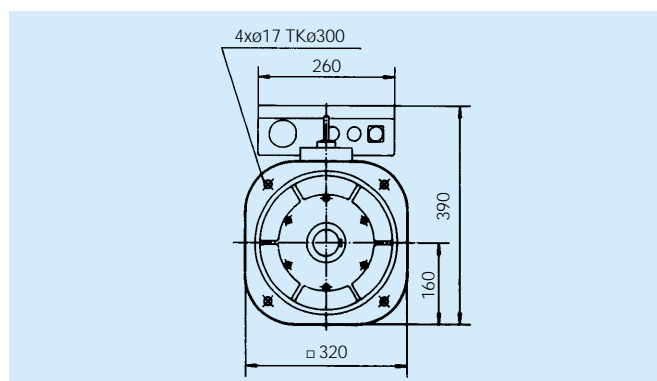
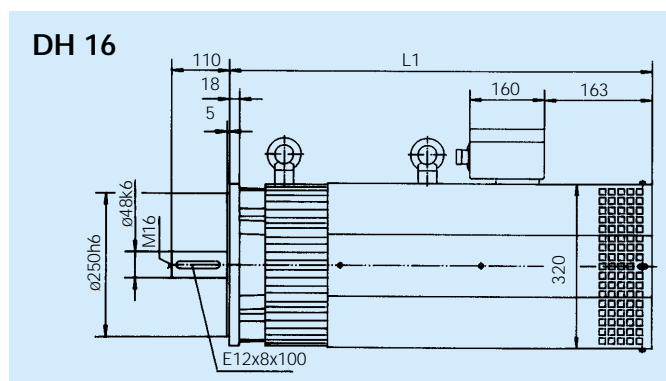
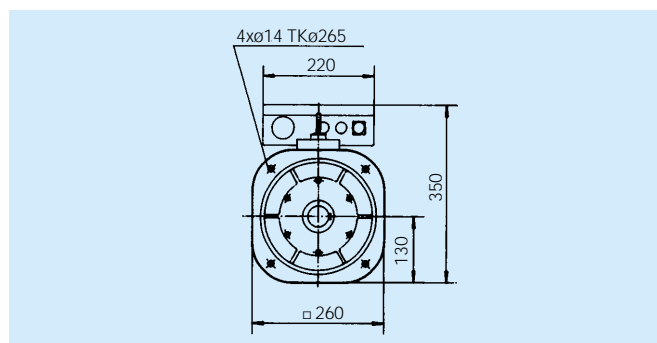
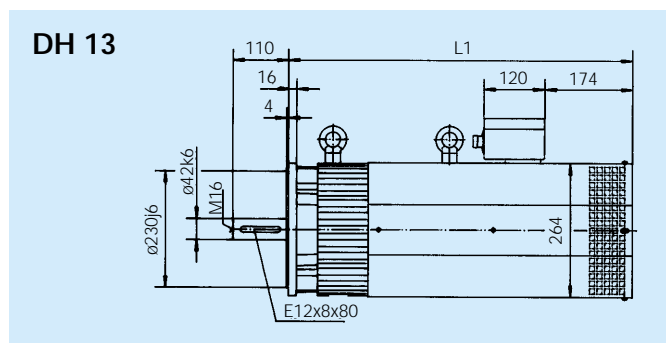
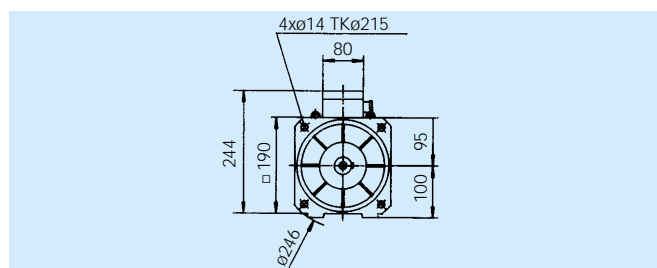
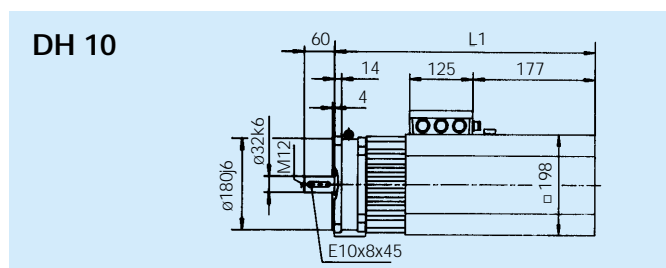
- Holding brake
- Shaft end without keyway
- Reverse fan airflow
- Higher vibration severity grade
- Tighter runout tolerances

Technical Data DH

Rated voltage 350 V

| Motor type | M _O [Nm] | M _N [Nm] | P _N [kW] | I _N [A] | n _N [1/min] | n _F [1/min] | n _{max} [1/min] | J [kgm ² · 10 ⁻³] | m [kg] | L1 [mm] | L1 _{BR} [mm] |
|----------------------|------------------------|------------------------|------------------------|-----------------------|---------------------------|---------------------------|-----------------------------|---|-----------|------------|--------------------------|
| DH 10- 40-4...F-1500 | 43 | 40 | 6.3 | 15 | 1500 | 4500 | 5500 | 18 | 57 | 500 | 579 |
| DH 10- 55-4...F-1800 | 56 | 53 | 10 | 22.5 | 1800 | 3600 | 5500 | 22 | 71 | 600 | 679 |
| DH 13- 60-4...F-1500 | 68 | 60 | 9.5 | 23 | 1500 | 3000 | 5000 | 46 | 90 | 520 | 610 |
| DH 13-100-4...F-1500 | 100 | 95 | 15 | 32 | 1500 | 3000 | 5000 | 80 | 125 | 630 | 720 |
| DH 13-120-4...F-1500 | 125 | 110 | 17.5 | 39 | 1500 | 3000 | 5000 | 95 | 145 | 680 | 770 |
| DH 13-150-4...F-1800 | 155 | 148 | 28 | 63 | 1800 | 3200 | 5000 | 120 | 180 | 780 | 870 |
| DH 16-180-4...F-1500 | 190 | 180 | 28 | 62 | 1500 | 3000 | 4500 | 160 | 220 | 725 | 870 |
| DH 16-240-4...F-1500 | 255 | 240 | 38 | 78 | 1500 | 3000 | 4500 | 210 | 265 | 825 | 970 |

Dimensions DH



All dimensions in millimeter

AMKASYN. Liquid-cooled Main Spindle Motors DW

These liquid-cooled three-phase asynchronous motors feature compact frame sizes at high power density.

Due to the liquid-cooled design of these motors the thermal influences on the immediately surrounding components and area are reduced to a minimum as compared to fan cooled designs. The created waste heat can be reclaimed easily for other inhouse processes.

AMKASYN main spindle motors DW feature a constant power speed range of 1:3, rated power up to 28kW and rated torque up to 150 Nm. The heavy duty design and strengthened bearings permit high radial loads. AMKASYN main spindle motors DW in addition display outstanding servo properties. They can be used in speed control, position and synchronous control in combination with the digital AMK inverters type AMKASYN.

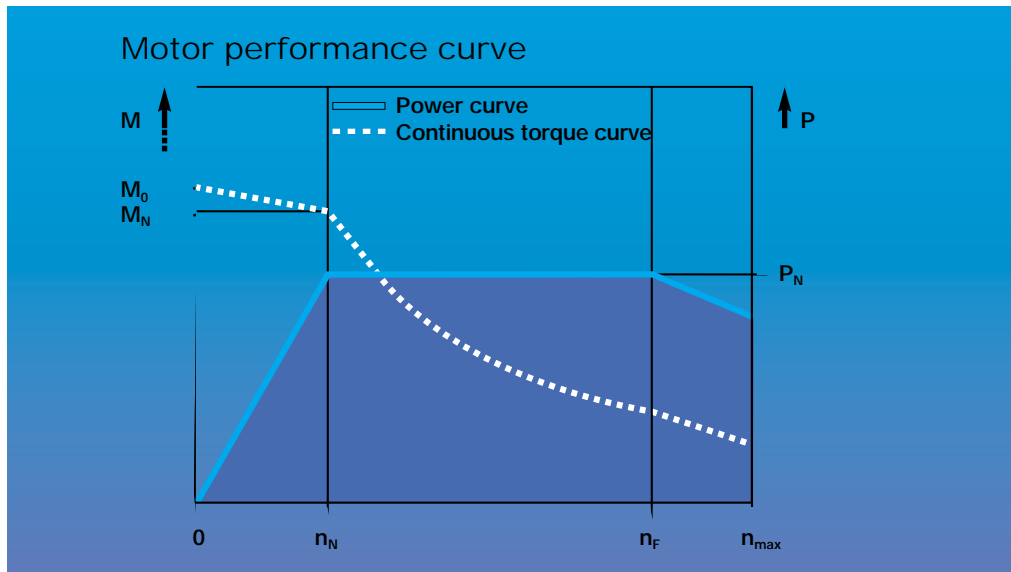


Standard version

| | |
|-----------------------|-----------------------------------|
| Mounting: | B5 Metric flange |
| Degree of protection: | IP 54 |
| Motor connection: | Terminal box |
| Position feedback: | Optical sine wave encoder, Type I |
| Keyway: | None (smooth shaft) |

Features

- Low maintenance
- Compact
- High power density
- No thermal influence on surrounding components
- Heavy duty bearings
- High overload capacity
- Outstanding servo properties



Options

- Shaft with keyway
- Higher vibration severity grade
- Tighter runout tolerances

Liquid cooling requirements

- Inlet temperature 15 to 30 degrees Celsius
- Maximum input pressure: 1 bar
- Closed circuit cooling system
- In case of water cooling please follow AMK recommendations for the water quality.

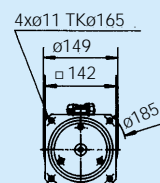
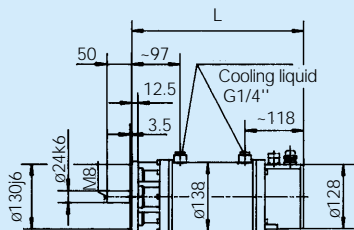
Technical Data DW

Rated voltage 350 V

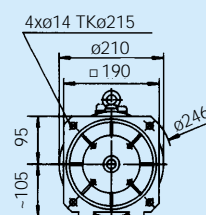
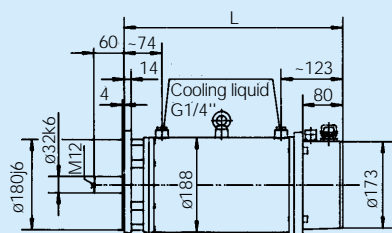
| Motor type | M _O [Nm] | M _N [Nm] | P _N [kW] | I _N [A] | n _N [1/min] | n _F [1/min] | n _{max} [1/min] | J [kgm ² · 10 ⁻³] | m [kg] | Q [l/min] | ΔT [K] | L [mm] | L _{BR} [mm] |
|-----------------------|------------------------|------------------------|------------------------|-----------------------|---------------------------|---------------------------|-----------------------------|---|-----------|--------------|-----------|-----------|-------------------------|
| DW 7- 17-4-..W- 3000 | 14 | 13 | 4 | 11 | 3000 | 5500 | 5500 | 1.7 | 22 | 1.5 | 15 | 345 | ---- |
| DW 7- 33-4-..W- 3000 | 25 | 23 | 7.2 | 20 | 3000 | 5500 | 5500 | 3.2 | 30 | 2 | 15 | 450 | ---- |
| DW 10- 40-4-..W- 1500 | 43 | 40 | 6 | 15 | 1500 | 4500 | 5500 | 18 | 68 | 2 | 15 | 435 | 555 |
| DW 10- 55-4-..W- 1800 | 56 | 53 | 10 | 22 | 1800 | 3600 | 5500 | 22 | 85 | 2 | 15 | 535 | 655 |
| DW 13- 60-4-..W- 1500 | 68 | 60 | 9.5 | 23 | 1500 | 3000 | 5000 | 46 | 80 | 2 | 20 | 360 | 455 |
| DW 13-100-4-..W- 1500 | 100 | 95 | 15 | 32 | 1500 | 3000 | 5000 | 80 | 115 | 2 | 20 | 465 | 560 |
| DW 13-150-4-..W- 1800 | 155 | 148 | 28 | 63 | 1800 | 3200 | 5000 | 120 | 170 | 2.5 | 20 | 615 | 710 |

Dimensions DW

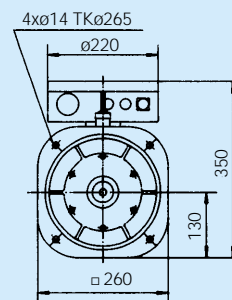
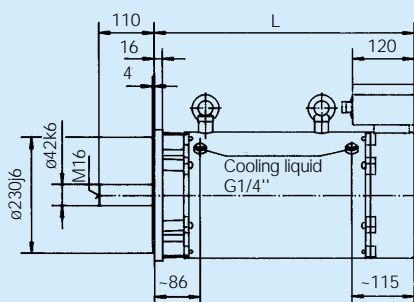
DW 7



DW 10



DW 13



All dimensions in millimeter

Motor Connection

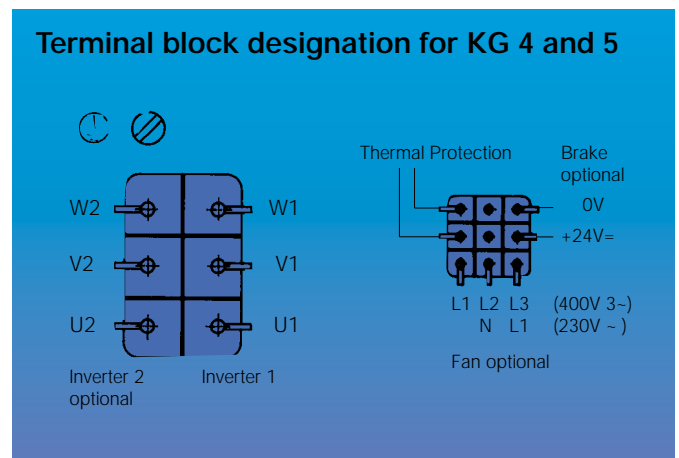
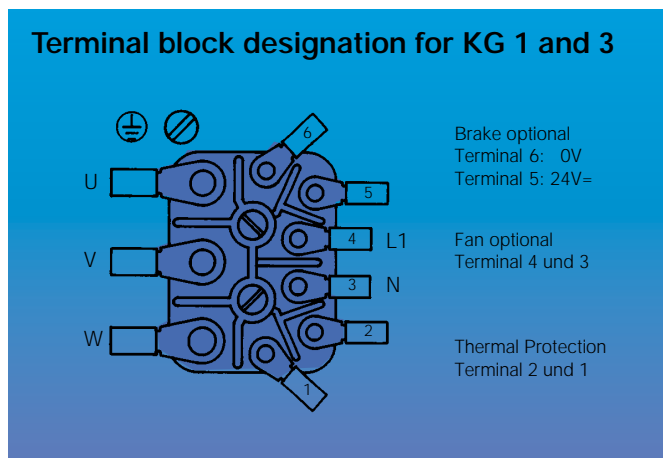
DV, DH and DW motors feature terminal box connections for motor leads, fan and holding brake. The motors of the DS series and optionally of the DV series feature plug-style connectors. Connection cables with the cor-

responding cross-sections can be purchased preassembled. Shielded cables must be used for EMC reasons.

Terminal box types and terminal block wiring

| Motor type | Terminal box size | Terminal block components | Cable strain relief | Cable dia. in mm | Wire size [mm ²] | I _L * [A] |
|------------|-------------------|---------------------------|-------------------------|------------------|------------------------------|----------------------|
| DV5/ DV7 | KG 1 | 3 x M6 and 6 x M4 | 1 x PG13.5 and 2 x PG11 | 5-12 5-10 | 4 x 1 | 9.6 |
| DW7 | ----- | 6 x M5 | 1 x PG13.5 and 1 x PG11 | 5-12 5-10 | 4 x 1 | 9.6 |
| DV10/ DH10 | KG 3 | 3 x M6 and 6 x M4 | 1 x PG21 and 2 x PG11 | 11-17.5 5-10 | 4 x 1.5 / 2.5 / 4 | 12.2 / 16.5 / 23 |
| DW10 | ----- | 3 x M6 and 6 x M4 | 1 x PG29 and 1 x PG11 | 18-27 7.5-12 | 4 x 1.5 / 2.5 / 4 | 12.2 / 16.5 / 23 |
| DH13/ DW13 | KG 4 | 6 x M6 and 9 x M4 | 1 x PG29 and 2 x PG11 | 18-25 5-10 | 4 x 6/10 | 29 / 40 |
| DH16 | KG 5 | 6 x M10 and 9 x M4 | 1 x PG29 and 2 x PG11 | 18-25 5-10 | 4 x 16 | 53 |

*The current values I_L for the connection cable refer to applications according to EN 60204-1:1992 in the cable laying type B2, or according to DIN 46200 for connection bolts.



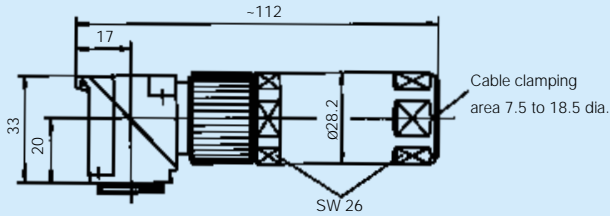
Connector types

| Motor size | Connector size (cable dia in mm) | Wire size [mm ²] | I _L * [A] |
|----------------|----------------------------------|------------------------------|----------------------|
| DS3-10, DV4-10 | BG 1 (7,5-18,5) | 4 x 1.5 + 4 x 0.25 | 12.2 |
| DS10, DV10 | BG 1.5 (9-25) | 4 x 4.0 + 4 x 0.75 | 23 |
| DS10, DV10 | BG 1.5 (9-25) | 4 x 6.0 + 4 x 0.75 | 29 |

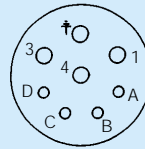
*The current values I_L for the connection cable refer to applications according to EN 60204-1:1992 in the cable laying type B2

Dimensions of the motor connector and connection wiring

Power connector size BG 1



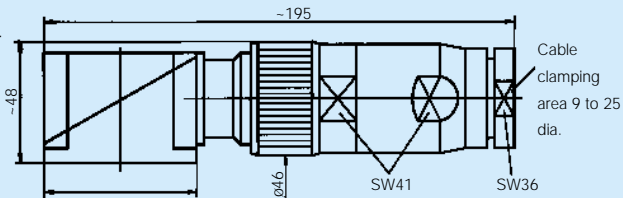
All dimensions in millimeter



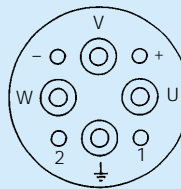
Connection assignment when viewed onto the motor socket

| Designation | Connection |
|-------------|--------------------|
| A | Temperature sensor |
| B | Temperature sensor |
| C | Brake + |
| D | Brake 0 Volt |
| 1 | Motor phase u |
| 3 | Motor phase w |
| 4 | Motor phase v |
| ⊥ | PE ground |

Power connector size BG 1.5



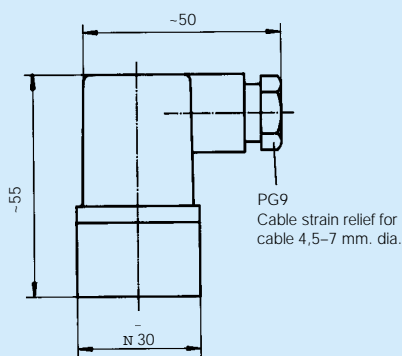
All dimensions in millimeter



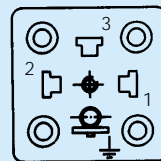
Connection assignment when viewed onto the motor socket

| Designation | Connection |
|-------------|--------------------|
| u | Motor phase u |
| v | Motor phase v |
| w | Motor phase w |
| 1 | Temperature sensor |
| 2 | Temperature sensor |
| + | Brake + |
| - | Brake 0 V |
| ⊥ | PE ground |

Socket and connector for external fan.



All dimensions in millimeter



Connection assignment when viewed onto the motor socket

| Designation | Connection |
|-------------|------------|
| 1 | L1 |
| 2 | N |
| 3 | ----- |
| ⊥ | PE ground |

Position Feedback Systems

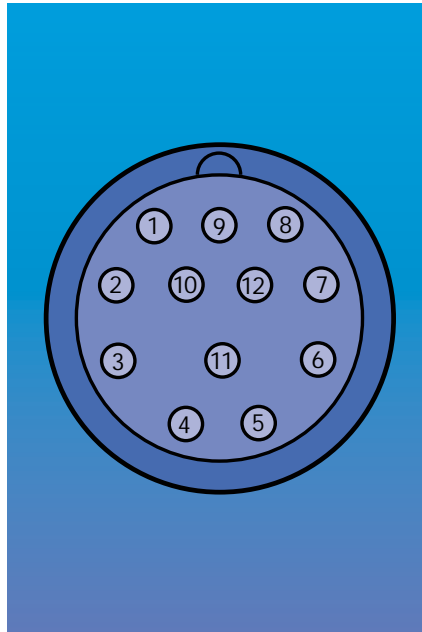


Feedback types

The motors can be equipped with different position feedback systems. Depending upon the type of feedback used, the maximum speed of the motor is limited accordingly.

| Type | Description | Max. speed [rpm] |
|------|--|------------------|
| R | Resolver | 15.000 |
| I | Optical sine wave encoder 1000 (optional 1024) periods/revolution | 6.000 |
| T | Optical absolute value encoder max. 4096 revolutions 512 periods/revolution | 6.000 |
| A | Magnetic sine wave encoder 100 (50) periods/revolution | 60.000 |

Pin-outs of the socket of the position feedback signal.



| Pin | Feedback types | | | |
|-----|----------------|-----|--------|-----|
| | R | I | T | A |
| 1 | +Sin | G2N | G2N | G2N |
| 2 | -Sin | G2I | G2I | G2I |
| 3 | +Cos | G1N | G1N | G1N |
| 4 | -Cos | G1I | G1I | G1I |
| 5 | - | - | - | - |
| 6 | - | GND | GND | GND |
| 7 | - | - | - | - |
| 8 | SSS | - | SSS | - |
| 9 | +UREF | G0N | +RS485 | G0N |
| 10 | -UREF | G0I | -RS485 | G0I |
| 11 | - | 05P | 09P | 05P |
| 12 | - | - | - | - |

Connection assignment when viewed onto the encoder socket

Description of pin-out symbols

| | |
|-----|---------------------------------------|
| G0N | Reference pulse |
| G0I | Reference pulse inverted |
| G1N | Channel 1 |
| G1I | Channel 1 inverted |
| G2N | Channel 2 |
| G2I | Channel 2 inverted |
| 05P | Supply 5 V _s , max. 250 mA |
| 09P | Supply 9 V _s , max. 150 mA |
| SSS | Shield |

| | |
|---------|---------------------------------|
| + Sin | Resolver sine |
| - Sin | Resolver sine inverted |
| + Cos | Resolver cosine |
| - Cos | Resolver cosine inverted |
| + UREF | Resolver supply signal |
| - UREF | Resolver supply signal inverted |
| + RS485 | T encoder, interface |
| - RS485 | T encoder, interface |

Technical Data of External Fan and Holding Brake

External fan

The external fans on the motors must be connected to a separate supply voltage. Up to motor size 10 the external fans are driven by single-phase 230V, 50/60 Hz AC-motors, from motor size 13 they are driven by three-phase 400V, 50/60 Hz motors (see table). The air flow is in the direction of the output shaft in the DS and DV motors. The DH motors can be designed either for air flow in the direction of the output shaft (standard) or reverse (optional). With reverse air flow the stated performance data must be reduced by approx. 15%. Please inquire for accurate data. Sufficient clearance for the air supply or discharge is required.



| Motor type | External fan data | |
|------------|-------------------|--------------|
| | U_F [V] | I_F [A] |
| DV 5 | 1 x 230 | 0.25 |
| DS 7 | 1 x 230 | 0.1 |
| DV 7 | 1 x 230 | 0.1 |
| DS 10 | 1 x 230 | 0.6 |
| DV 10 | 1 x 230 | 0.6 |
| DH 10 | 1 x 230 | 0.6 |
| DH 13 | 3 x 400 | 0.5 |
| DH 16 | 3 x 400 | 0.7 |

Holding brake

The motors can be equipped optionally with holding brakes. These are not suitable as service brakes. The brakes are lifted with 24V DC input. In the case of changed operating conditions, the operating

instructions of the brake manufacturer must be observed.

Note: For the maximum speed of the motor the maximum speed of the brake must also be considered.

| Motor type | Holding brake data | | | | | |
|---------------------------|--------------------|-----------------|-----------------|---|------------------------|------------------|
| | M_{BR} [Nm] | U_{BR} [V] | I_{BR} [A] | J_{BR} [kgm ² ·10 ⁻³] | n_{maxBR} [1/min] | m_{BR} [kg] |
| DS 4, DV 4 | 1.2 | 24 ≙ | 0.35 | 0.007 | 12000 | 0.5 |
| DS 5, DV 5 | 2.5 | 24 ≙ | 0.5 | 0.04 | 10000 | 1 |
| DV 7 with $M_N \leq 6$ Nm | 5 | 24 ≙ | 0.55 | 0.1 | 10000 | 1.5 |
| DV 7 with $M_N > 6$ Nm | 11 | 24 ≙ | 0.55 | 0.1 | 10000 | 1.5 |
| DS 7 | 11 | 24 ≙ | 0.55 | 0.1 | 10000 | 1.5 |
| DS 10, DV 10 | 20 | 24 ≙ | 0.95 | 1 | 10000 | 2.5 |
| DH 10 | 40 | 24 ≙ | 1.4 | 3.2 | 8000 | 4.5 |
| DH 13 | 100 | 24 ≙ | 2.3 | 1.6 | 3500 | 15 |
| DH 16 | 130 | 24 ≙ | 3.2 | 3.8 | 3500 | 23 |

General Technical Data

Ambient temperature:

+5 ... +40 degrees Celsius. At higher ambient temperatures up to maximum 60 degree Celsius the rating data must be reduced by 1% per 1 Kelvin temperature rise.

Installation altitude:

Up to 1000 m above sea level. In operation above 1000 m altitude, ambient temperatures corresponding to DIN VDE 0530 Table 4 shall be used as basis.

Humidity:

Maximum 85% relative humidity, non-condensating

Degree of protection:

IP 54. Higher degree of protection on request

The stated maximum speeds apply for the IP 54 version with seal ring.

Rating data:

Refer to 100 Kelvin temperature rise in the windings. The test motor is mounted using a thermally insulating flange.

Insulating material class:

F according to DIN VDE 0530.

Thermal protection:

PTC resistor, cold resistance approx. 150-800 Ohm

Bearings:

Ball bearings, lifetime lubricated

Axial eccentricity run-out:

N according to DIN 42955

Balancing grade:

G2,5 corresponding to VDI 2056

Vibrational grade:

N according to DIN ISO 2373

Painting:

RAL 9005, flat black

Cooling:

Non-ventilated or fan-cooled; airflow toward output shaft. Reverse airflow as option.

Abbreviations

Motor tables

| Character | Unit | Description |
|------------|------------------|--|
| M_0 | Nm | Zero speed torque |
| M_N | Nm | Rated torque |
| P_N | kW | Rated power |
| n_N | rpm | Rated speed |
| n_F | rpm | Speed limit for constant rated power |
| n_{max} | rpm | Maximum speed |
| U_N | V | Rated voltage |
| I_N | A | Rated current |
| J | kgm ² | Rotor inertia |
| m | kg | Motor weight |
| k_T | Nm/A | Torque constant ($M=I \cdot k_T$) |
| Q | l/min | Rated flow rate |
| ΔT | K | Temperature rise of the liquid at point of rated operation |
| L | mm | Length of non-ventilated motor |
| L_1 | mm | Length of fan cooled motor |
| L_{BR} | mm | Length of motor including brake |
| L_{1BR} | mm | Length of fan cooled motor including brake |

Holding brake

| | | |
|-------------|------------------|---|
| M_{BR} | Nm | Holding torque |
| n_{maxBR} | rpm | Brake maximum speed |
| U_{BR} | V | Rated voltage 24V≅ (unregulated) |
| I_{BR} | A | Brake rated current |
| J_{BR} | kgm ² | Brake moment of inertia |
| m_{BR} | kg | Weight of the brake, total motor weight is $m + m_{BR}$ |

External fan

| | | |
|-------|---|----------------------------|
| U_F | V | External fan rated voltage |
| I_F | A | External fan rated current |

Important Notes

- Motors can reach surface temperatures above 100 degrees Celsius during operation. Before touching the motor check the surface temperature to avoid injury.
- In the case of motors with keyways and freely rotating shaft ends, the key must be removed or secured against being thrown off.
- Before opening the terminal box or pulling out or plugging in a connector on the motors, ensure that there is no voltage at the termination end. Voltage can be present at the connections even when the motor is not moving. If not complied with injuries or death may occur.
- A low-resistance connection of the motor housing to the PE ground bus in the control cabinet is required for trouble free and safe operation of the motors.
- Pounding or uncontrolled impact of force onto the motor shaft during transport, storage and installation of the motors in the machine can lead to damage of the bearings and shaft.
- Inadmissible axial and radial loads lead to reduction of the bearing life. Bearing load diagrams are available on request.
- When using couplings, attention to correct assembly of the coupling components has to be observed. Alignment errors or offset of the coupling can lead to premature destruction of bearings and of the coupling.
- All motors listed may not be connected directly to the main power lines. The motors are intended exclusively for operation on AMK inverter systems.

AMK – your competent
partner in drive
and control systems



- AC servo and main drives
- Linear-motion drives
- Joint-drive modules
- Variable-speed AC drives and 3-phase AC drives
- Custom-designed special motors
- Built-in and geared motors
- Frequency inverters

AMK

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