



Technical Information

# Orbital Motors

# OMS, OMT and OMV Orbital Motors



**Revision history***Table of revisions*

| <b>Date</b>   | <b>Changed</b>                         | <b>Rev</b> |
|---------------|----------------------------------------|------------|
| November 2014 | Converted to Danfoss layout - DITA CMS | FA         |
| Jun 2013      | Drawing corrected                      | EK         |
| Apr 2013      | Drawing corrected                      | EJ         |
| Jan 2013      | Correct drawing                        | EI         |
| Nov 2012      | Planetary Gears deleted                | EH         |
| Jul 2012      | Typo in 'Major dia'                    | EG         |
| Nov 2010      | Dimensions changed                     | EF         |
| Nov 2009      | conversions, and layout adjusted       | ED         |

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**OMVS**

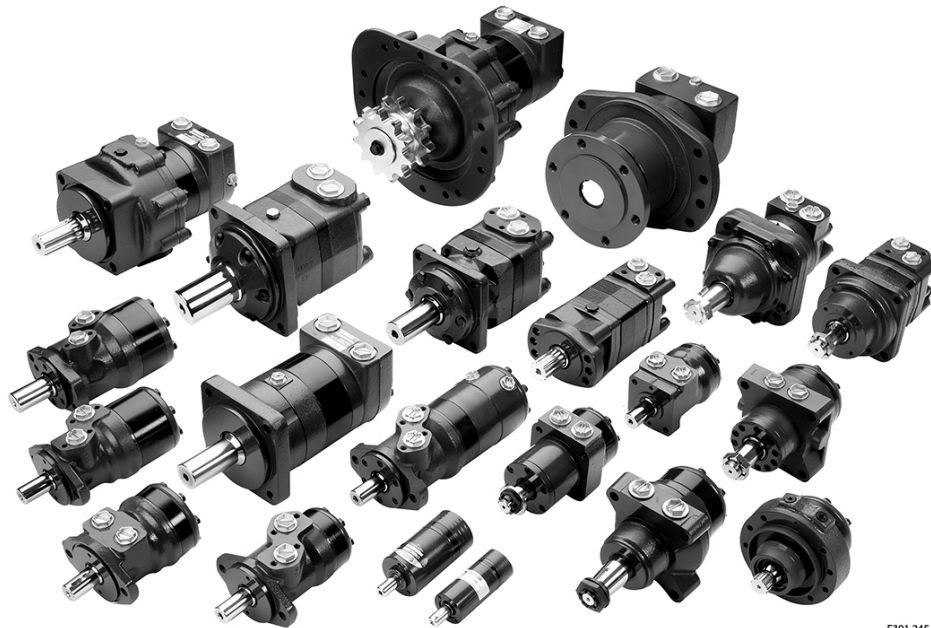
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## A wide range of Orbital Motors

### Characteristic, features and application areas of Orbital Motors



Danfoss is a world leader within production of low speed orbital motors with high torque. We can offer more than 3,000 different orbital motors, categorised in types, variants and sizes (including different shaft versions).

The motors vary in size (rated displacement) from 8 cm<sup>3</sup> [0.50 in<sup>3</sup>] to 800 cm<sup>3</sup> [48.9 in<sup>3</sup>] per revolution.

Speeds range up to approximate 2,500 min<sup>-1</sup> (rpm) for the smallest type and up to approximate 600 min<sup>-1</sup> (rpm) for the largest type.

Maximum operating torques vary from 13 N·m [115 lbf·in] to 2,700 N·m [24,000 lbf·in] (peak) and maximum outputs are from 2.0 kW [2.7 hp] to 70 kW [95 hp].

#### Characteristic features of Danfoss Orbital Motors

- Smooth running over the entire speed range
- Constant operating torque over a wide speed range
- High starting torque
- High return pressure without the use of drain line (High pressure shaft seal)
- High efficiency
- Long life under extreme operating conditions
- Robust and compact design
- High radial and axial bearing capacity
- For applications in both open and closed loop hydraulic systems
- Suitable for a wide variety of hydraulics fluids

#### Technical features of Danfoss Orbital Motor

The programme is characterised by technical features appealing to a large number of applications and a part of the programme is characterised by motors that can be adapted to a given application. Adaptions comprise the following variants among others:

### A wide range of Orbital Motors

- Motors with corrosion resistant parts
- Wheel motors with recessed mounting flange
- OMP, OMR- motors with needle bearing
- OMR motor in low leakage version
- OMR motors in a super low leakage version
- Short motors without bearings
- Ultra short motors
- Motors with integrated positive holding brake
- Motors with integrated negative holding brake
- Motors with integrated flushing valve
- Motors with speed sensor
- Motors with tacho connection
- All motors are available with black finish paint

### **The Danfoss Orbital Motors are used in the following application areas:**

- Construction equipment
- Agricultural equipment
- Material handling & Lifting equipment
- Forestry equipment
- Lawn and turf equipment
- Special purpose
- Machine tools and stationary equipment
- Marine equipment

### **Survey of literature with technical data on Danfoss Orbital Motors**

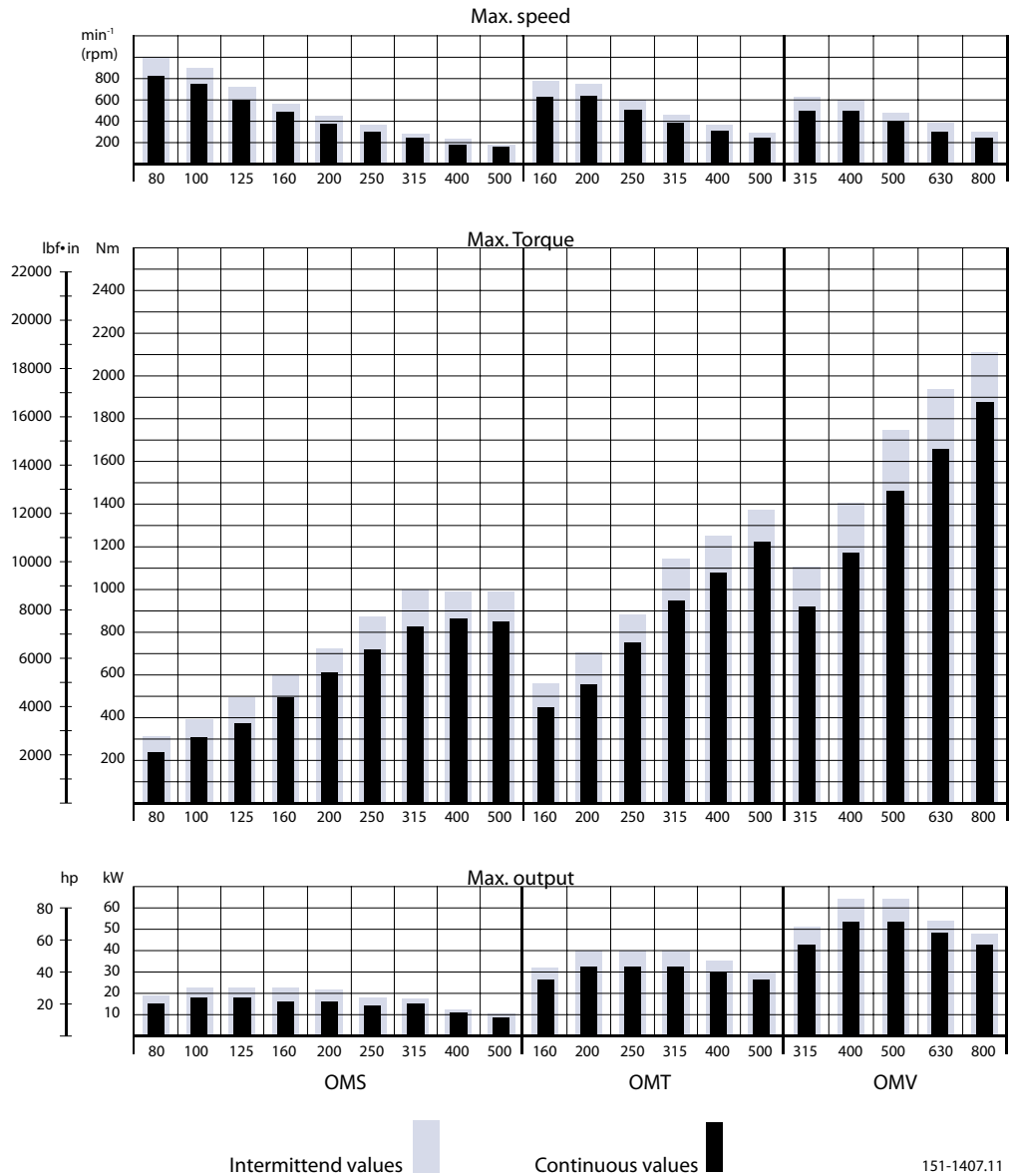
Detailed data on all Danfoss Orbital Motors can be found in our motor catalogue, which is divided into more individual subcatalogues:

- General information on Danfoss Orbital Motors: function, use, selection of orbital motor, hydraulic systems, etc.
- Technical data on small motors: OML and OMM
- Technical data on medium sized motors: OMP, OMR, OMH
- Technical data on medium sized motors: DH and DS
- Technical data on medium sized motors: OMEW
- Technical data on medium sized motors: VMP
- Technical data on medium sized motors: VMR
- Technical data on large motors: OMS, OMT and OMV
- Technical data on large motors: TMT
- Technical data on large motors: TMV

A general survey brochure on Danfoss Orbital Motors gives a quick motor reference based on power, torque, speed and capabilities.

Data survey

OMS, OMT and OMV speed, torque and output



The bar diagrams above are useful for a quick selection of relevant motor size for the application. The final motor size can be determined by using the function diagram for each motor size.



**Data survey**

- OMS can be found [here](#)
- OMT can be found [here](#)
- OMV can be found [here](#)

The function diagrams are based on actual tests on a representative number of motors from our production. The diagrams apply to a return pressure between 5 and 10 bar [75 and 150 psi] when using mineral based hydraulic oil with a viscosity of 35 mm<sup>2</sup>/s [165 SUS] and a temperature of 50°C [120°F]. For further explanation concerning how to read and use the function diagrams, please consult the paragraph "Selection of motor size" in the technical information "General Orbital motors" 520L0232.

**Versions**
**OMS versions**

| Mounting flange | Shaft            | Port size  | European version | US version | Drain connection | Check valve | Main type designation |
|-----------------|------------------|------------|------------------|------------|------------------|-------------|-----------------------|
| Standard flange | Cyl. 32 mm       | G 1/2      | X                |            | Yes              | Yes         | OMS                   |
|                 | Cyl. 1.25 in     | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
|                 | Splined 1.25 in  | G 1/2      | X                |            | Yes              | Yes         | OMS                   |
|                 |                  | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
|                 | Tapered 35 mm    | G 1/2      | X                |            | Yes              | Yes         | OMS                   |
|                 | Tapered 1.25 in  | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
| P.t.o.          | G 1/2            | X          |                  | Yes        | Yes              | OMS         |                       |
| Special flange  | Splined 1.25 in  | G 1/2      | X                |            | Yes              | Yes         | OMS                   |
| A-2 flange      | Cyl. 1 in        | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
|                 | Cyl. 1.25 in     | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
|                 | Splined 1 in     | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
|                 | Splined 1.25 in  | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
|                 | Tapered 1.25 in  | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
| Magneto flange  | Cyl. 1 in        | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
|                 | Cyl. 1.25 in     | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
|                 | Splined 1 in     | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
|                 | Splined 1.25 in  | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
| SAE B flange    | Splined 1.25 in  | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
|                 | Splined 0.875 in | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMS                   |
| Wheel           | Cyl. 32 mm       | G 1/2      | X                |            | Yes              | Yes         | OMSW                  |
|                 | Cyl. 1.25 in     | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMSW                  |
|                 | Tapered 35 mm    | G 1/2      | X                |            | Yes              | Yes         | OMSW                  |
|                 | Tapered 1.25 in  | 7/8-14 UNF |                  | X          | Yes              | Yes         | OMSW                  |
| Short           | No output shaft  | G 1/2      | X                |            | Yes              | Yes         | OMSW                  |

**Features available (options):**

- Speed sensor
- Motor with tacho connection
- High pressure shaft seal
- Viton shaft seal
- Painted
- Ultra short
- Motor with drum brake

**Code numbers**
**Code numbers**

| Code Numbers | Displacement [cm <sup>3</sup> ] |      |      |      |      |      |      |      |      |
|--------------|---------------------------------|------|------|------|------|------|------|------|------|
|              | 80                              | 100  | 125  | 160  | 200  | 250  | 315  | 400  | 500  |
| 151F         | 0500                            | 0501 | 0502 | 0503 | 0504 | 0505 | 0506 | 0605 | -    |
| 151F         | 2200                            | 2201 | 2202 | 2203 | 2204 | 2205 | 2206 | 2261 | 2268 |
| 151F         | 0507                            | 0508 | 0509 | 0510 | 0511 | 0512 | 0513 | -    | -    |
| 151F         | 2207                            | 2208 | 2209 | 2210 | 2211 | 2212 | 2213 | 2262 | 2269 |
| 151F         | 0514                            | 0515 | 0516 | 0517 | 0518 | 0519 | 0520 | -    | -    |
| 151F         | 2214                            | 2215 | 2216 | 2217 | 2218 | 2219 | 2220 | 2264 | 2270 |
| 151F         | 0560                            | 0561 | 0562 | 0563 | 0564 | 0565 | 0566 | -    | -    |
| 151F         | 0542                            | 0543 | 0544 | 0545 | 0546 | 0547 | 0548 | -    | -    |
| 151F         | 2300                            | 2301 | 2302 | 2303 | 2304 | 2305 | 2306 | 2307 | 2345 |
| 151F         | 2316                            | 2317 | 2318 | 2319 | 2320 | 2321 | 2322 | 2323 | 2347 |
| 151F         | 2308                            | 2309 | 2310 | 2311 | 2312 | 2313 | 2314 | 2315 | 2346 |
| 151F         | 2324                            | 2325 | 2326 | 2327 | 2328 | 2329 | 2330 | 2331 | 2348 |
| 151F         | 2332                            | 2333 | 2334 | 2335 | 2336 | 2337 | 2338 | 2339 | 2349 |
| 151F         | 2377                            | 2378 | 2379 | 2380 | 2381 | 2382 | 2383 | 2384 | 2385 |
| 151F         | 2368                            | 2369 | 2370 | 2371 | 2372 | 2373 | 2374 | 2375 | 2376 |
| 151F         | 2359                            | 2360 | 2361 | 2362 | 2363 | 2364 | 2365 | 2366 | 2367 |
| 151F         | 2350                            | 2351 | 2352 | 2353 | 2354 | 2355 | 2356 | 2357 | 2358 |
| 151F         | 2395                            | 2396 | 2397 | 2398 | 2399 | 2400 | 2401 | 2402 | 2403 |
| 151F         | 2413                            | 2414 | 2415 | 2416 | 2417 | -    | -    | -    | -    |
| 151F         | 0521                            | 0522 | 0523 | 0524 | 0525 | 0526 | 0527 | 0610 | -    |
| 151F         | 2235                            | 2236 | 2237 | 2238 | 2239 | 2240 | 2241 | 2265 | 2266 |
| 151F         | 0528                            | 0529 | 0530 | 0531 | 0532 | 0533 | 0534 | 0609 | -    |
| 151F         | 2242                            | 2243 | 2244 | 2245 | 2246 | 2247 | 2248 | 2263 | 2267 |
| 151F         | 0535                            | 0536 | 0537 | 0538 | 0539 | 0540 | 0541 | 0608 | -    |

**Ordering**

Add the four digit prefix "151F" to the four digit numbers from the chart for complete code number.

Example:

151F0504 for an OMS 200 with standard flange, cyl. 32 mm shaft and port size G 1/2.

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Orders will not be accepted without the four digit prefix.

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**Technical Data**
**Technical data for OMS**

| Type                                       |                                                       | OMS<br>OMSW<br>OMSS | OMS<br>OMSW<br>OMSS | OMS<br>OMSW<br>OMSS | OMS<br>OMSW<br>OMSS | OMS<br>OMSW<br>OMSS | OMS<br>OMSW<br>OMSS | OMS<br>OMSW<br>OMSS | OMS<br>OMSW<br>OMSS | OMS<br>OMSW<br>OMSS |                |
|--------------------------------------------|-------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------|
| <b>Motor size</b>                          |                                                       | <b>80</b>           | <b>100</b>          | <b>125</b>          | <b>160</b>          | <b>200</b>          | <b>250</b>          | <b>315</b>          | <b>400</b>          | <b>500</b>          |                |
| Geometric displacement                     | cm <sup>3</sup><br>[in <sup>3</sup> ]                 | 80.5<br>[4.91]      | 100.0<br>[6.10]     | 125.7<br>[7.67]     | 159.7<br>[9.75]     | 200.0<br>[12.20]    | 250.0<br>[15.26]    | 314.9<br>[19.22]    | 393.0<br>[23.98]    | 488.0<br>[29.78]    |                |
| Max. speed                                 | min <sup>-1</sup><br>[rpm]                            | cont.               | 810                 | 750                 | 600                 | 470                 | 375                 | 300                 | 240                 | 190                 | 155            |
|                                            |                                                       | int. <sup>1)</sup>  | 1000                | 900                 | 720                 | 560                 | 450                 | 360                 | 285                 | 230                 | 185            |
| Max. torque                                | Nm<br>[lbf·in]                                        | cont.               | 240<br>[2120]       | 305<br>[2700]       | 375<br>[3320]       | 490<br>[4340]       | 610<br>[5400]       | 720<br>[6370]       | 825<br>[7300]       | 865<br>[7660]       | 850<br>[7520]  |
|                                            |                                                       | int. <sup>1)</sup>  | 310<br>[2740]       | 390<br>[3450]       | 490<br>[4340]       | 600<br>[5310]       | 720<br>[6370]       | 870<br>[7700]       | 1000<br>[8850]      | 990<br>[8760]       | 990<br>[8760]  |
| Max. output                                | kW<br>[hp]                                            | cont.               | 15.5<br>[20.8]      | 18.0<br>[24.1]      | 18.0<br>[24.1]      | 16.5<br>[22.1]      | 16.5<br>[22.1]      | 14.5<br>[19.4]      | 15.0<br>[20.1]      | 11.0<br>[14.8]      | 9.0<br>[12.1]  |
|                                            |                                                       | int. <sup>1)</sup>  | 19.5<br>[26.2]      | 22.5<br>[30.2]      | 22.5<br>[30.2]      | 23.0<br>[30.8]      | 22.0<br>[29.5]      | 18.0<br>[24.1]      | 17.0<br>[22.8]      | 12.5<br>[16.8]      | 10.5<br>[14.1] |
| Max. pressure drop                         | bar<br>[psi]                                          | cont.               | 210<br>[3050]       | 210<br>[3050]       | 210<br>[3050]       | 210<br>[3050]       | 210<br>[3050]       | 200<br>[2900]       | 200<br>[2900]       | 160<br>[2320]       | 120<br>[1740]  |
|                                            |                                                       | int. <sup>1)</sup>  | 275<br>[3990]       | 275<br>[3990]       | 275<br>[3990]       | 260<br>[3770]       | 250<br>[3630]       | 250<br>[3630]       | 240<br>[3480]       | 190<br>[2760]       | 140<br>[2030]  |
|                                            |                                                       | peak <sup>2)</sup>  | 295<br>[4280]       | 295<br>[4280]       | 295<br>[4280]       | 280<br>[4060]       | 270<br>[3920]       | 270<br>[3920]       | 260<br>[3770]       | 210<br>[3050]       | 160<br>[2320]  |
| Max. oil flow                              | l/min<br>[USgal/min]                                  | cont.               | 65<br>[17.2]        | 75<br>[19.8]        | 75<br>[19.8]        | 75<br>[19.8]        | 75<br>[19.8]        | 75<br>[19.8]        | 75<br>[19.8]        | 75<br>[19.8]        | 75<br>[19.8]   |
|                                            |                                                       | int. <sup>1)</sup>  | 80<br>[21.1]        | 90<br>[23.8]        | 90<br>[23.8]        | 90<br>[23.8]        | 90<br>[23.8]        | 90<br>[23.8]        | 90<br>[23.8]        | 90<br>[23.8]        | 90<br>[23.8]   |
| Max. starting pressure with unloaded shaft | bar<br>[psi]                                          | 12<br>[175]         | 10<br>[145]         | 10<br>[145]         | 8<br>[115]          | 8<br>[115]          | 8<br>[115]          | 8<br>[115]          | 8<br>[115]          | 8<br>[115]          |                |
| Min. starting torque                       | at max. press. drop cont.<br>Nm [lbf·in]              | 180<br>[1590]       | 230<br>[2040]       | 290<br>[2570]       | 370<br>[3270]       | 470<br>[4160]       | 560<br>[4960]       | 710<br>[6280]       | 710<br>[6280]       | 660<br>[5840]       |                |
|                                            | at max. press. drop int. <sup>1)</sup><br>Nm [lbf·in] | 235<br>[2080]       | 300<br>[2660]       | 380<br>[3360]       | 460<br>[4070]       | 560<br>[4960]       | 700<br>[6200]       | 850<br>[7520]       | 840<br>[7430]       | 770<br>[6820]       |                |

| Type                |           |                    | Max. inlet pressure | Max. return pressure with drain line |
|---------------------|-----------|--------------------|---------------------|--------------------------------------|
| OMS<br>OMSW<br>OMSS | bar [psi] | cont.              | 230 [3340]          | 140 [2030]                           |
|                     | bar [psi] | int. <sup>1)</sup> | 295 [4280]          | 175 [2540]                           |
|                     | bar [psi] | peak <sup>2)</sup> | 300 [4350]          | 210 [3050]                           |

|                            |                |                    | Splined 1 in | Cyl. 1 in  | Splined 0.875 in |
|----------------------------|----------------|--------------------|--------------|------------|------------------|
| *Max torque for shaft type | Nm<br>[lbf·in] | cont.              | 360 [3190]   | 300 [2660] | 200 [1770]       |
|                            |                | int. <sup>1)</sup> | 450 [3980]   | 410 [3630] | 200 [1770]       |

<sup>1)</sup> Intermittent operation: the permissible values may occur for max. 10% of every minute.

<sup>2)</sup> Peak load: the permissible values may occur for max. 1% of every minute.

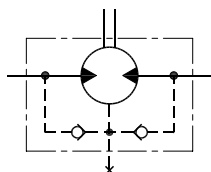
[For max. permissible combination of flow and pressure, see function diagram for actual motor.](#)

Technical Data

Max. Permissible Shaft Seal Pressure

**OMS with standard shaft seal, check valves and without use of drain connection:**

The pressure on the shaft seal never exceeds the pressure in the return line

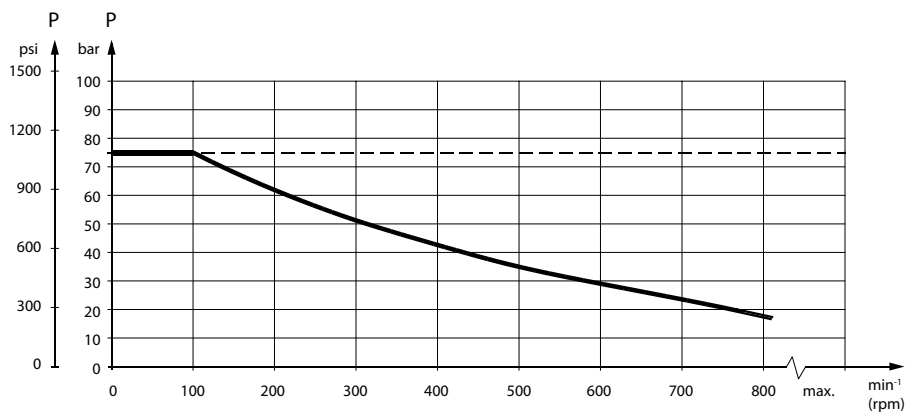


151-320.10

**OMS with standard shaft seal, check valves and with drain connection:**

The shaft seal pressure equals the pressure on the drain line.

*Max. return pressure without drain line or max. pressure in the drain line*



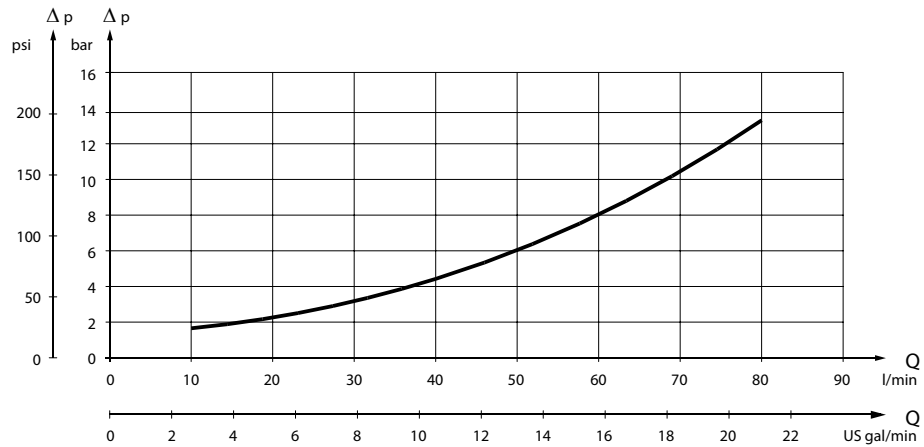
151-1674.10

----- Intermittent operation: the permissible values may occur for max. 10% of every minute.

———— Continuous operation

**Technical Data**

**Pressure Drop in Motor**



151-1408.10

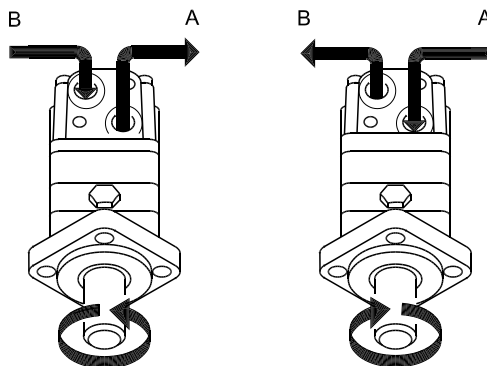
The curve applies to an unloaded motor shaft and an oil viscosity of 35 mm<sup>2</sup>/s [165 SUS]

**Oil flow in drain line**

The table shows the max. oil flow in the drain line at a return pressure less than 5-10 bar [75-150 psi].

| Pressure drop<br>bar [psi] | Viscosity<br>mm <sup>2</sup> /s [SUS] | Oil flow in drain line<br>l/min [US gal/min] |
|----------------------------|---------------------------------------|----------------------------------------------|
| 140 [2030]                 | 20 [100]                              | 1.5 [0.40]                                   |
|                            | 35 [165]                              | 1.0 [0.26]                                   |
| 210 [3050]                 | 20 [100]                              | 3.0 [0.79]                                   |
|                            | 35 [165]                              | 2.0 [0.53]                                   |

**Direction of Shaft Rotation**



151-843.10

**Permissible Shaft Loads for OMS**

**Mounting flange:**

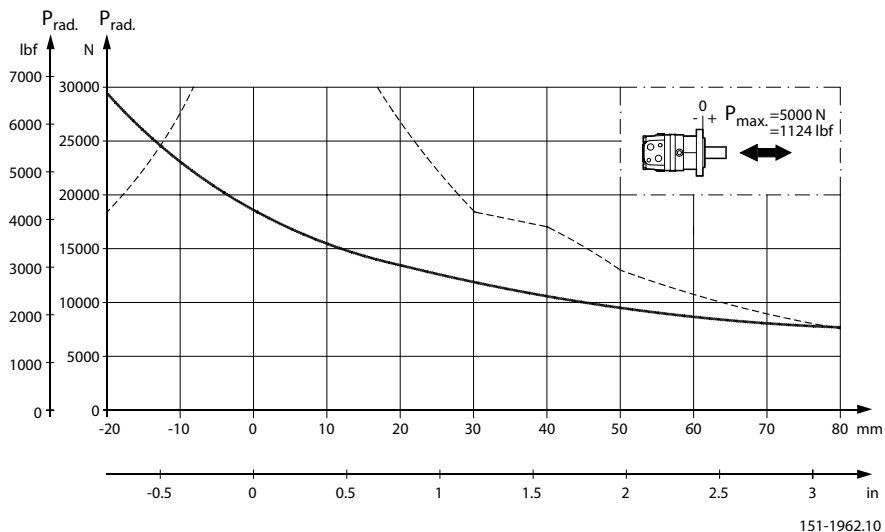
Standard – A-2 – Magneto – SAE B

**Shaft:**

**Technical Data**

Cyl. 32 mm – Cyl. 1.25 in – Splined 1.25 in.

Tapered 35 mm – Tapered 1.25 in – P.t.o.

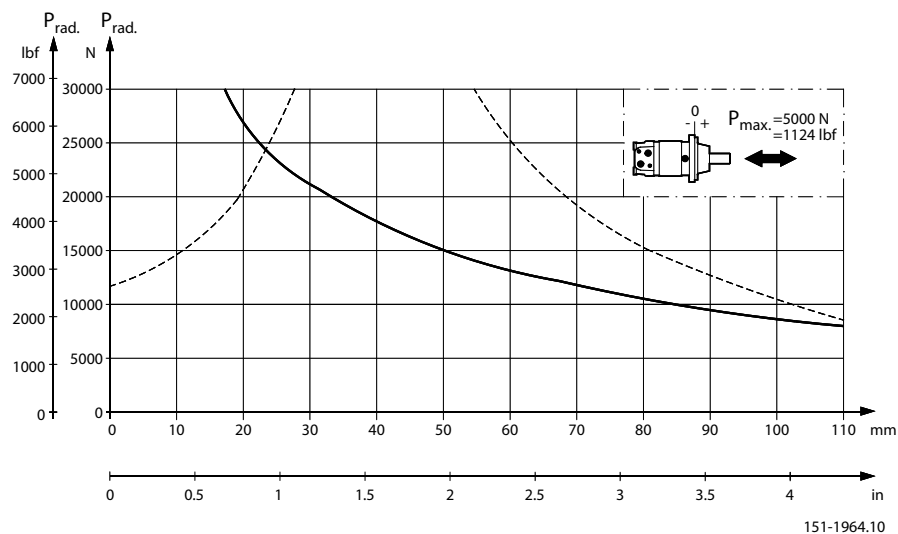


**Mounting flange:**

Wheel

**Shaft:**

All shaft types



The output shaft runs in tapered roller bearings that permit high axial and radial forces.

The permissible radial load on the shaft is shown for an axial load of 0 N as a function of the distance from the mounting flange to the point of load application.

The curve is based on B10 bearing life (2000 hours or 12,000,000 shaft revolutions at  $100 \text{ min}^{-1}$ ) at rated output torque, when mineral-based hydraulic oil with a sufficient content of anti-wear additives, is used.

For 3,000,000 shaft revolutions or 500 hours – increase these shaft loads with 52%.

**Technical Data**

The dash curve shows max. radial shaft load. Any shaft load exceeding the values shown in the curve will involve a risk of breakage.

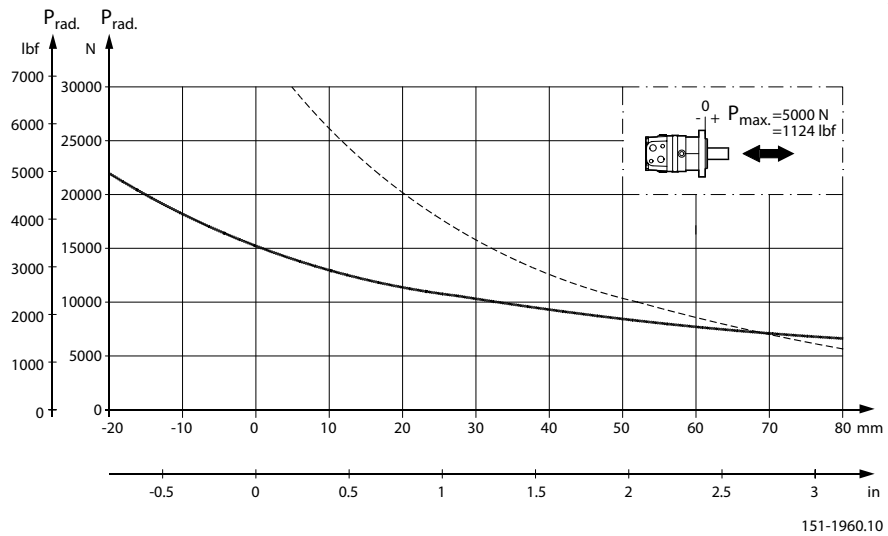
Bearing life calculations can be made using the explanation and formula provided in the chapter "Bearing dimensioning" in the technical information "General Orbital motors" 520L0232.

**Mounting flange:**

Special

**Shaft:**

Splined 1.25 in

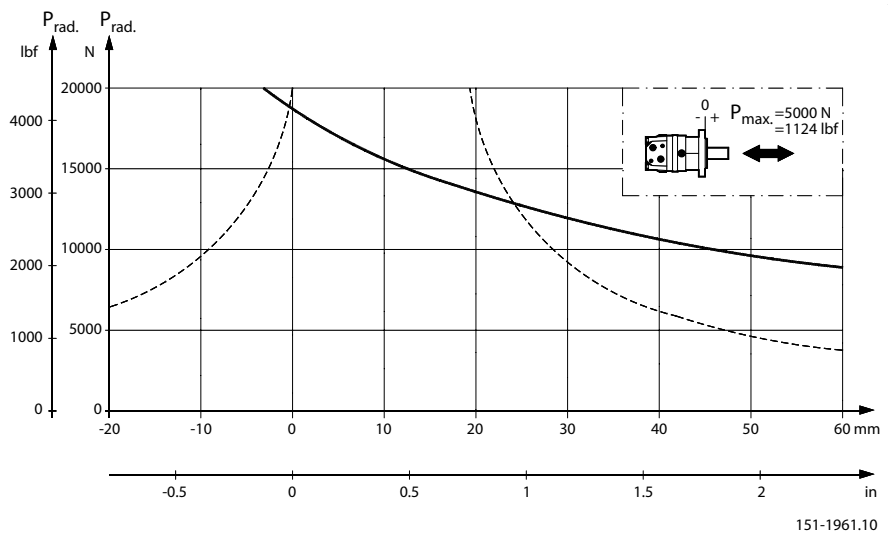


**Mounting flange:**

A-2 – Magneto

**Shaft:**

Cyl. 1 in – Splined 1 in





**Technical Data**

The output shaft runs in tapered roller bearings that permit high axial and radial forces.

The permissible radial load on the shaft is shown for an axial load of 0 N as a function of the distance from the mounting flange to the point of load application.

The curve is based on B10 bearing life (2000 hours or 12,000,000 shaft revolutions at 100 min<sup>-1</sup>) at rated output torque, when mineral-based hydraulic oil with a sufficient content of anti-wear additives, is used.

For 3,000,000 shaft revolutions or 500 hours – increase these shaft loads with 52%.

The dash curve shows max. radial shaft load. Any shaft load exceeding the values shown in the curve will involve a risk of breakage.

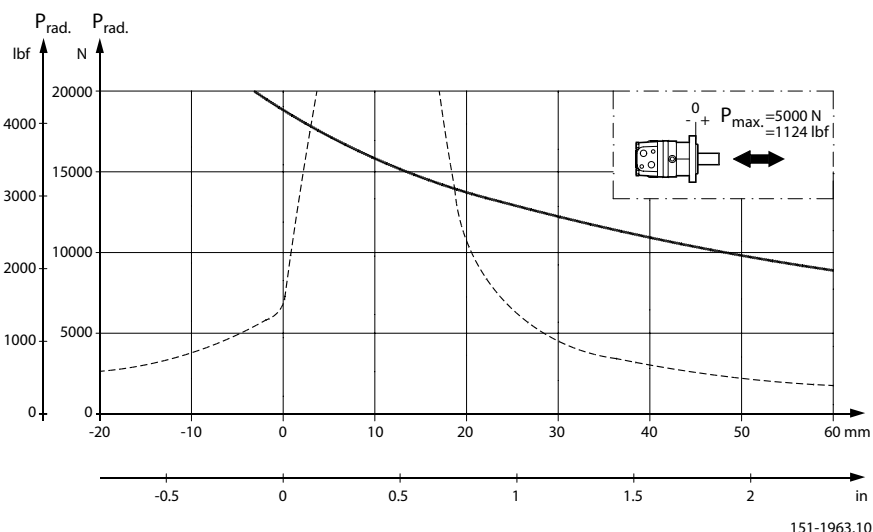
Bearing life calculations can be made using the explanation and formula provided in the chapter "Bearing dimensioning" in the technical information "General Orbital motors" 520L0232.

**Mounting flange:**

SAE B

**Shaft:**

Splined 0.875 in



The output shaft runs in tapered roller bearings that permit high axial and radial forces.

The permissible radial load on the shaft is shown for an axial load of 0 N as a function of the distance from the mounting flange to the point of load application.

The curve is based on B10 bearing life (2000 hours or 12,000,000 shaft revolutions at 100 min<sup>-1</sup>) at rated output torque, when mineral-based hydraulic oil with a sufficient content of anti-wear additives, is used.

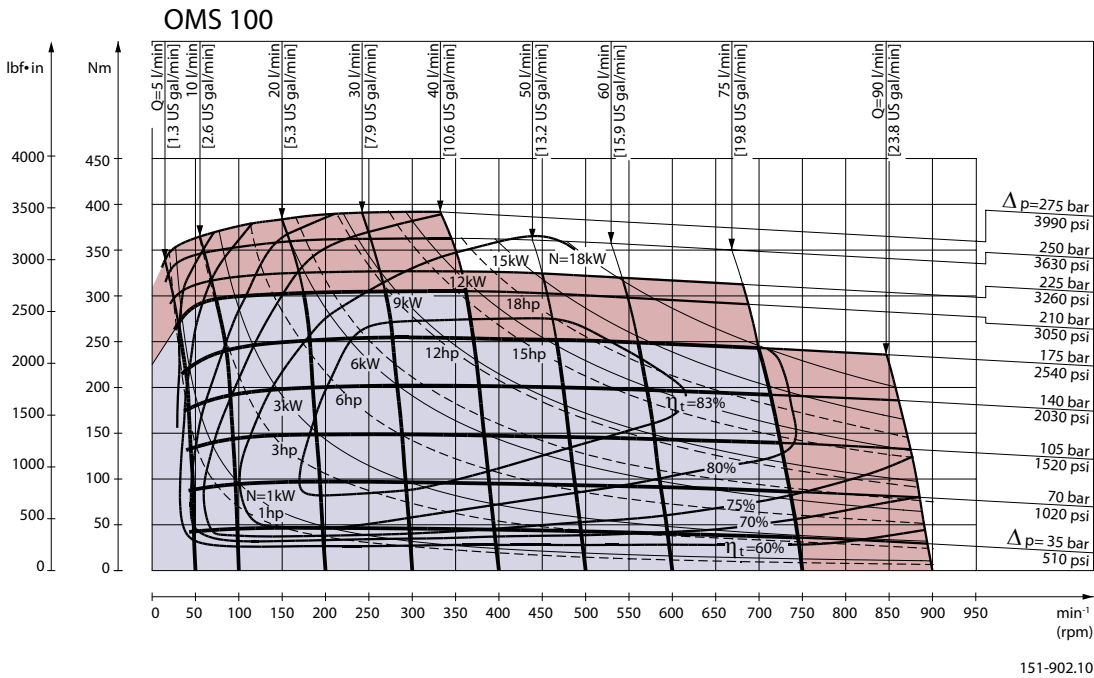
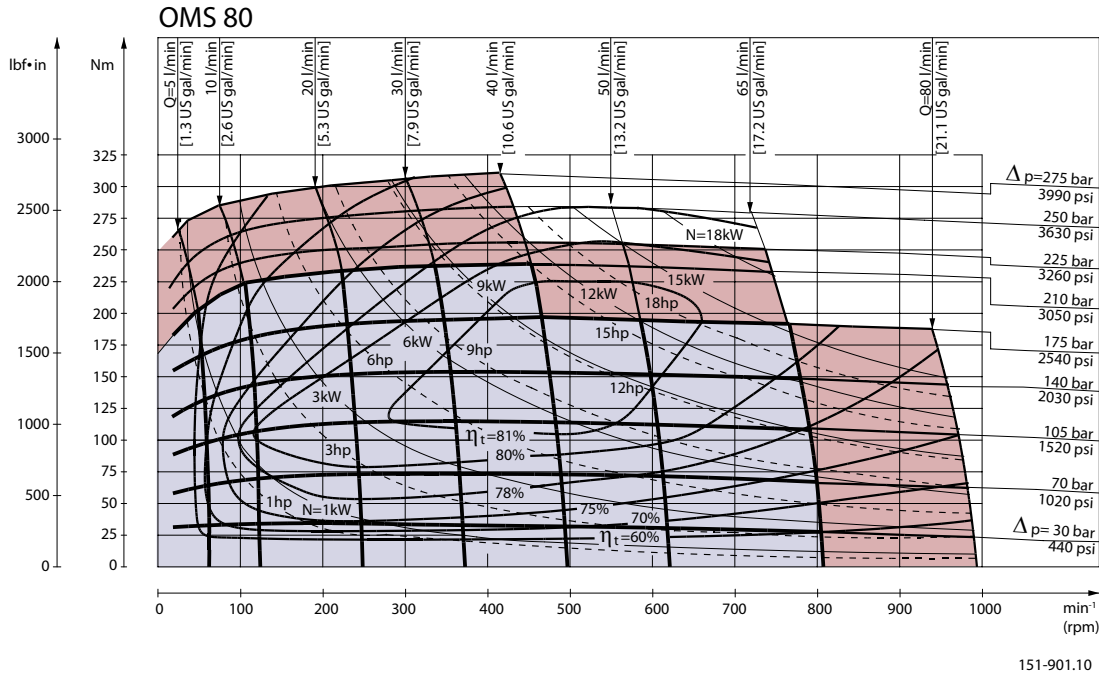
For 3,000,000 shaft revolutions or 500 hours – increase these shaft loads with 52%.

The dash curve shows max. radial shaft load. Any shaft load exceeding the values shown in the curve will involve a risk of breakage.

Bearing life calculations can be made using the explanation and formula provided in the chapter "Bearing dimensioning" in the technical information "General Orbital motors" 520L0232.

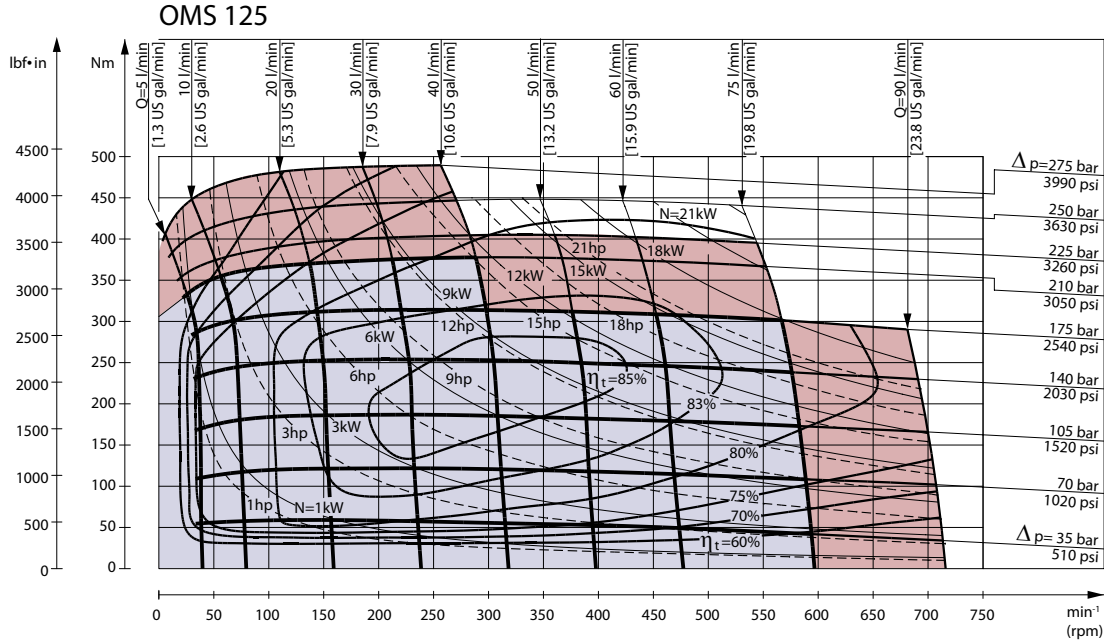
Function Diagrams

Function Diagrams

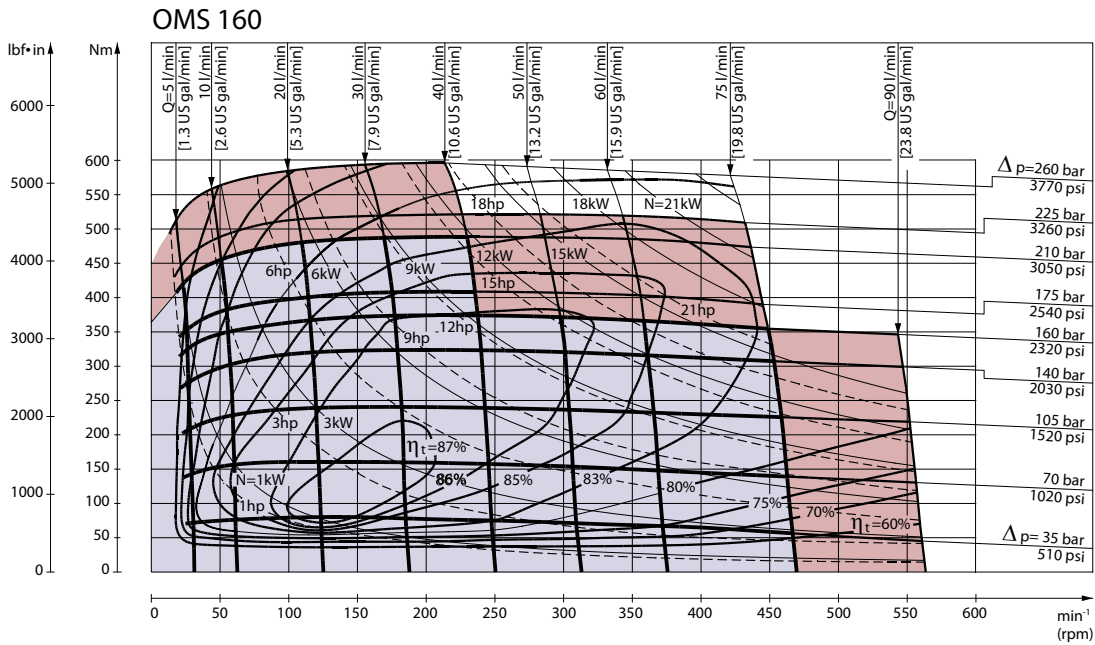


9hp

Function Diagrams

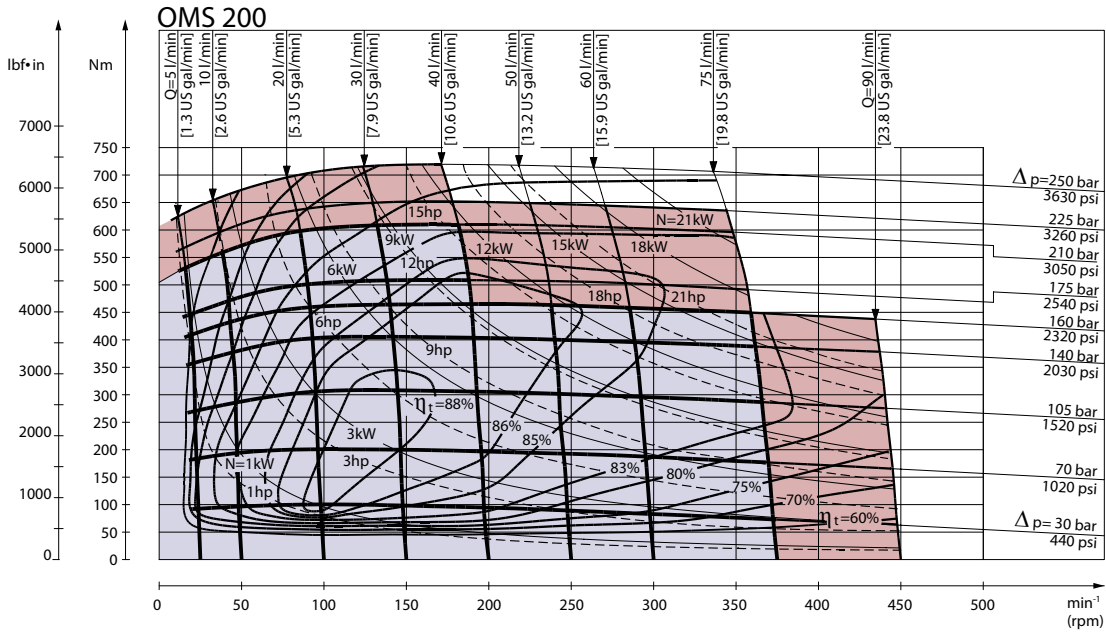


151-903.10

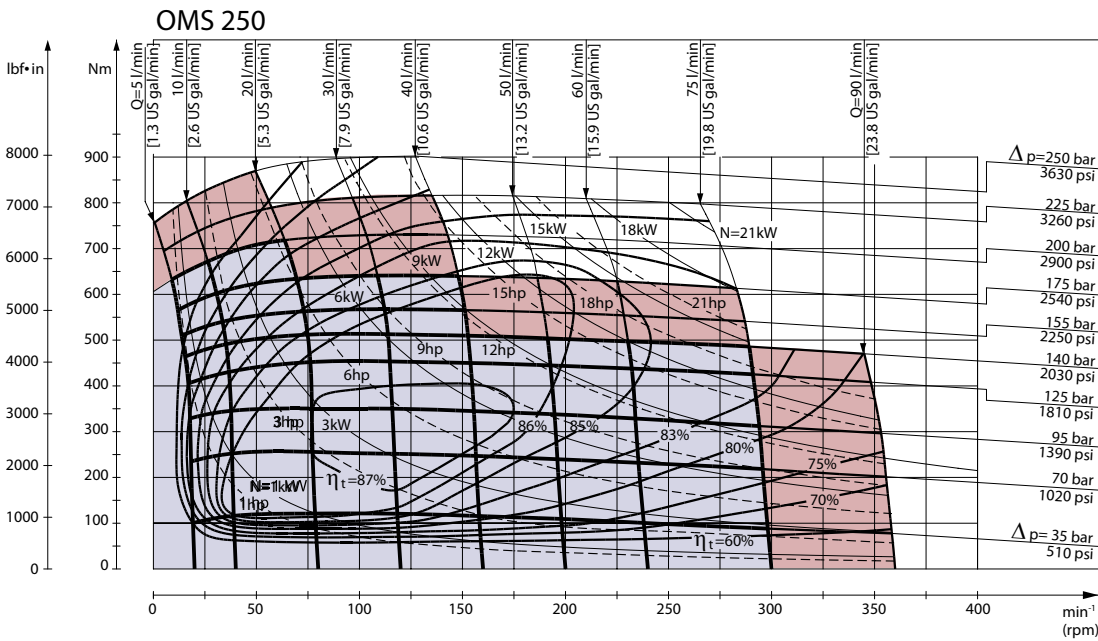


151-904.11

Function Diagrams



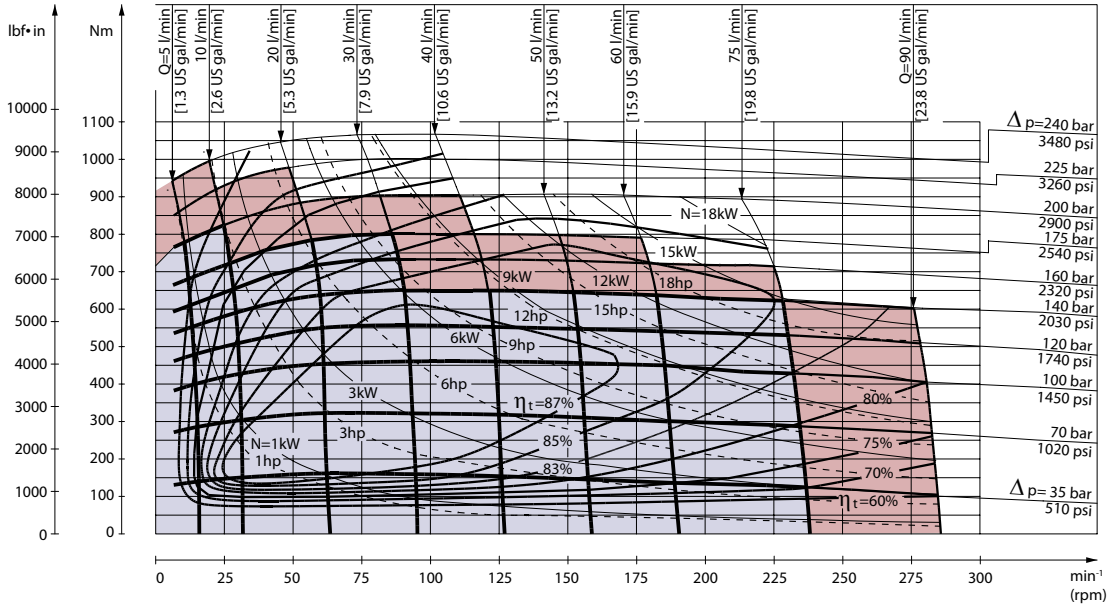
151-905.10



151-1039.10

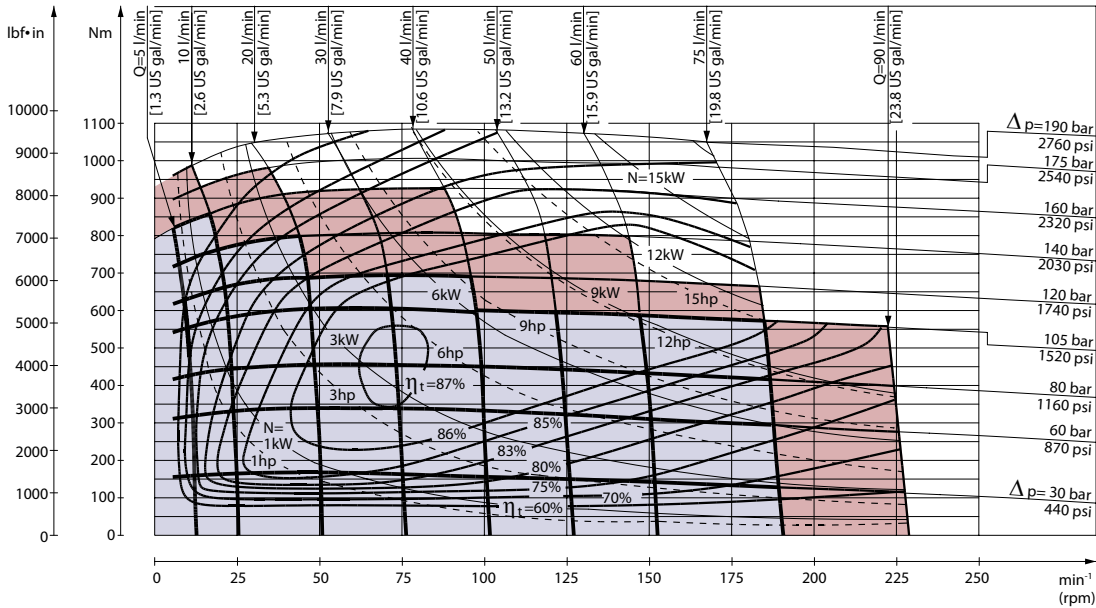
Function Diagrams

OMS 315



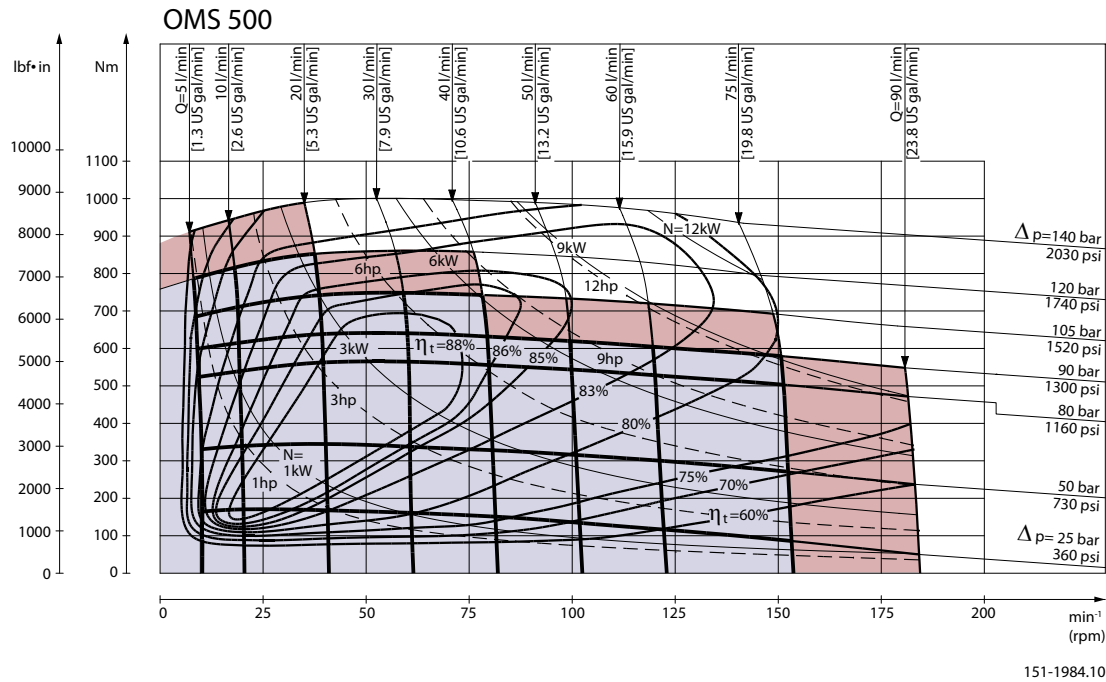
151-906.10

OMS 400



151-1491.10

Function Diagrams



Explanation of function diagram use, basis and conditions, see [OMS, OMT and OMV speed, torque and output](#) on page 8.

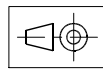
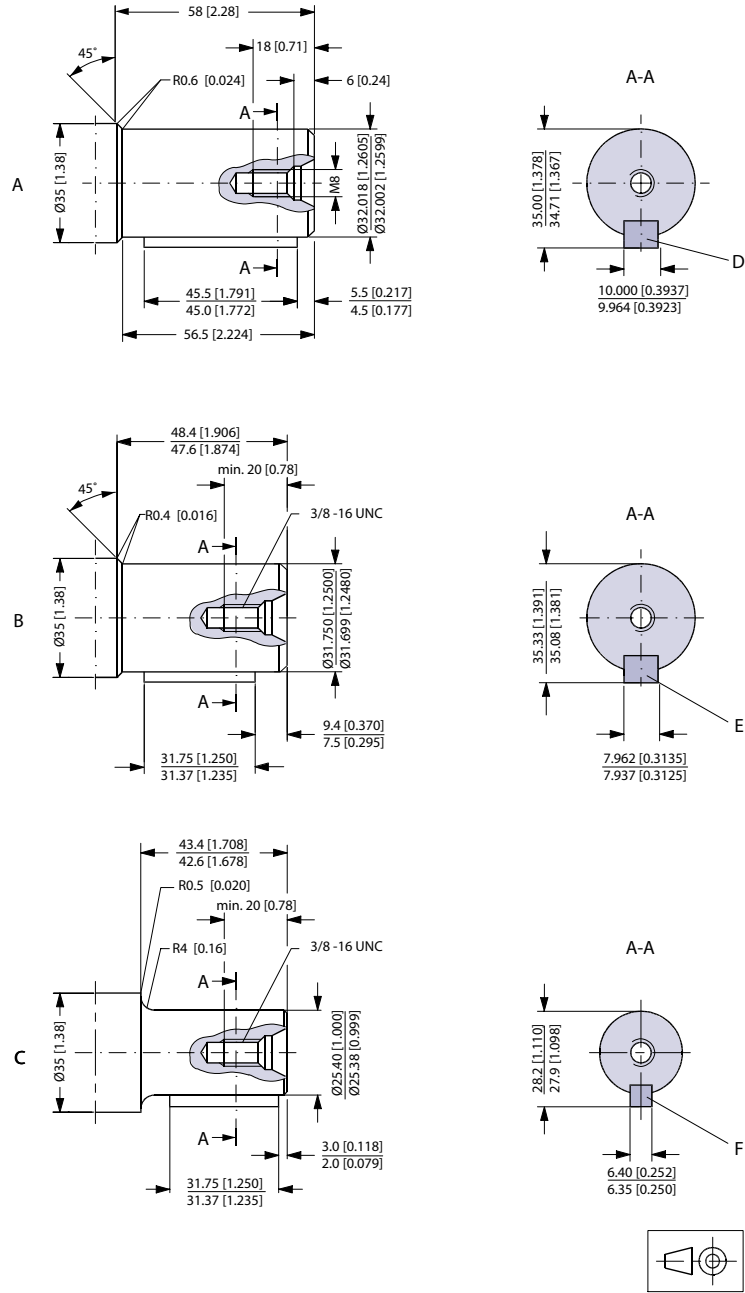
- Continuous range
- Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent torque for the actual shaft version, see [Technical data for OMS](#) on page 12.

Intermittent pressure drop and oil flow must not occur simultaneously.

Shaft Version

Shaft Version



151-876.10

**A:** Cylindrical 32 mm shaft

**B:** Cylindrical 1.25 in shaft

**C:** Cylindrical 1 in shaft

**D:** Parallel key

**E:** Parallel key

**F:** Parallel key

A10 × 8 × 45

5/16 × 5/16 × 11/4 in

1/4 × 1/4 × 11/4 in

DIN 6885

SAE J744

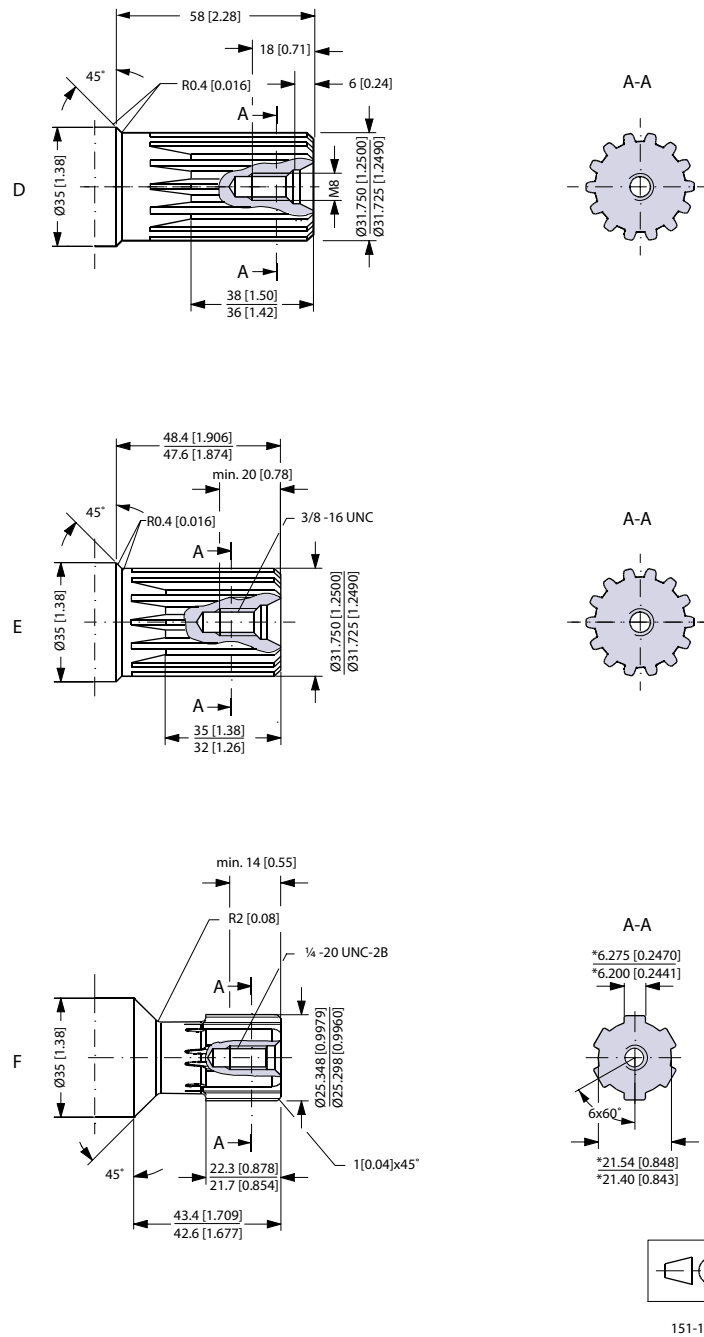
B.S. 46

Keyway deviates from standard

Keyway deviates from standard

Keyway deviates from standard

Shaft Version



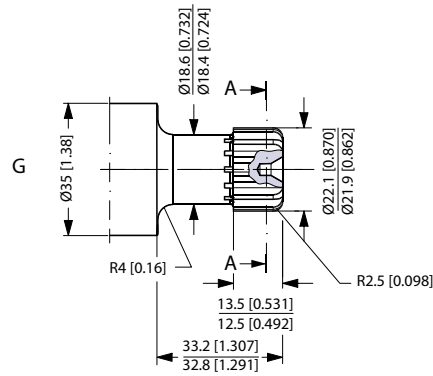
**D:** Involute splined shaft  
ANS B92.1 - 1970 standard  
Flat root side fit  
Pitch 12/24  
Teeth 14  
Major dia. 1.25 in  
Pressure angle 30°

**US version**  
**E:** Involute splined shaft  
ANS B92.1 - 1970 standard  
Flat root side fit  
Pitch 12/24  
Teeth 14  
Major dia. 1.25 in  
Pressure angle 30°

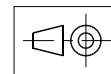
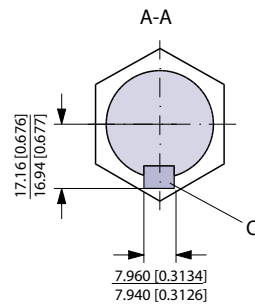
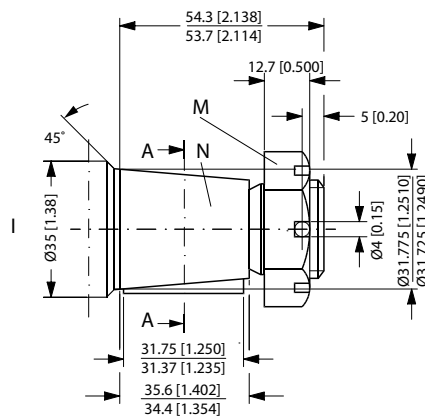
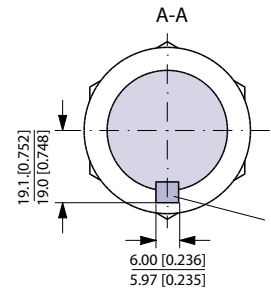
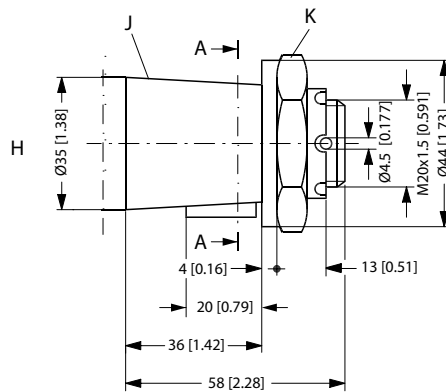
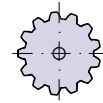
**F:** Splined shaft  
SAE 6 B (B.S. 2059)  
Straight-sided, bottom fitting, deep.  
Fit 2  
Nom. size 1 in  
\*Deviates from SAE 6 B (B.S. 2059)



Shaft Version



A-A



151-1915.10

**G:** Involute splined shaft  
ANS B92.1 - 1970 standard  
Flat root side fit  
Pitch 16/32  
Teeth 13

**K:** DIN 937  
Across flats: 41 mm  
Tightening torque:  
200 ± 10 Nm [1770 ± 85 lbf-in]

**Shaft Version**

Major dia. 0.875 in  
Pressure angle 30°

**H:** Tapered 35 mm shaft  
(ISO/R775)

**J:** Taper 1:10

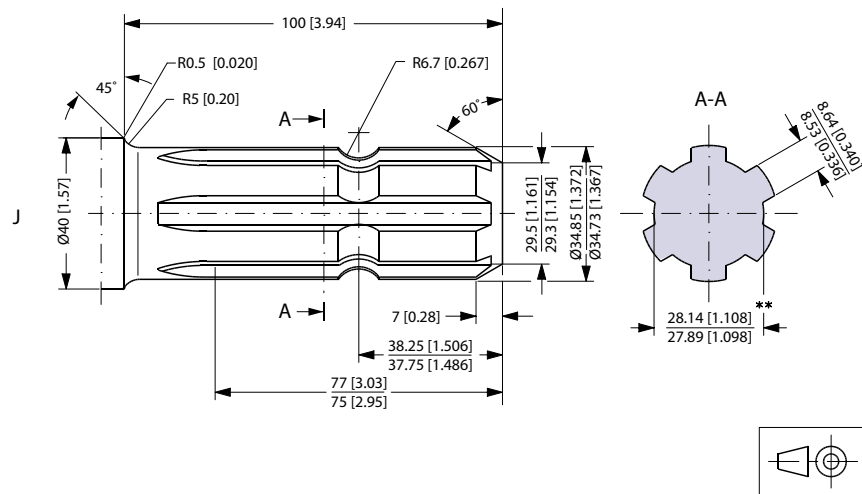
**L:** Parallel key  
B6 × 6 × 20  
DIN 6885  
Keyway deviates from standard

**M:** 1 - 20 UNEF  
Across flats 1 7/16 in  
Tightening torque:  
200 ± 10 Nm (1770 ± 85 lbf-in)

**I:** Tapered 1 1/4 in shaft

**N:** Cone 1:8  
SAE J501

**O:** Parallel key  
5/16 × 5/16 × 1 1/4  
SAE J501  
Keyway deviates from standard



151-1948.10

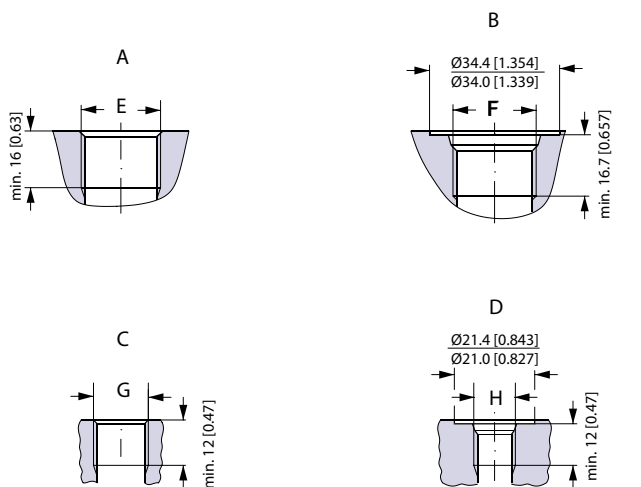
**J.** P.t.o. shaft

DIN 9611 Form 1  
(ISO/R500 without pin hole)

\*\* Deviates from DIN 9611

Shaft Version

Port Thread Versions



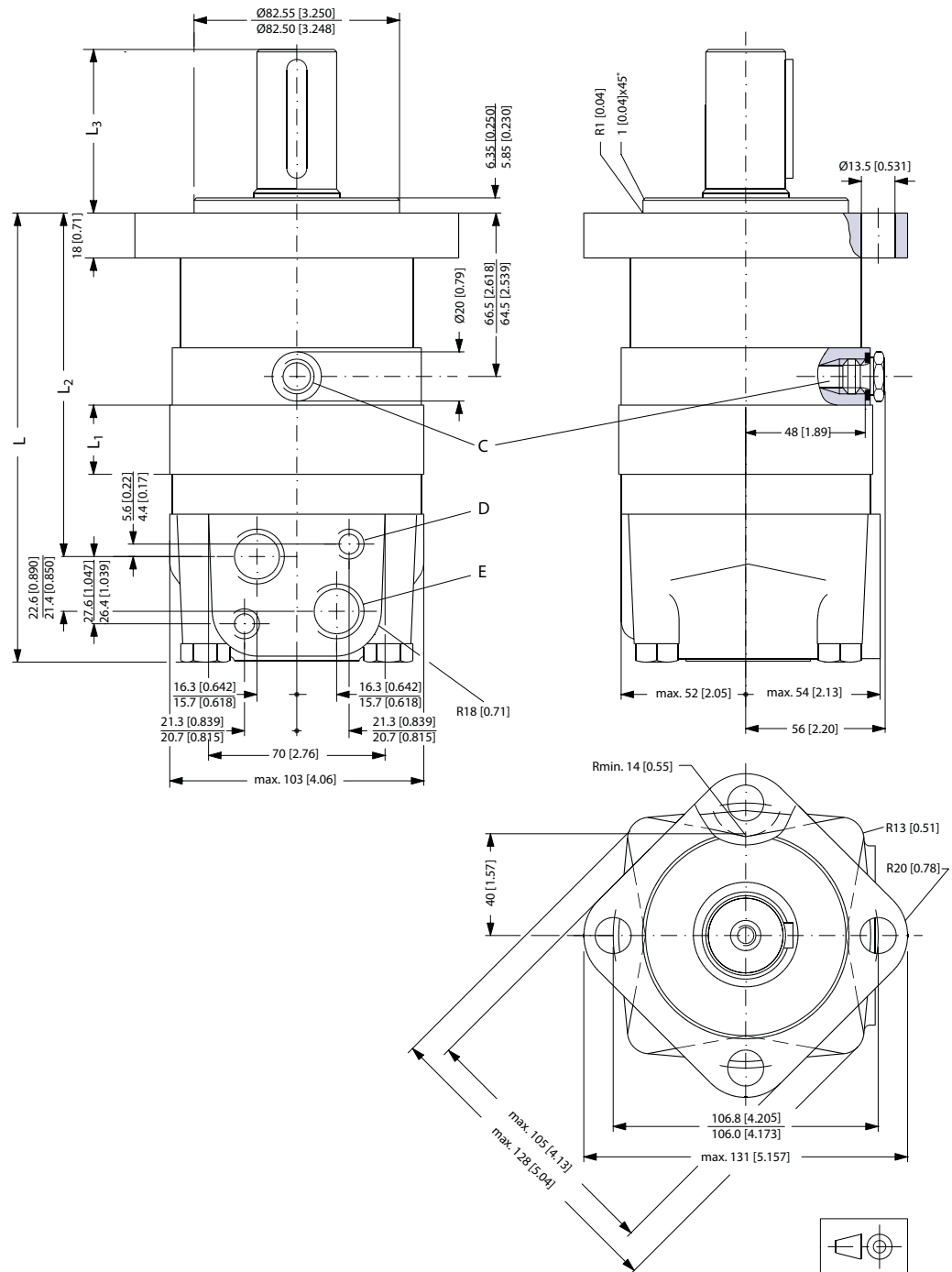
151-1971.11

- A:** G main ports
- E:** ISO 228/1 - G1/2 O-ring boss port
- C:** G drain port
- G:** ISO 228/1 - G1/4 O-ring boss port

- B:** UNF main ports
- F:** 7/8 - 14 UNF
- D:** UNF drain port
- H:** 7/16 - 20 UNF

Dimensions – European Version

Standard Flange



**C:** Drain connection  
G 1/4; 12 mm [0.47 in] deep

**E:** G 1/2; 15 mm [0.59 in] deep

**D:** M10; 13 mm [0.51 in] deep



151-1809.10

**Dimensions – European Version**

| Type    | L <sub>max</sub> mm [in] | L <sub>1</sub> mm [in] | L <sub>2</sub> mm [in] |
|---------|--------------------------|------------------------|------------------------|
| OMS 80  | 167 [6.57]               | 14.0 [0.551]           | 124 [4.88]             |
| OMS 100 | 170 [6.69]               | 17.4 [0.685]           | 127 [5.00]             |
| OMS 125 | 175 [6.89]               | 21.8 [0.858]           | 132 [5.20]             |
| OMS 160 | 181 [7.13]               | 27.8 [1.094]           | 138 [5.43]             |
| OMS 200 | 188 [7.40]               | 34.8 [1.370]           | 145 [5.71]             |
| OMS 250 | 196 [7.72]               | 43.5 [1.713]           | 153 [6.02]             |
| OMS 315 | 208 [8.19]               | 54.8 [2.157]           | 165 [6.50]             |
| OMS 400 | 221 [8.70]               | 68.4 [2.693]           | 178 [7.01]             |

| Output shaft                   |     | L <sub>3</sub> mm [in] |
|--------------------------------|-----|------------------------|
| All shafts except P.t.o. shaft | max | 67 [2.64]              |
|                                | min | 65 [2.56]              |
| P.t.o. shaft                   | max | 109 [4.29]             |
|                                | min | 107 [4.21]             |



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**Technical Information    OMS, OMT and OMV Orbital Motors**


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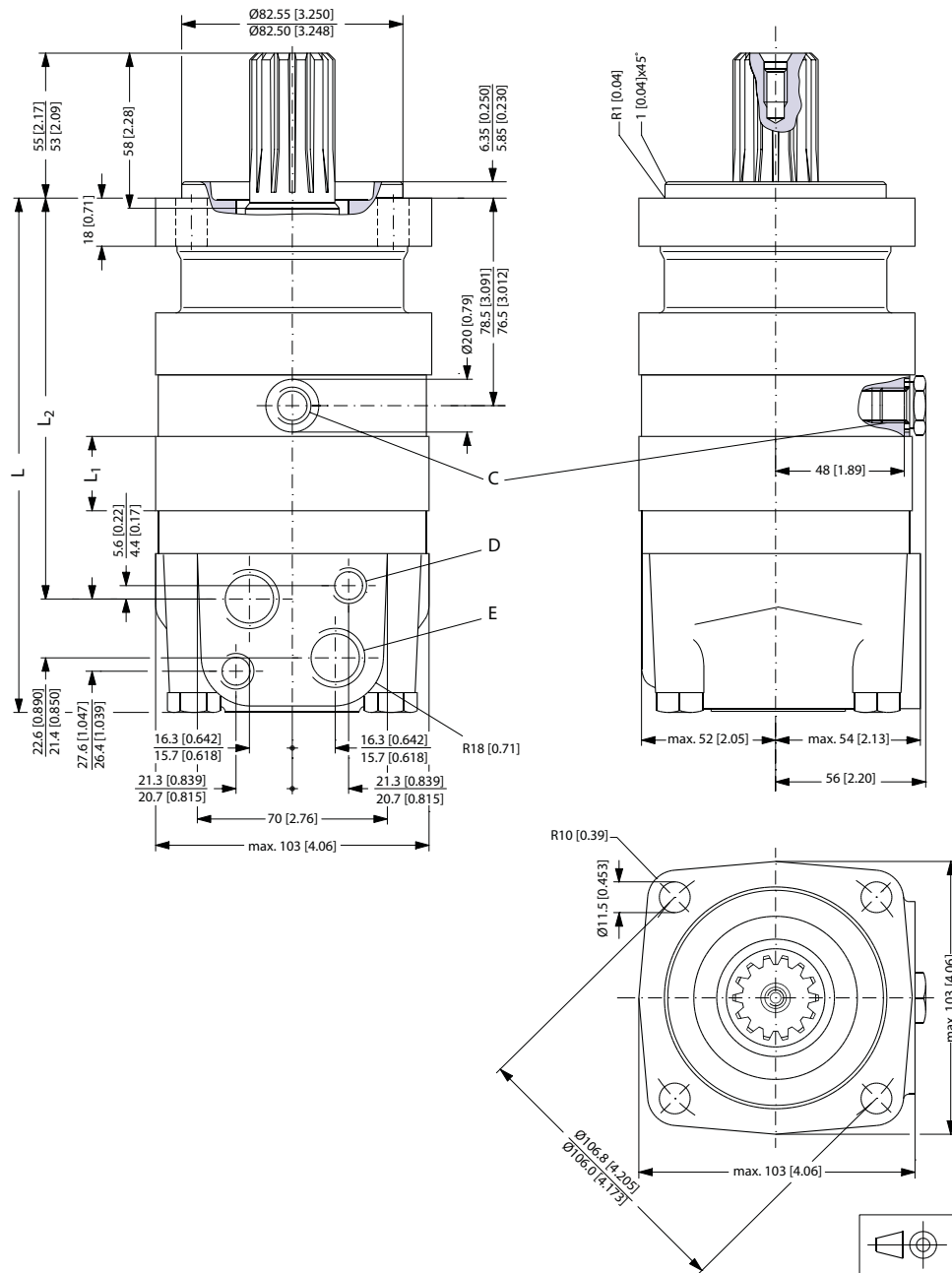
**Dimensions – US Version**

| Type    | L <sub>max</sub> mm [in] | L <sub>1</sub> mm [in] | L <sub>2</sub> mm [in] |
|---------|--------------------------|------------------------|------------------------|
| OMS 125 | 175 [6.89]               | 21.8 [0.858]           | 132 [5.20]             |
| OMS 160 | 181 [7.13]               | 27.8 [1.094]           | 138 [5.43]             |
| OMS 200 | 188 [7.40]               | 34.8 [1.370]           | 145 [5.71]             |
| OMS 250 | 196 [7.72]               | 43.5 [1.713]           | 153 [6.02]             |
| OMS 315 | 208 [8.19]               | 54.8 [2.157]           | 165 [6.50]             |
| OMS 400 | 221 [8.70]               | 68.4 [2.693]           | 178 [7.01]             |
| OMS 500 | 221 [8.70]               | 68.4 [2.693]           | 178 [7.01]             |

| Output shaft                   |     | L <sub>3</sub> mm [in] |
|--------------------------------|-----|------------------------|
| Cyl.1.25 in<br>Splined 1.25 in | max | 57 [2.24]              |
|                                | min | 55 [2.17]              |
| Tapered 1.25 in                | max | 67 [2.64]              |
|                                | min | 65 [2.56]              |

Dimensions – European Version

Special Flange



151-1810.10

**C:** Drain connection  
G 1/4; 12 mm [0.47 in] deep

**E:** G 1/2; 15 mm [0.59 in] deep

**D:** M10; 13 mm [0.51 in] deep

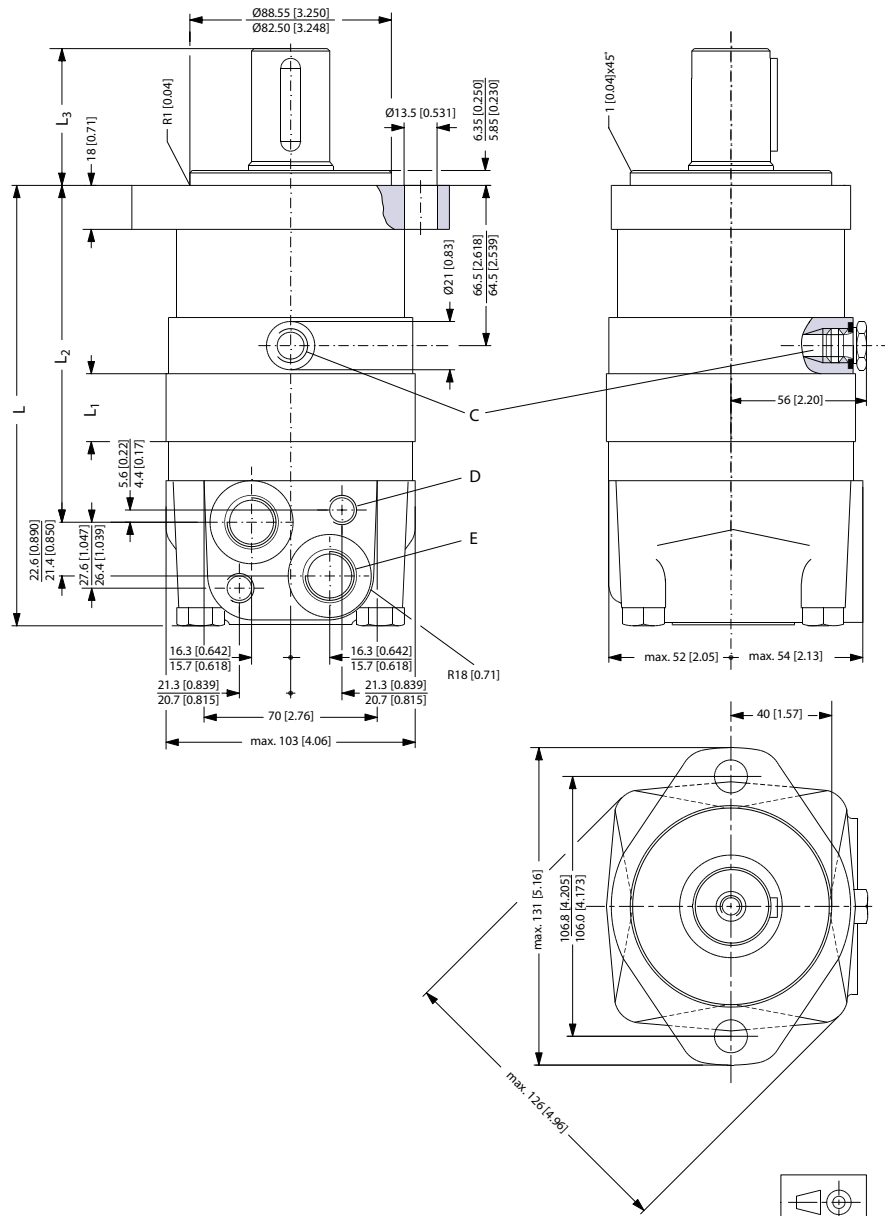


**Dimensions – European Version**

| Type    | L <sub>max</sub> mm [in] | L <sub>1</sub> mm [in] | L <sub>2</sub> mm [in] |
|---------|--------------------------|------------------------|------------------------|
| OMS 80  | 178 [7.01]               | 14.0 [0.551]           | 136 [5.35]             |
| OMS 100 | 182 [7.17]               | 17.4 [0.685]           | 140 [5.51]             |
| OMS 125 | 186 [7.32]               | 21.8 [0.858]           | 144 [5.67]             |
| OMS 160 | 192 [7.56]               | 27.8 [1.094]           | 150 [5.91]             |
| OMS 200 | 199 [7.83]               | 34.8 [1.370]           | 157 [6.18]             |
| OMS 250 | 208 [8.19]               | 43.5 [1.713]           | 166 [6.54]             |
| OMS 315 | 219 [8.62]               | 54.8 [2.157]           | 177 [6.97]             |
| OMS 400 | 232 [9.13]               | 68.4 [2.693]           | 190 [7.48]             |

Dimensions – US Version

A-2 Flange



151-1979.10

**C:** Drain connection  
 7/16 - 20 UNF;  
 12 mm [0.47 in] deep  
 O-ring boss port

**D:** M10; 13 mm [0.51 in] deep

**E:** 7/8 - 14 UNF;  
 16.7 mm [0.657 in] deep  
 O-ring boss port

**Dimensions – US Version**

| Type    | L <sub>max</sub> mm [in] | L <sub>1</sub> mm [in] | L <sub>2</sub> mm [in] |
|---------|--------------------------|------------------------|------------------------|
| OMS 80  | 167 [6.57]               | 14.0 [0.551]           | 124 [4.88]             |
| OMS 100 | 170 [6.69]               | 17.4 [0.685]           | 127 [5.00]             |
| OMS 125 | 175 [6.89]               | 21.8 [0.858]           | 132 [5.20]             |
| OMS 160 | 181 [7.13]               | 27.8 [1.094]           | 138 [5.43]             |
| OMS 200 | 188 [7.40]               | 34.8 [1.370]           | 145 [5.71]             |
| OMS 250 | 196 [7.72]               | 43.5 [1.713]           | 153 [6.02]             |
| OMS 315 | 208 [8.19]               | 54.8 [2.157]           | 165 [6.50]             |
| OMS 400 | 221 [8.70]               | 68.4 [2.693]           | 178 [7.01]             |
| OMS 500 | 221 [8.70]               | 68.4 [2.693]           | 178 [7.01]             |

| Output shaft                   |     | L <sub>3</sub> mm [in] |
|--------------------------------|-----|------------------------|
| Cyl.1 in<br>Splined 1 in       | max | 52 [2.05]              |
|                                | min | 50 [1.97]              |
| Cyl.1.25 in<br>Splined 1.25 in | max | 57 [2.24]              |
|                                | min | 55 [2.17]              |
| Tapered 1.25 in                | max | 67 [2.64]              |
|                                | min | 65 [2.56]              |



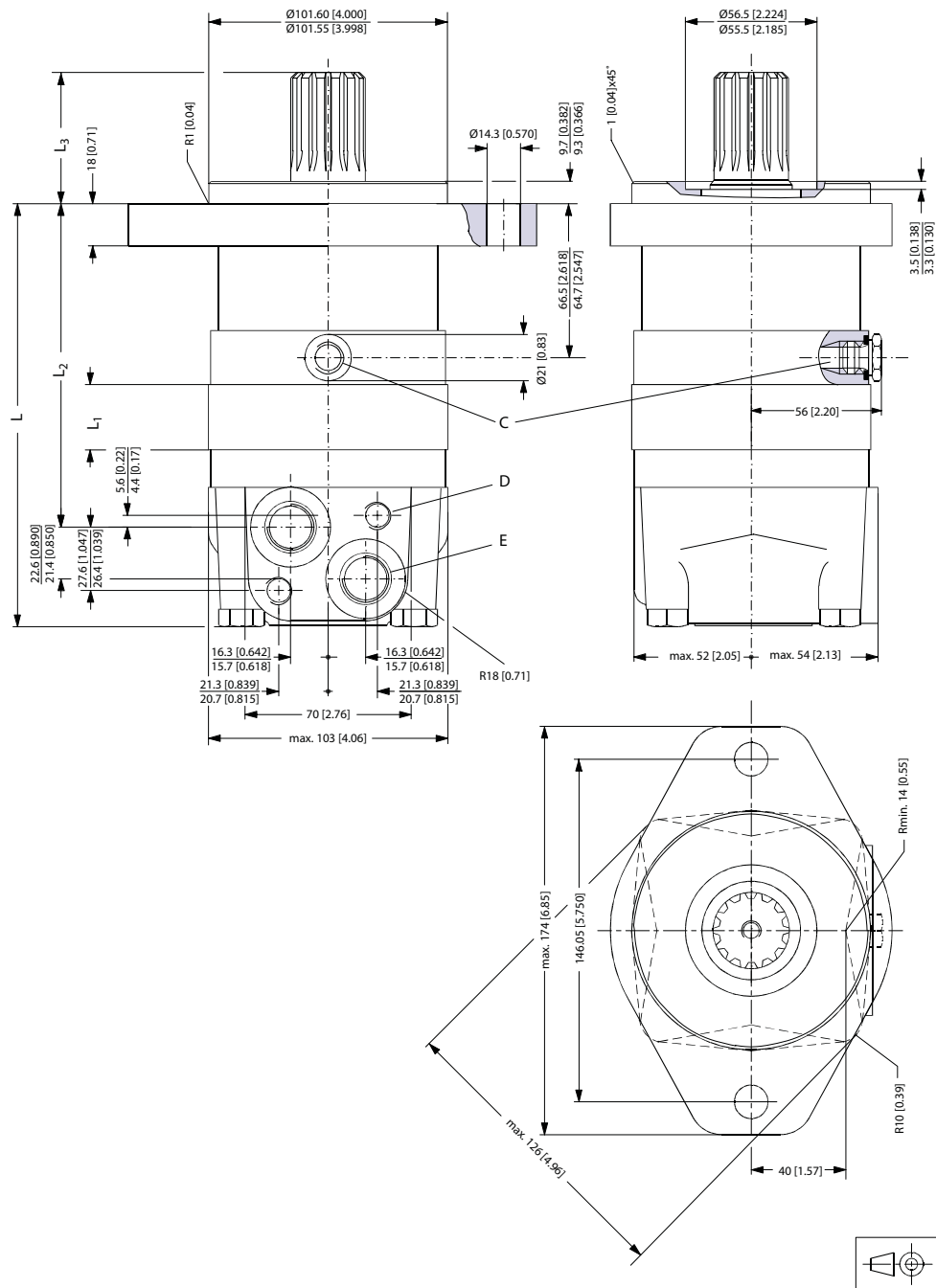
**Dimensions – US Version**

| Type    | L <sub>max</sub> mm [in] | L <sub>1</sub> mm [in] | L <sub>2</sub> mm [in] |
|---------|--------------------------|------------------------|------------------------|
| OMS 80  | 171 [6.73]               | 14.0 [0.551]           | 128 [5.04]             |
| OMS 100 | 174 [6.85]               | 17.4 [0.685]           | 131 [5.16]             |
| OMS 125 | 179 [7.05]               | 21.8 [0.858]           | 136 [5.35]             |
| OMS 160 | 185 [7.28]               | 27.8 [1.094]           | 142 [5.59]             |
| OMS 200 | 192 [7.56]               | 34.8 [1.370]           | 149 [5.87]             |
| OMS 250 | 200 [7.87]               | 43.5 [1.713]           | 157 [6.18]             |
| OMS 315 | 212 [8.35]               | 54.8 [2.157]           | 169 [6.65]             |
| OMS 400 | 225 [8.86]               | 68.4 [2.693]           | 182 [7.17]             |
| OMS 500 | 225 [8.86]               | 68.4 [2.693]           | 182 [7.17]             |

| Output shaft                   |     | L <sub>3</sub> mm [in] |
|--------------------------------|-----|------------------------|
| Cyl.1 in<br>Splined 1 in       | max | 49 [1.93]              |
|                                | min | 47 [1.85]              |
| Cyl.1.25 in<br>Splined 1.25 in | max | 54 [2.13]              |
|                                | min | 52 [2.05]              |

Dimensions – US Version

SAE-B Flange



151-1981.10

**C:** Drain connection  
7/16 - 20 UNF;  
12 mm [0.47 in] deep  
O-ring boss port

**E:** 7/8 - 14 UNF;  
16.7 mm [0.657 in] deep  
O-ring boss port

**D:** M10; 13 mm [0.51 in] deep

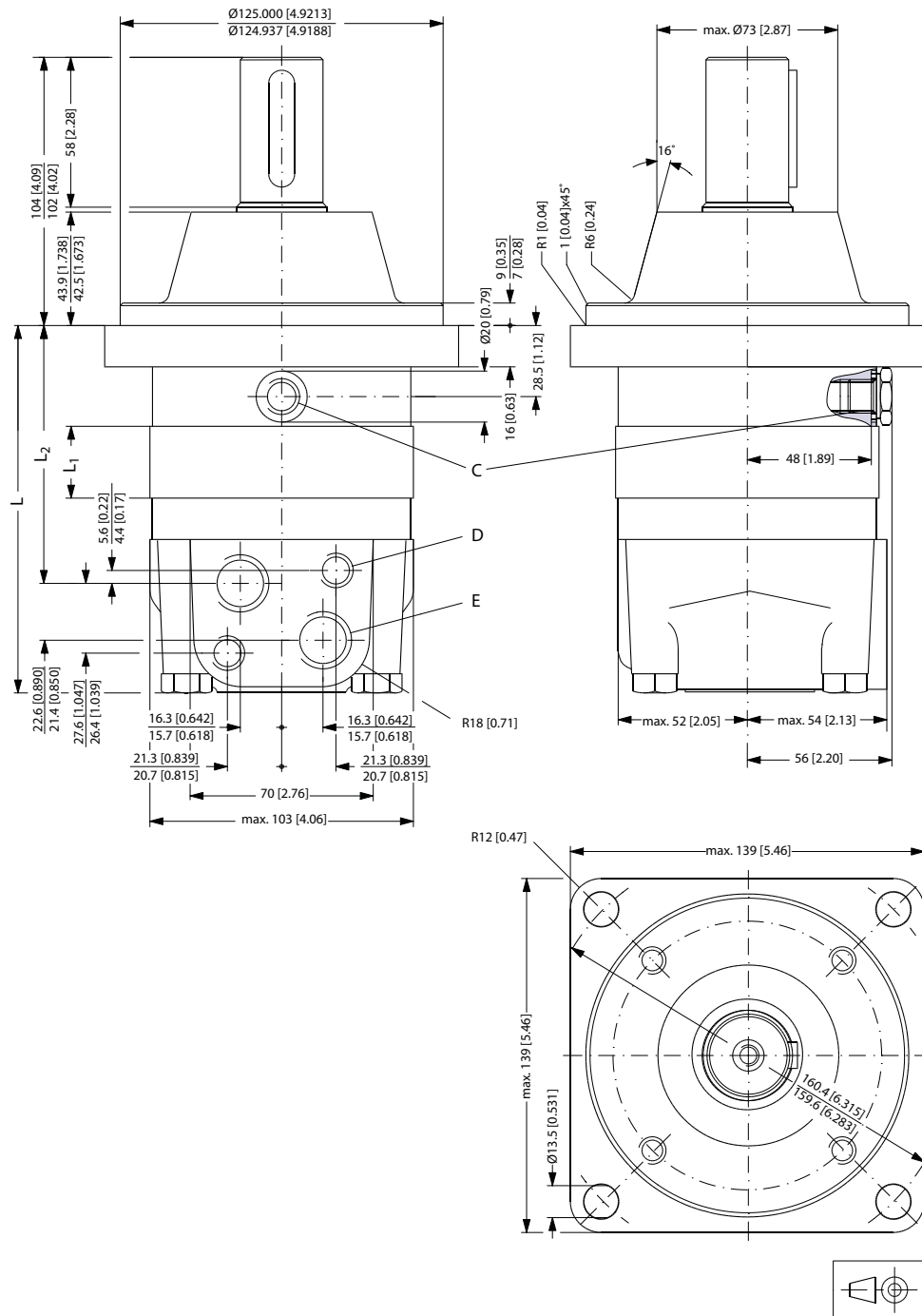
**Dimensions – US Version**

| Type    | L <sub>max</sub> mm [in] | L <sub>1</sub> mm [in] | L <sub>2</sub> mm [in] |
|---------|--------------------------|------------------------|------------------------|
| OMS 80  | 167 [6.57]               | 14.0 [0.551]           | 124 [4.88]             |
| OMS 100 | 170 [6.69]               | 17.4 [0.685]           | 127 [5.00]             |
| OMS 125 | 175 [6.89]               | 21.8 [0.858]           | 132 [5.20]             |
| OMS 160 | 181 [7.13]               | 27.8 [1.094]           | 138 [5.43]             |
| OMS 200 | 188 [7.40]               | 34.8 [1.370]           | 145 [5.71]             |
| OMS 250 | 196 [7.72]               | 43.5 [1.713]           | 153 [6.02]             |
| OMS 315 | 208 [8.19]               | 54.8 [2.157]           | 165 [6.50]             |
| OMS 400 | 221 [8.70]               | 68.4 [2.693]           | 178 [7.01]             |
| OMS 500 | 221 [8.70]               | 68.4 [2.693]           | 178 [7.01]             |

| Output shaft     |     | L <sub>3</sub> mm [in] |
|------------------|-----|------------------------|
| Splined 1.25 in  | max | 57 [2.24]              |
|                  | min | 55 [2.17]              |
| Splined 0.875 in | max | 42 [1.65]              |
|                  | min | 40 [1.57]              |

Dimensions – European Version

Wheel



**C:** Drain connection  
G 1/4; 12 mm [0.47 in] deep

**E:** G 1/2; 15 mm [0.59 in] deep

**D:** M10; 13 mm [0.51 in] deep

151-1812.10

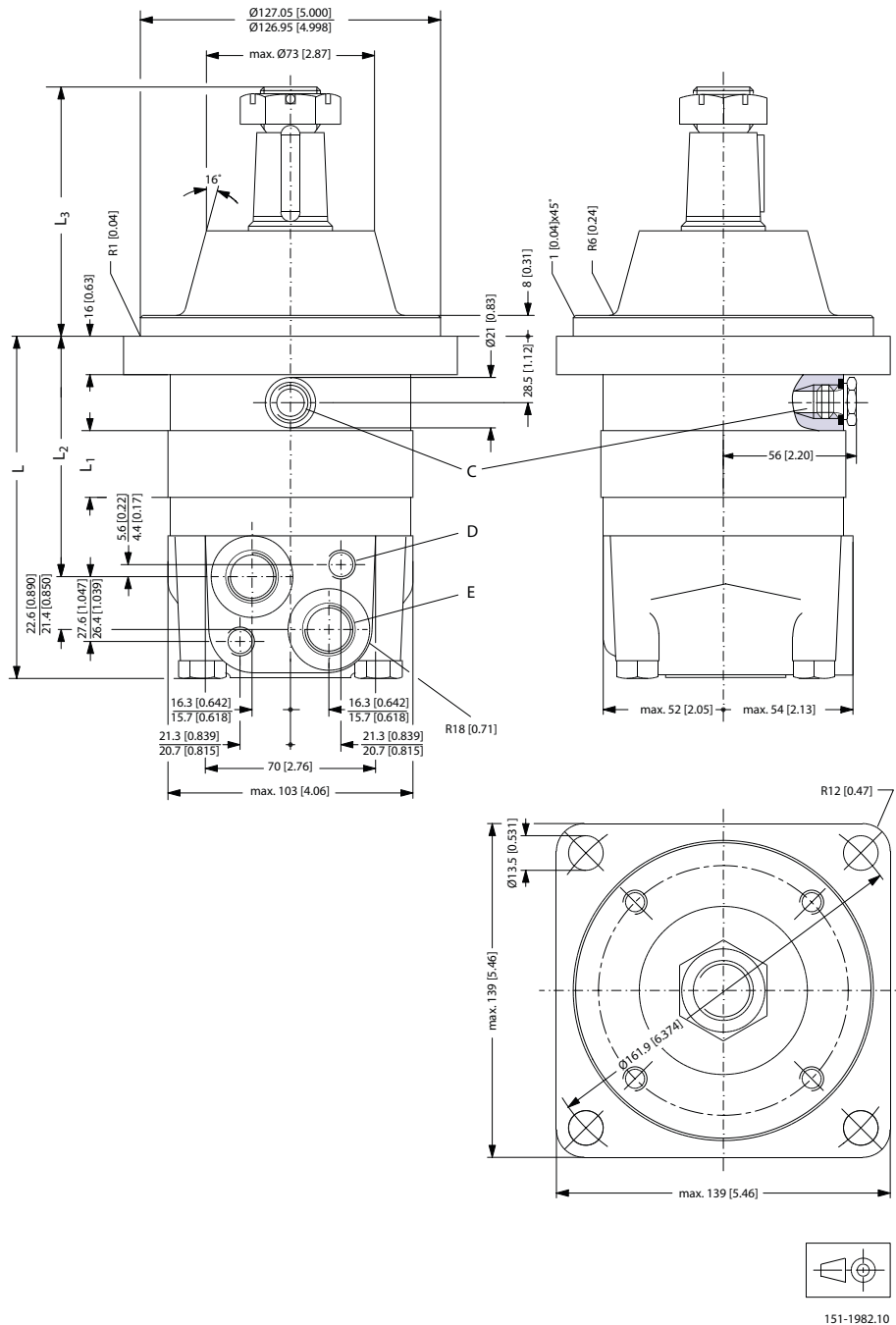


**Dimensions – European Version**

| Type     | L <sub>max</sub> mm [in] | L <sub>1</sub> mm [in] | L <sub>2</sub> mm [in] |
|----------|--------------------------|------------------------|------------------------|
| OMSW 80  | 129 [5.08]               | 14.0 [0.551]           | 87 [3.43]              |
| OMSW 100 | 132 [5.20]               | 17.4 [0.685]           | 90 [3.54]              |
| OMSW 125 | 137 [5.39]               | 21.8 [0.858]           | 95 [3.74]              |
| OMSW 160 | 143 [5.63]               | 27.8 [1.094]           | 101 [3.98]             |
| OMSW 200 | 150 [5.91]               | 34.8 [1.370]           | 108 [4.25]             |
| OMSW 250 | 158 [6.22]               | 43.5 [1.713]           | 116 [4.57]             |
| OMSW 315 | 170 [6.69]               | 54.8 [2.157]           | 128 [5.04]             |
| OMSW 400 | 183 [7.20]               | 68.4 [2.693]           | 142 [5.59]             |

Dimensions – US Version

Wheel



**C:** Drain connection  
 7/16 - 20 UNF;  
 12 mm [0.47 in] deep  
 O-ring boss port

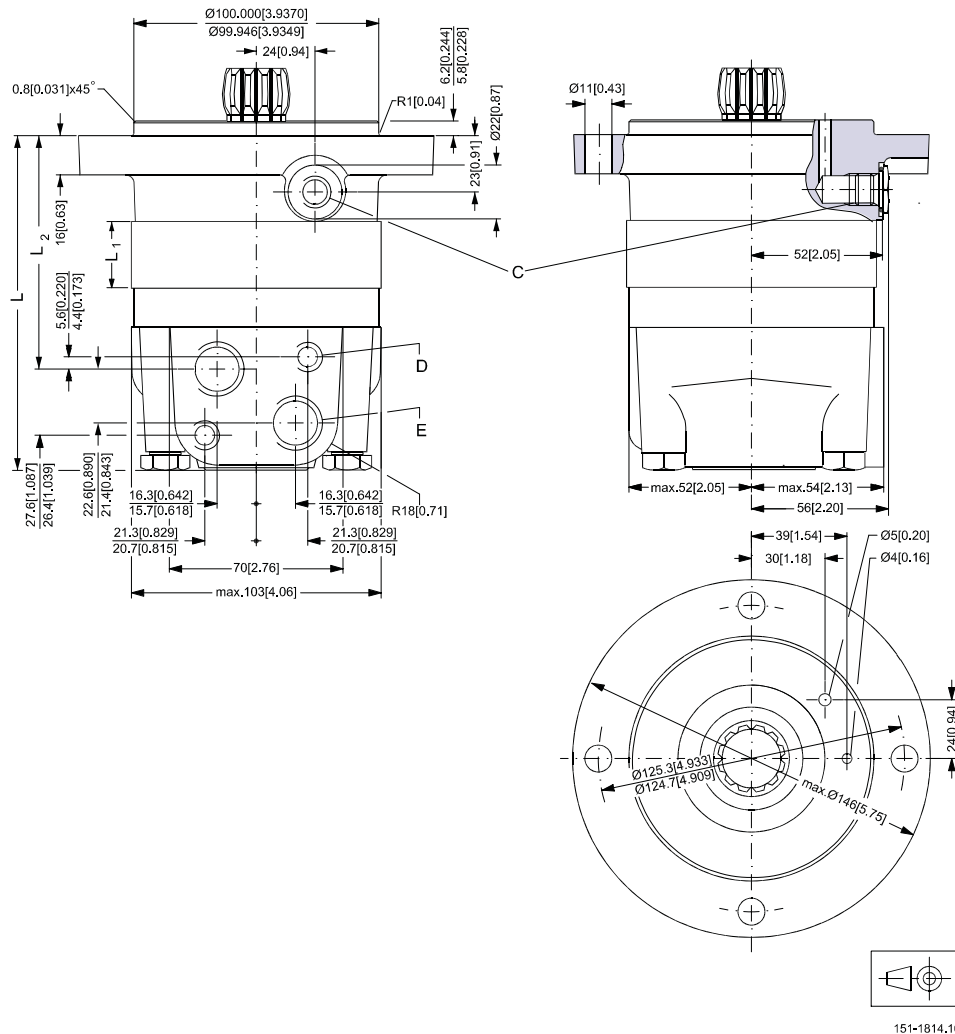
**D:** M10; 13 mm [0.51 in] deep

**E:** 7/8 - 14 UNF;  
 16.7 mm [0.657 in] deep  
 O-ring boss port

**Dimensions – US Version**

| Type     | L <sub>max</sub> mm [in] | L <sub>1</sub> mm [in] | L <sub>2</sub> mm [in] |
|----------|--------------------------|------------------------|------------------------|
| OMSW 80  | 130 [5.12]               | 14.0 [0.551]           | 88 [3.46]              |
| OMSW 100 | 133 [5.24]               | 17.4 [0.685]           | 91 [3.58]              |
| OMSW 125 | 138 [5.43]               | 21.8 [0.858]           | 96 [3.78]              |
| OMSW 160 | 144 [5.67]               | 27.8 [1.094]           | 102 [4.02]             |
| OMSW 200 | 151 [5.94]               | 34.8 [1.370]           | 109 [4.29]             |
| OMSW 250 | 159 [6.26]               | 43.5 [1.713]           | 117 [4.61]             |
| OMSW 315 | 171 [6.73]               | 54.8 [2.157]           | 129 [5.08]             |
| OMSW 400 | 184 [7.24]               | 68.4 [2.693]           | 142 [5.59]             |
| OMSW 500 | 184 [7.24]               | 68.4 [2.693]           | 142 [5.59]             |

| Output shaft    |     | L <sub>3</sub> mm [in] |
|-----------------|-----|------------------------|
| Cyl.1.25 in     | max | 94 [3.70]              |
|                 | min | 92 [3.62]              |
| Tapered 1.25 in | max | 104 [4.09]             |
|                 | min | 102 [4.02]             |

**Dimensions – European Version**
**Short**


**C:** Drain connection  
G 1/4; 12 mm [0.47 in] deep

**D:** M10; 13 mm [0.51 in] deep

**E:** G 1/2; 15 mm [0.59 in] deep

| Type     | L <sub>max</sub> mm [in] | L <sub>1</sub> mm [in] | L <sub>2</sub> mm [in] |
|----------|--------------------------|------------------------|------------------------|
| OMSS 80  | 124 [4.88]               | 14.0 [0.551]           | 83 [3.27]              |
| OMSS 100 | 128 [5.04]               | 17.4 [0.685]           | 86 [3.39]              |
| OMSS 125 | 132 [5.20]               | 21.8 [0.858]           | 90 [3.54]              |
| OMSS 160 | 138 [5.43]               | 27.8 [1.094]           | 96 [3.78]              |
| OMSS 200 | 145 [5.71]               | 34.8 [1.370]           | 103 [4.06]             |
| OMSS 250 | 154 [6.06]               | 43.5 [1.713]           | 112 [4.41]             |
| OMSS 315 | 165 [6.50]               | 54.8 [2.157]           | 123 [4.84]             |
| OMSS 400 | 179 [7.05]               | 68.4 [2.693]           | 137 [5.39]             |

**OMSS**
**Installing the OMSS**

The cardan shaft of the OMSS motor acts as an "output shaft". Because of the movement of the shaft, no seal can be fitted at the shaft output.

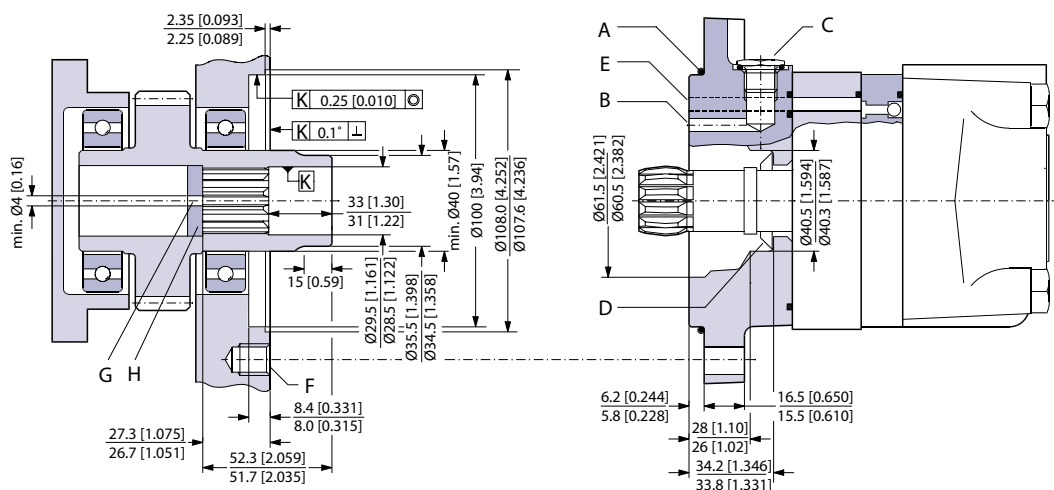
Internal oil leakage from the motor will therefore flow into the attached component.

During start and operation it is important that the spline connection and the bearings in the attached component receive oil and are adequately lubricated. To ensure that the spline connection receives sufficient oil, a conical sealing ring between the shaft of the attached component and the motor intermediate plate is recommended. This method is used in the OMS.

The conical sealing ring (code. no. 633B9023) is supplied with the motor.

To ensure that oil runs to the bearings and other parts of the attached component, the stop plate must have a hole in it (see fig. below).

We recommend an O-ring between motor and attached component. The O-ring (code no. 151F1033) is supplied with the motor. If motor and attached component have been separated, remember to refill before starting up. Fill the oil through the drain connection.

**OMSS Dimensions of the Attached Component**


151-873.10

- |                                |                                  |                                                        |
|--------------------------------|----------------------------------|--------------------------------------------------------|
| <b>A:</b> O-ring: 100 × 3 mm   | <b>B:</b> External drain channel | <b>C:</b> Drain connection G 1/4; 12 mm [0.47 in] deep |
| <b>D:</b> Conical seal ring    | <b>E:</b> Internal drain channel | <b>F:</b> M10; min. 15 mm [0.59 in] deep               |
| <b>G:</b> Oil circulation hole | <b>H:</b> Hardened stop plate    |                                                        |

**Internal Spline Data for the Component to be Attached**

The attached component must have internal splines corresponding to the external splines on the motor cardan shaft (see drawing below).

**Material:**

Case hardening steel with a tensile strength corresponding at least to 20 MoCr4 (900 N/mm<sup>2</sup>) or SAE 8620.

**Hardening specification:**

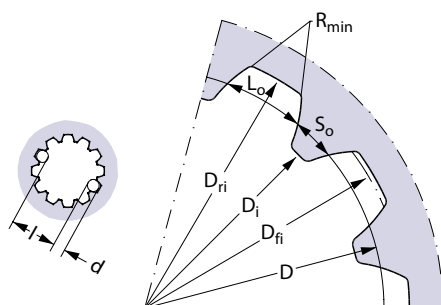
**OMSS**

- On the surface: HV = 750 ± 50
- 7 ± 2 mm under the surface: HV = 560

*Internal involute spline data; Standard ANS B92.1-1970, class 5 (corrected  $m \cdot X = 0.8$ ;  $m = 2.1166$ )*

| Flat root side fit             |            | mm                  | in                     |
|--------------------------------|------------|---------------------|------------------------|
| Number of teeth                | z          | 12                  | 12                     |
| Pitch                          | DP         | 12/24               | 12/24                  |
| Pressure angle                 |            | 30°                 | 30°                    |
| Pitch dia.                     | D          | 25.4                | 1.0                    |
| Major dia.                     | $D_{ri}$   | $28.0_{-0.1}^0$     | 1.10 0–0.004           |
| Form dia. (min.)               | $D_{fi}$   | 27.6                | 1.09                   |
| Minor dia.                     | $D_i$      | $23.0_{+0.033}^0$   | $0.9055_{+0.0013}^0$   |
| Space width (circular)         | $L_o$      | $4.308_{\pm 0.020}$ | $0.1696_{\pm 0.0008}$  |
| Tooth thickness (circular)     | $S_o$      | 2.341               | 0.09217                |
| Fillet radius                  | $R_{min.}$ | 0.2                 | 0.008                  |
| Max. measurement between pins* | l          | $17.62_{+0.15}^0$   | $0.700_{-0.006}^0$     |
| Pin dia.                       | d          | $4.835_{\pm 0.001}$ | $0.1903_{\pm 0.00004}$ |

\* Finished dimensions (when hardened)



151-874.10

**Drain Connection on OMSS or Attached Component**

A drain line ought to be used when pressure in the return line can exceed the permissible pressure on the shaft seal of the attached component.

**The drain line can be connected at two different points:**

- 1) at the motor drain connection
- 2) at the drain connection of the attached component.

If a drain line is fitted to the attached component, it must be possible for oil to flow freely between motor and attached component.

The drain line must be led to the tank in such a way that there is no risk of the motor and attached component being drained of oil when at rest.

The maximum pressure in the drain line is limited by the attached component and its shaft seal.

**Weight of motors**
**Weight of motors**

| Code no  | Weight |      |
|----------|--------|------|
|          | kg     | [lb] |
| 151B2050 | 20.0   | 44.1 |
| 151B2051 | 20.5   | 45.2 |
| 151B2052 | 21.0   | 46.3 |
| 151B2053 | 22.0   | 48.5 |
| 151B2054 | 23.0   | 50.7 |
| 151B2055 | 24.0   | 52.9 |
| 151B2056 | 20.0   | 44.1 |
| 151B2057 | 20.5   | 45.2 |
| 151B2058 | 21.0   | 46.3 |
| 151B2059 | 22.0   | 48.5 |
| 151B2060 | 23.0   | 50.7 |
| 151B2061 | 24.0   | 52.9 |
| 151B2062 | 20.0   | 44.1 |
| 151B2063 | 20.5   | 45.2 |
| 151B2064 | 21.0   | 46.3 |
| 151B2065 | 22.0   | 48.5 |
| 151B2066 | 23.0   | 50.7 |
| 151B2067 | 24.0   | 52.9 |
| 151B2080 | 22.0   | 48.5 |
| 151B2081 | 22.5   | 49.6 |
| 151B2082 | 23.0   | 50.7 |
| 151B2083 | 24.0   | 52.9 |
| 151B2084 | 25.0   | 55.1 |
| 151B2085 | 26.0   | 57.3 |
| 151B2150 | 31.8   | 70.1 |
| 151B2151 | 32.6   | 71.9 |
| 151B2152 | 33.5   | 73.9 |
| 151B2153 | 34.9   | 76.9 |
| 151B2154 | 36.5   | 80.5 |
| 151B2155 | 31.8   | 70.1 |
| 151B2156 | 32.6   | 71.9 |
| 151B2157 | 33.5   | 73.9 |
| 151B2158 | 34.9   | 76.9 |
| 151B2159 | 36.5   | 80.5 |
| 151B2160 | 31.8   | 70.1 |
| 151B2161 | 32.6   | 71.9 |
| 151B2162 | 33.5   | 73.9 |
| 151B2163 | 34.9   | 76.9 |
| 151B2164 | 36.5   | 80.5 |

**Weight of motors**

| Code no  | Weight |      |
|----------|--------|------|
|          | kg     | [lb] |
| 151B2170 | 32.4   | 71.4 |
| 151B2171 | 33.2   | 73.2 |
| 151B2172 | 34.1   | 75.2 |
| 151B2173 | 35.5   | 78.3 |
| 151B2174 | 37.1   | 81.8 |
| 151B2183 | 30.0   | 66.2 |
| 151B2184 | 30.8   | 67.9 |
| 151B2185 | 31.7   | 69.9 |
| 151B2186 | 33.1   | 73.0 |
| 151B2187 | 34.7   | 76.5 |
| 151B2188 | 30.0   | 66.2 |
| 151B2189 | 30.8   | 67.9 |
| 151B2190 | 31.7   | 69.9 |
| 151B2191 | 33.1   | 73.0 |
| 151B2192 | 34.7   | 76.5 |
| 151B3000 | 20.0   | 44.1 |
| 151B3001 | 20.5   | 45.2 |
| 151B3002 | 21.0   | 46.3 |
| 151B3003 | 22.0   | 48.5 |
| 151B3004 | 23.0   | 50.7 |
| 151B3005 | 24.0   | 52.9 |
| 151B3006 | 20.0   | 44.1 |
| 151B3007 | 20.5   | 45.2 |
| 151B3008 | 21.0   | 46.3 |
| 151B3009 | 22.0   | 48.5 |
| 151B3010 | 23.0   | 50.7 |
| 151B3011 | 24.0   | 52.9 |
| 151B3012 | 20.0   | 44.1 |
| 151B3013 | 20.5   | 45.2 |
| 151B3014 | 21.0   | 46.3 |
| 151B3015 | 22.0   | 48.5 |
| 151B3016 | 23.0   | 50.7 |
| 151B3017 | 24.0   | 52.9 |
| 151B3018 | 20.0   | 44.1 |
| 151B3019 | 20.5   | 45.2 |
| 151B3020 | 21.0   | 46.3 |
| 151B3021 | 22.0   | 48.5 |
| 151B3022 | 23.0   | 50.7 |
| 151B3023 | 24.0   | 52.9 |
| 151B3024 | 22.0   | 48.5 |
| 151B3025 | 22.5   | 49.6 |
| 151B3026 | 23.0   | 50.7 |



**Weight of motors**

| Code no  | Weight |      |
|----------|--------|------|
|          | kg     | [lb] |
| 151B3027 | 24.0   | 52.9 |
| 151B3028 | 25.0   | 55.1 |
| 151B3029 | 26.0   | 57.3 |
| 151B3030 | 22.0   | 48.5 |
| 151B3031 | 22.5   | 49.6 |
| 151B3032 | 23.0   | 50.7 |
| 151B3033 | 24.0   | 52.9 |
| 151B3034 | 25.0   | 55.1 |
| 151B3035 | 26.0   | 57.3 |
| 151B3036 | 15.0   | 33.1 |
| 151B3037 | 15.5   | 34.2 |
| 151B3038 | 16.0   | 35.3 |
| 151B3039 | 17.0   | 37.5 |
| 151B3040 | 18.0   | 39.7 |
| 151B3041 | 19.0   | 41.9 |
| 151B3100 | 31.8   | 70.1 |
| 151B3101 | 32.6   | 71.9 |
| 151B3102 | 33.5   | 73.9 |
| 151B3103 | 34.9   | 76.9 |
| 151B3104 | 36.5   | 80.5 |
| 151B3105 | 31.8   | 70.1 |
| 151B3106 | 32.6   | 71.9 |
| 151B3107 | 33.5   | 73.9 |
| 151B3108 | 34.9   | 76.9 |
| 151B3109 | 36.5   | 80.5 |
| 151B3110 | 31.8   | 70.1 |
| 151B3111 | 32.6   | 71.9 |
| 151B3112 | 33.5   | 73.9 |
| 151B3113 | 34.9   | 76.9 |
| 151B3114 | 36.5   | 80.5 |
| 151B3115 | 32.4   | 71.4 |
| 151B3116 | 33.2   | 73.2 |
| 151B3117 | 34.1   | 75.2 |
| 151B3118 | 35.5   | 78.3 |
| 151B3119 | 37.1   | 81.8 |
| 151B3120 | 32.4   | 71.4 |
| 151B3121 | 33.2   | 73.2 |
| 151B3122 | 34.1   | 75.2 |
| 151B3123 | 35.5   | 78.3 |
| 151B3124 | 37.1   | 81.8 |
| 151B3125 | 22.7   | 50.1 |
| 151B3126 | 23.5   | 51.8 |

**Weight of motors**

| Code no  | Weight |      |
|----------|--------|------|
|          | kg     | [lb] |
| 151B3127 | 24.4   | 53.8 |
| 151B3128 | 25.6   | 56.4 |
| 151B3129 | 27.7   | 61.1 |
| 151B3200 | 31.0   | 68.3 |
| 151B3201 | 31.5   | 69.4 |
| 151B3202 | 32.0   | 70.5 |
| 151B3203 | 33.0   | 72.8 |
| 151B3204 | 34.0   | 75.0 |
| 151B3205 | 35.0   | 77.2 |
| 151B3207 | 31.0   | 68.3 |
| 151B3208 | 31.5   | 69.4 |
| 151B3209 | 32.0   | 70.5 |
| 151B3210 | 33.0   | 72.8 |
| 151B3211 | 34.0   | 75.0 |
| 151B3212 | 35.0   | 77.2 |
| 151B4000 | 24.5   | 54.0 |
| 151B4001 | 25.0   | 55.1 |
| 151B4002 | 25.5   | 56.2 |
| 151B4003 | 26.5   | 58.4 |
| 151B4004 | 27.5   | 60.6 |
| 151B4005 | 28.5   | 62.8 |
| 151B4007 | 24.5   | 54.0 |
| 151B4008 | 25.0   | 55.1 |
| 151B4009 | 25.5   | 56.2 |
| 151B4010 | 26.5   | 58.4 |
| 151B4011 | 27.5   | 60.6 |
| 151B4012 | 28.5   | 62.8 |
| 151B4021 | 24.5   | 54.0 |
| 151B4022 | 25.0   | 55.1 |
| 151B4023 | 25.5   | 56.2 |
| 151B4024 | 26.5   | 58.4 |
| 151B4025 | 27.5   | 60.6 |
| 151B4026 | 28.5   | 62.8 |
| 151B4028 | 24.5   | 54.0 |
| 151B4029 | 25.0   | 55.1 |
| 151B4030 | 25.5   | 56.2 |
| 151B4031 | 26.5   | 58.4 |
| 151B4032 | 27.5   | 60.6 |
| 151B4033 | 28.5   | 62.8 |
| 151F0500 | 9.8    | 21.6 |
| 151F0501 | 10.0   | 22.1 |
| 151F0502 | 10.3   | 22.7 |

**Weight of motors**

| Code no  | Weight |      |
|----------|--------|------|
|          | kg     | [lb] |
| 151F0503 | 10.7   | 23.6 |
| 151F0504 | 11.1   | 24.5 |
| 151F0505 | 11.6   | 25.6 |
| 151F0506 | 12.3   | 27.1 |
| 151F0507 | 9.8    | 21.6 |
| 151F0508 | 10.0   | 22.1 |
| 151F0509 | 10.3   | 22.7 |
| 151F0510 | 10.7   | 23.6 |
| 151F0511 | 11.1   | 24.5 |
| 151F0512 | 11.6   | 25.6 |
| 151F0513 | 12.3   | 27.1 |
| 151F0514 | 9.8    | 21.6 |
| 151F0515 | 10.0   | 22.1 |
| 151F0516 | 10.3   | 22.7 |
| 151F0517 | 10.7   | 23.6 |
| 151F0518 | 11.1   | 24.5 |
| 151F0519 | 11.6   | 25.6 |
| 151F0520 | 12.3   | 27.1 |
| 151F0521 | 10.3   | 22.7 |
| 151F0522 | 10.5   | 23.1 |
| 151F0523 | 10.8   | 23.8 |
| 151F0524 | 11.2   | 24.7 |
| 151F0525 | 11.6   | 25.6 |
| 151F0526 | 12.1   | 26.7 |
| 151F0527 | 12.8   | 28.2 |
| 151F0528 | 10.3   | 22.7 |
| 151F0529 | 10.5   | 23.1 |
| 151F0530 | 10.8   | 23.8 |
| 151F0531 | 11.2   | 24.7 |
| 151F0532 | 11.6   | 25.6 |
| 151F0533 | 12.1   | 26.7 |
| 151F0534 | 12.8   | 28.2 |
| 151F0535 | 7.8    | 17.2 |
| 151F0536 | 8.0    | 17.6 |
| 151F0537 | 8.3    | 18.3 |
| 151F0538 | 8.7    | 19.2 |
| 151F0539 | 9.1    | 20.1 |
| 151F0540 | 9.6    | 21.2 |
| 151F0541 | 10.3   | 22.7 |
| 151F0542 | 10.2   | 22.5 |
| 151F0543 | 10.4   | 22.9 |
| 151F0544 | 10.7   | 23.6 |

**Weight of motors**

| Code no  | Weight |      |
|----------|--------|------|
|          | kg     | [lb] |
| 151F0545 | 11.1   | 24.5 |
| 151F0546 | 11.5   | 25.4 |
| 151F0547 | 12.0   | 26.5 |
| 151F0548 | 12.7   | 28.0 |
| 151F0560 | 9.8    | 21.6 |
| 151F0561 | 10.0   | 22.1 |
| 151F0562 | 10.3   | 22.7 |
| 151F0563 | 10.7   | 23.6 |
| 151F0564 | 11.1   | 24.5 |
| 151F0565 | 11.6   | 25.6 |
| 151F0566 | 12.3   | 27.1 |
| 151F0605 | 13.1   | 28.9 |
| 151F0608 | 11.1   | 24.5 |
| 151F0609 | 13.6   | 30.0 |
| 151F0610 | 13.6   | 30.0 |
| 151F2200 | 9.8    | 21.6 |
| 151F2201 | 10.0   | 22.1 |
| 151F2202 | 10.3   | 22.7 |
| 151F2203 | 10.7   | 23.6 |
| 151F2204 | 11.1   | 24.5 |
| 151F2205 | 11.6   | 25.6 |
| 151F2206 | 12.3   | 27.1 |
| 151F2207 | 9.8    | 21.6 |
| 151F2208 | 10.0   | 22.1 |
| 151F2209 | 10.3   | 22.7 |
| 151F2210 | 10.7   | 23.6 |
| 151F2211 | 11.1   | 24.5 |
| 151F2212 | 11.6   | 25.6 |
| 151F2213 | 12.3   | 27.1 |
| 151F2214 | 9.8    | 21.6 |
| 151F2215 | 10.0   | 22.1 |
| 151F2216 | 10.3   | 22.7 |
| 151F2217 | 10.7   | 23.6 |
| 151F2218 | 11.1   | 24.5 |
| 151F2219 | 11.6   | 25.6 |
| 151F2220 | 12.3   | 27.1 |
| 151F2235 | 10.3   | 22.7 |
| 151F2236 | 10.5   | 23.1 |
| 151F2237 | 10.8   | 23.8 |
| 151F2238 | 11.2   | 24.7 |
| 151F2239 | 11.6   | 25.6 |
| 151F2240 | 12.1   | 26.7 |

**Weight of motors**

| Code no  | Weight |      |
|----------|--------|------|
|          | kg     | [lb] |
| 151F2241 | 12.8   | 28.2 |
| 151F2242 | 10.3   | 22.7 |
| 151F2243 | 10.5   | 23.1 |
| 151F2244 | 10.8   | 23.8 |
| 151F2245 | 11.2   | 24.7 |
| 151F2246 | 11.6   | 25.6 |
| 151F2247 | 12.1   | 26.7 |
| 151F2248 | 12.8   | 28.2 |
| 151F2261 | 13.1   | 28.9 |
| 151F2262 | 13.1   | 28.9 |
| 151F2263 | 13.6   | 30.0 |
| 151F2264 | 13.1   | 28.9 |
| 151F2265 | 13.6   | 30.0 |
| 151F2300 | 9.8    | 21.6 |
| 151F2301 | 10.0   | 22.1 |
| 151F2302 | 10.3   | 22.7 |
| 151F2303 | 10.7   | 23.6 |
| 151F2304 | 11.1   | 24.5 |
| 151F2305 | 11.6   | 25.6 |
| 151F2306 | 12.3   | 27.1 |
| 151F2307 | 13.1   | 28.9 |
| 151F2308 | 9.8    | 21.6 |
| 151F2309 | 10.0   | 22.1 |
| 151F2310 | 10.3   | 22.7 |
| 151F2311 | 10.7   | 23.6 |
| 151F2312 | 11.1   | 24.5 |
| 151F2313 | 11.6   | 25.6 |
| 151F2314 | 12.3   | 27.1 |
| 151F2315 | 13.1   | 28.9 |
| 151F2316 | 9.8    | 21.6 |
| 151F2317 | 10.0   | 22.1 |
| 151F2318 | 10.3   | 22.7 |
| 151F2319 | 10.7   | 23.6 |
| 151F2320 | 11.1   | 24.5 |
| 151F2321 | 11.6   | 25.6 |
| 151F2322 | 12.3   | 27.1 |
| 151F2323 | 13.1   | 28.9 |
| 151F2324 | 9.8    | 21.6 |
| 151F2325 | 10.0   | 22.1 |
| 151F2326 | 10.3   | 22.7 |
| 151F2327 | 10.7   | 23.6 |
| 151F2328 | 11.1   | 24.5 |

**Weight of motors**

| Code no  | Weight |      |
|----------|--------|------|
|          | kg     | [lb] |
| 151F2329 | 11.6   | 25.6 |
| 151F2330 | 12.3   | 27.1 |
| 151F2331 | 13.1   | 28.9 |
| 151F2332 | 9.8    | 21.6 |
| 151F2333 | 10.0   | 22.1 |
| 151F2334 | 10.3   | 22.7 |
| 151F2335 | 10.7   | 23.6 |
| 151F2336 | 11.1   | 24.5 |
| 151F2337 | 11.6   | 25.6 |
| 151F2338 | 12.3   | 27.1 |
| 151F2339 | 13.1   | 28.9 |
| 151F2345 | 14.0   | 30.9 |
| 151F2346 | 14.0   | 30.9 |
| 151F2347 | 14.0   | 30.9 |
| 151F2348 | 14.0   | 30.9 |
| 151F2349 | 14.0   | 30.9 |
| 151F2350 | 9.8    | 21.6 |
| 151F2351 | 10.0   | 22.1 |
| 151F2352 | 10.3   | 22.7 |
| 151F2353 | 10.7   | 23.6 |
| 151F2354 | 11.1   | 24.5 |
| 151F2355 | 11.6   | 25.6 |
| 151F2356 | 12.3   | 27.1 |
| 151F2357 | 13.1   | 28.9 |
| 151F2358 | 14.0   | 30.9 |
| 151F2359 | 9.8    | 21.6 |
| 151F2360 | 10.0   | 22.1 |
| 151F2361 | 10.3   | 22.7 |
| 151F2362 | 10.7   | 23.6 |
| 151F2363 | 11.1   | 24.5 |
| 151F2364 | 11.6   | 25.6 |
| 151F2365 | 12.3   | 27.1 |
| 151F2366 | 13.1   | 28.9 |
| 151F2367 | 14.0   | 30.9 |
| 151F2368 | 9.8    | 21.6 |
| 151F2369 | 10.0   | 22.1 |
| 151F2370 | 10.3   | 22.7 |
| 151F2371 | 10.7   | 23.6 |
| 151F2372 | 11.1   | 24.5 |
| 151F2373 | 11.6   | 25.6 |
| 151F2374 | 12.3   | 27.1 |
| 151F2375 | 13.1   | 28.9 |

**Weight of motors**

| Code no  | Weight |      |
|----------|--------|------|
|          | kg     | [lb] |
| 151F2376 | 14.0   | 30.9 |
| 151F2395 | 9.8    | 21.6 |
| 151F2396 | 10.0   | 22.1 |
| 151F2397 | 10.3   | 22.7 |
| 151F2398 | 10.7   | 23.6 |
| 151F2399 | 11.1   | 24.5 |
| 151F2400 | 11.6   | 25.6 |
| 151F2401 | 12.3   | 27.1 |
| 151F2402 | 13.1   | 28.9 |
| 151F2403 | 14.0   | 30.9 |
| 151F2413 | 9.8    | 21.6 |
| 151F2414 | 10.0   | 22.1 |
| 151F2415 | 10.3   | 22.7 |
| 151F2416 | 10.7   | 23.6 |
| 151F2417 | 11.1   | 24.5 |



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