Danfoss OMTS 315 151B3039 orbital hydraulic motor

Manufacturer: Danfoss

Manufacturer part number / published order designation: 151B3039

Published model: 151B3039

About this compilation

Prepared by Hydmaster from selected manufacturer documentation. Original technical pages follow without cropped drawings, rewritten data or altered units. This cover and index are Hydmaster editorial material, not a manufacturer-issued exact-execution datasheet.

Coverage: selected pages relevant to the identified size and configuration. Other options or neighbouring models retained on an original page apply only where explicitly identified.

Execution notes and conditions

Factory model code: OMT-0315-C-NN-S14-AD-1D-NNN-N-N-1B-1-N-NN-NNNNN-NN-NN-NN-SP-NNN

Current exact factory article verified separately from the October 2024 technical reference.

Representative factory photograph; use the applicable execution drawings.

Separate catalogue limits; check operating point, shaft loading and drain requirements.

Source-page index

Source page numbers below are physical pages of each complete original PDF. The original printed page labels and technical content remain unchanged. Compiled page numbers count this cover/index.

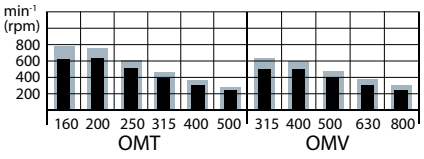
Source A: Danfoss OMT technical information - October 2024

Original pages	Compiled pages	Relevant content
7-12	2-7	Applicable original version, hydraulic limits, installation, shaft, ports or mounting drawing
16	8	Size-specific performance diagram
21	9	Applicable original version, hydraulic limits, installation, shaft, ports or mounting drawing
34-37	10-13	Applicable original version, hydraulic limits, installation, shaft, ports or mounting drawing

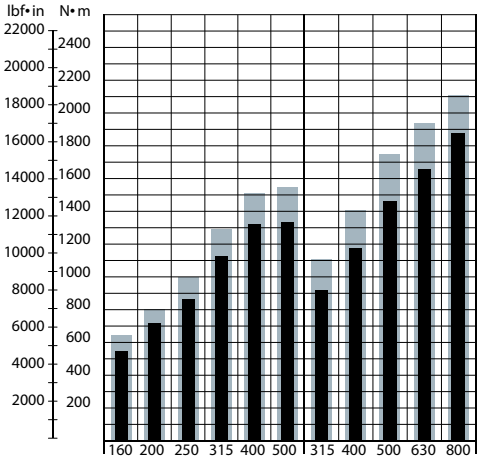
Orbital motors

Speed, torque, and output

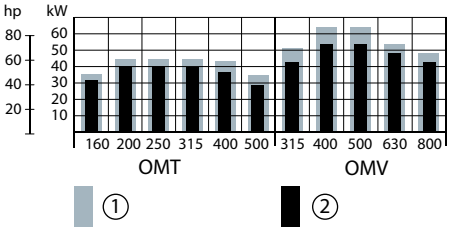
Maximum speed



Maximum torque



Maximum output



1. Intermittend values
2. Continuous values

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: see *OMT Function diagrams* on page 15, or *OMV function diagrams* on page 44.

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^2/s [165 SUS] and a temperature of 50°C [120°F].

OMT

Versions

OMT versions

Mounting flange	Shaft	Port size	European version	US version	Drain connection	Check valve	Low pressure release	High pressure release	Main type designation
Standard flange	Cyl. 40 mm	G 3/4	X		Yes	Yes			OMT
	Cyl. 1.5 in	1 1/16-12 UN		X	Yes	Yes			OMT
	Splined 1.5 in	G 3/4	X		Yes	Yes			OMT
		1 1/16-12 UN		X	Yes	Yes			OMT
	Tapered 45 mm	G 3/4	X		Yes	Yes			OMT
	Tapered 1.75 in	1 1/16-12 UN		X	Yes	Yes			OMT
	P.t.o.	G 3/4	X		Yes	Yes			OMT
Wheel	Cyl. 40 mm	G 3/4	X		Yes	Yes			OMTW
	Tapered 45 mm	G 3/4	X		Yes	Yes			OMTW
	Tapered 1.75 in	1 1/16-12 UN		X	Yes	Yes			OMTW
Brake-wheel	Wheel bolt flange	G 3/4	X		Yes	No	X		OMT FX
	Thread hole flange	G 3/4	X		Yes	No	X		OMT FX
Brake-standard	Cyl. 40 mm	G 3/4	X		Yes	No	X		OMT FL
	Splined 1.5 in	G 3/4	X		Yes	No	X		OMT FL
	Cyl. 40 mm	G 3/4	X		Yes	No		X	OMT FH
	Splined 1.5 in	G 3/4	X		Yes	No		X	OMT FH
Short	No output shaft	G 3/4	X		Yes	Yes			OMTS

Features

Features available (options):

- Speed sensor
- Motor with tacho connection
- Viton shaft seal
- Painted
- Ultra short

Code numbers

OMT code numbers

Code Numbers	Displacement [cm^3]					
	160	**200**	**250**	**315**	**400**	**500**
151B	3000	3001	3002	3003	3004	3005
151B	2050	2051	2052	2053	2054	2055
151B	3006	3007	3008	3009	3010	3011
151B	2056	2057	2058	2059	2060	2061
151B	3012	3013	3014	3015	3016	3017
151B	2062	2063	2064	2065	2066	2067

OMT

OMT code numbers (continued)

Code Numbers	Displacement [cm³]					
	160	200	250	315	400	500
151B	3018	3019	3020	3021	3022	3023
151B	3024	3025	3026	3027	3028	3029
151B	3030	3031	3032	3033	3034	3035
151B	2080	2081	2082	2083	2084	2085
151B	3207	3208	3209	3210	3211	3212
151B	3200	3201	3202	3203	3204	3205
151B	4000	4001	4002	4003	4004	4005
151B	4007	4008	4009	4010	4011	4012
151B	4021	4022	4023	4024	4025	4026
151B	4028	4029	4030	4031	4032	4033
151B	3036	3037	3038	3039	3040	3041

Ordering

Add the four digit prefix “151B” to the four digit numbers from the chart for complete code number.

Example:

151B3002 for an OMT 250 with standard flange, cyl. 40 mm shaft and port size G 3/4.

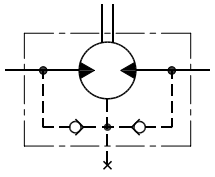
Orders will not be accepted without the four digit prefix.

Technical data

Maximum permissible shaft seal pressure

Motor with 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

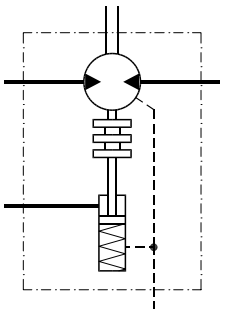
Motor with check valves and with drain connection

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

OMT FX, OMT FL and OMT FH must always be fitted with drain line.

Maximum pressure in drain line is 5 bar [75 psi]

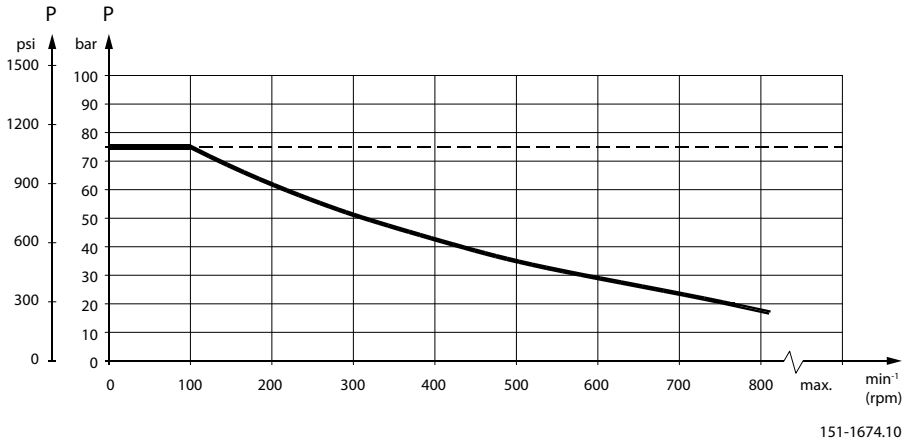
OMT



Motor with check valves and with drain connection

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

Maximum return pressure without drain line or maximum pressure in the drain line



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

——— Continuous operation

OMT, OMTW, OMTS, OMT FX OMT FL and OMT FH

Technical data for OMT, OMTW, OMTS, OMT FX OMT FL and OMT FH

Type			**OMT OMTW OMTS OMT FX OMT FL OMT FH**	**OMT OMTW OMTS OMT FX OMT FL OMT FH**	**OMT OMTW OMTS OMT FX OMT FL OMT FH**	**OMT OMTW OMTS OMT FX OMT FL OMT FH**	**OMT OMTW OMTS OMT FX OMT FL OMT FH**	**OMT OMTW OMTS OMT FX OMT FL OMT FH**
Motor size			**160**	**200**	**250**	**315**	**400**	**500**
Geometric displacement	cm^3 [in^3]		161.1 [9.83]	201.4 [12.29]	251.8 [15.37]	326.3 [19.91]	410.9 [25.07]	523.6 [31.95]
Maximum speed	min^{-1} [rpm]	cont.	625	625	500	380	305	240
		int[1)]	780	750	600	460	365	285
Maximum torque	Nm [lbf·in]	cont.	470 [4160]	590 [5220]	730 [6460]	950 [8410]	1080 [9560]	1220 [10800]
		int.[1)]	560 [4960]	710 [6280]	880 [7790]	1140 [10090]	1260 [11150]	1370 [12130]

OMT

Technical data for OMT, OMTW, OMTS, OMT FX OMT FL and OMT FH (continued)

Type			**OMT OMTW OMTS OMT FX OMT FL OMT FH**	**OMT OMTW OMTS OMT FX OMT FL OMT FH**	**OMT OMTW OMTS OMT FX OMT FL OMT FH**	**OMT OMTW OMTS OMT FX OMT FL OMT FH**	**OMT OMTW OMTS OMT FX OMT FL OMT FH**	**OMT OMTW OMTS OMT FX OMT FL OMT FH**
Motor size			**160**	**200**	**250**	**315**	**400**	**500**
Maximum output	kW [hp]	cont.	26.5 [35.5]	33.5 [44.9]	33.5 [44.9]	33.5 [44.9]	30.0 [40.2]	26.5 [35.5]
		int.[1)]	32.0 [42.9]	40.0 [53.6]	40.0 [53.6]	40.0 [53.6]	35.0 [46.9]	30.0 [40.2]
Maximum pressure drop	bar [psi]	cont.	200 [2900]	200 [2900]	200 [2900]	200 [2900]	180 [2610]	160 [2320]
		int.[1)]	240 [3480]	240 [3480]	240 [3480]	240 [3480]	210 [3050]	180 [2610]
		peak[2)]	280 [4060]	280 [4060]	280 [4060]	280 [4060]	240 [3480]	210 [3050]
Maximum oil flow	l/min [USgal/min]	cont.	100 [26.4]	125 [33.0]	125 [33.0]	125 [33.0]	125 [33.0]	125 [33.0]
		int.[1)]	125 [33.0]	150 [39.6]	150 [39.6]	150 [39.6]	150 [39.6]	150 [39.6]
Maximum starting pressure with unloaded shaft	bar [psi]		10 [145]	10 [145]	10 [145]	10 [145]	10 [145]	10 [145]
Minimum starting torque	at maximum pressure drop cont. Nm [lbf·in]		200 [2900]	200 [2900]	200 [2900]	200 [2900]	180 [2610]	160 [2320]
	at maximum pressure drop int.[1)] Nm [lbf·in]		240 [3480]	240 [3480]	240 [3480]	240 [3480]	210 [3050]	180 [2610]

[1)] Intermittent operation: the permissible values may occur for max. 10% of every minute.

[2)] Peak load: the permissible values may occur for max. 1% of every minute.

For maximum permissible combination of flow and pressure, see function diagram for actual motor.

Type			**Maximum inlet pressure**	**Maximum return pressure with drain line**
OMT, OMTW, OMTS, OMT FX, OMT FL, OMT FH	bar [psi]	cont.	210 [3050]	140 [2030]
	bar [psi]	int.[1)]	250 [3630]	175 [2540]
	bar [psi]	peak[2)]	300 [4350]	210 [3050]

[1)] Intermittent operation: the permissible values may occur for maximum 10% of every minute.

[2)] Peak load: The permissible values may occur for maximum 1% of every minute.

Brake motors

Type	**Maximum pressure in drain line[3)]**	**Holding torque[4)]**	**Brake-release pressure[3)]**	**Maximum pressure in brake line**
OMT FX, OMT FL	5 bar [70 psi]	1200 Nm [10620 lbf·in]	12 bar [170 psi]	30 bar [440 psi]
OMT FH	5 bar [70 psi]	1200 Nm [10620 lbf·in]	30 bar [440 psi]	280 bar [4060 psi]

[3)] Brake motors must always have a drain line. The brake-release pressure is the difference between the pressure in the brake line and the pressure in the drain line.

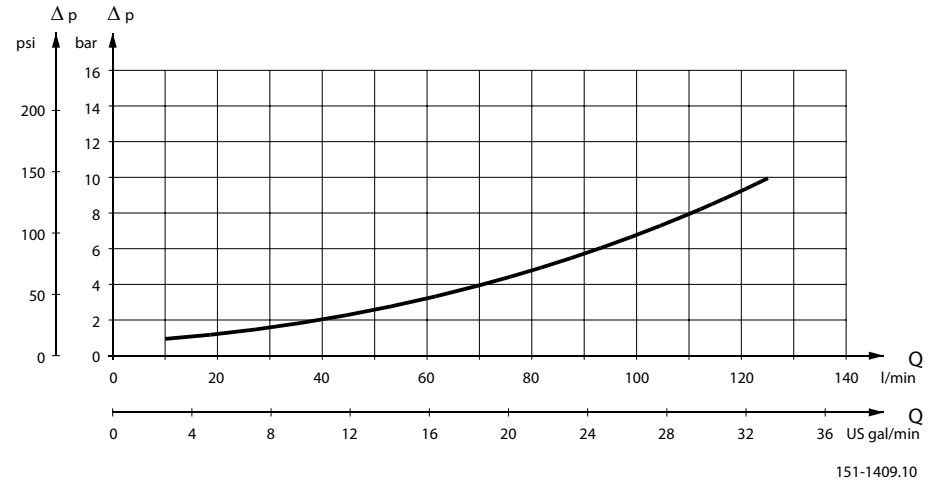
[4)] For the supply of motors with holding torques higher than those stated, please contact the Danfoss sales organization.

For maximum permissible combination of flow and pressure, see function diagram for actual motor.

OMT

Pressure drop in motor

OMT 160, 200, 250, 315, 400, 500 pressure drop



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

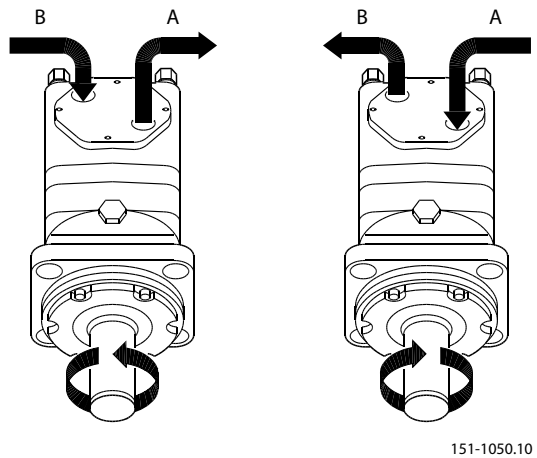
Oil flow in drain line

Maximum oil flow in the drain line at a return pressure less than 5-10 bar [75-150 psi]

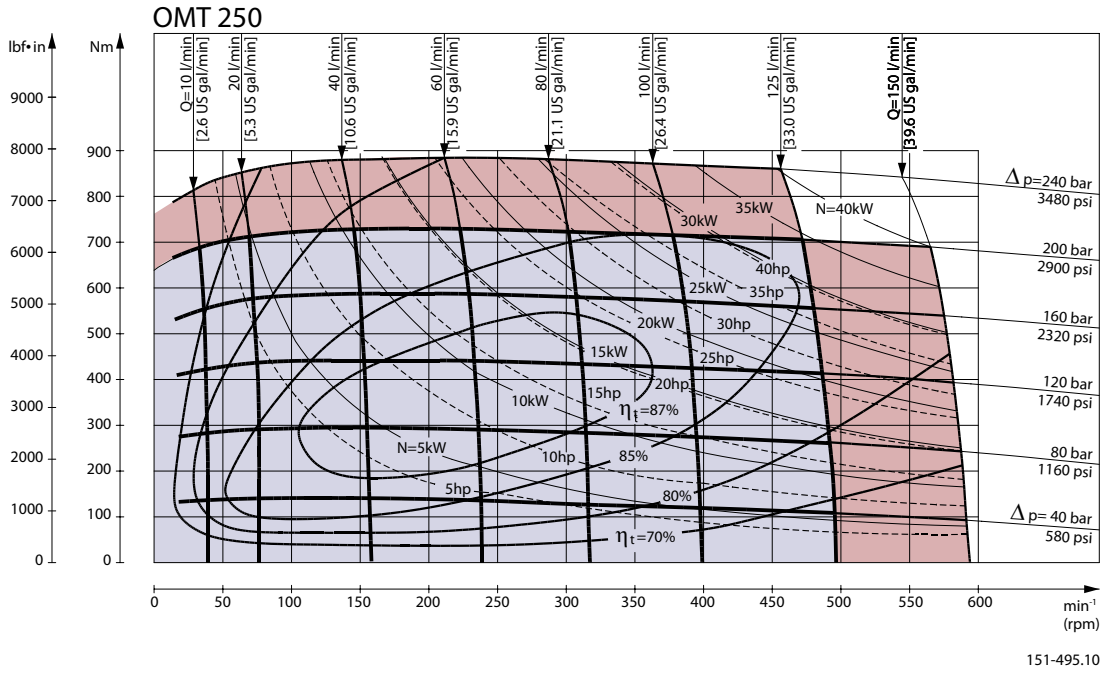
Pressure drop		Viscosity		Oil flow in drain line	
bar	**[psi]**	**mm^2/s**	**[SUS]**	**l/min**	**[US gal/min]**
140	[2030]	20	[100]	2.5	[0.66]
		35	[165]	1.5	[0.40]
210	[3050]	20	[100]	5.0	[1.32]
		35	[165]	3.0	[0.79]

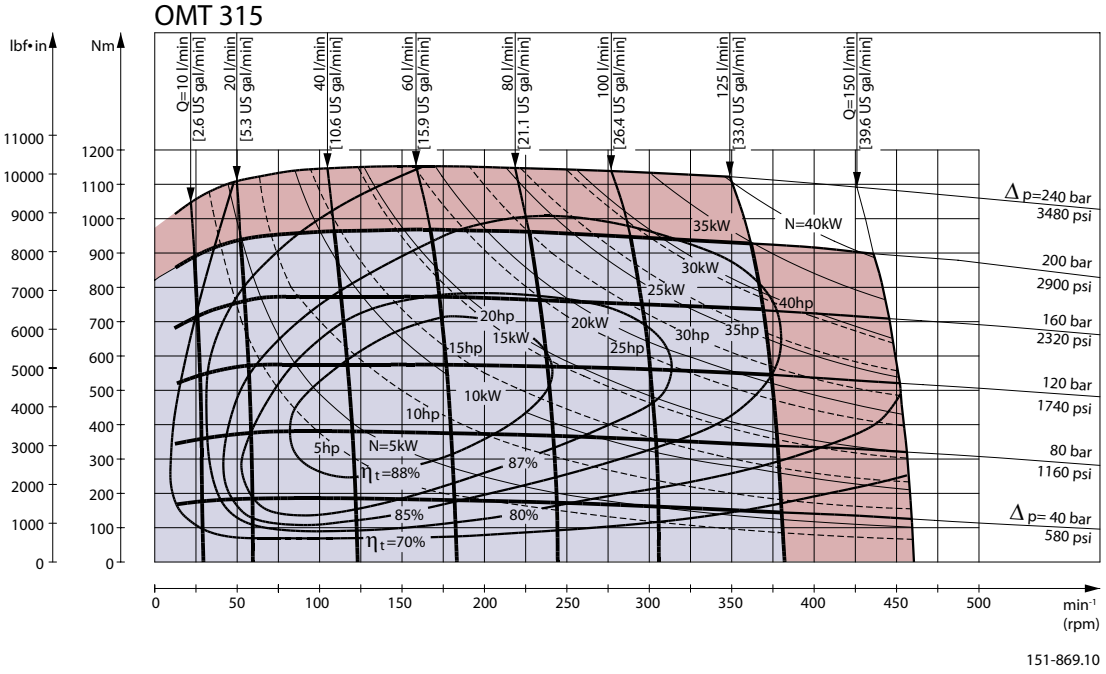
OMT direction of shaft rotation

Standard rotation



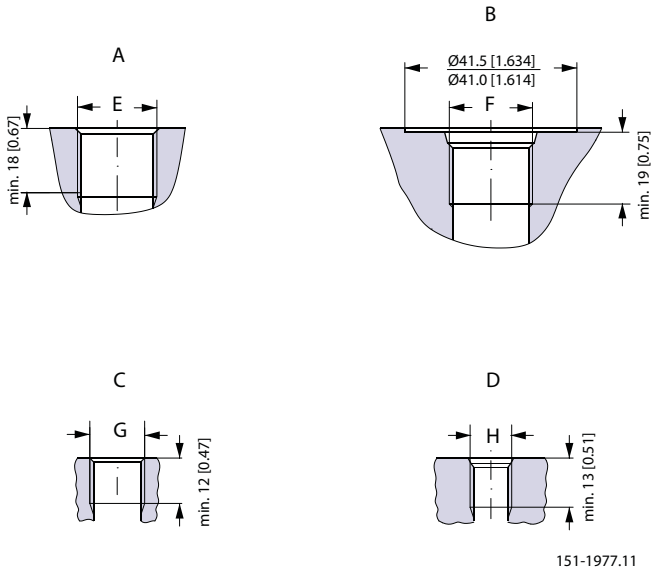
OMT


OMT 250
lbf•in
Nm
Q=10 l/min [2.6 US gal/min]
20 l/min [5.3 US gal/min]
40 l/min [10.6 US gal/min]
60 l/min [15.9 US gal/min]
80 l/min [21.1 US gal/min]
100 l/min [26.4 US gal/min]
125 l/min [33.0 US gal/min]
Q=150 l/min [39.6 US gal/min]
Δp=240 bar 3480 psi
200 bar 2900 psi
160 bar 2320 psi
120 bar 1740 psi
80 bar 1160 psi
Δp= 40 bar 580 psi
N=40kW
35kW
30kW
40hp
25kW
35hp
20kW
30hp
15kW
25hp
20hp
15hp
10kW
ηt=87%
N=5kW
10hp
85%
5hp
80%
ηt=70%
min-1 (rpm)
151-495.10


OMT 315
lbf•in
Nm
Q=10 l/min [2.6 US gal/min]
20 l/min [5.3 US gal/min]
40 l/min [10.6 US gal/min]
60 l/min [15.9 US gal/min]
80 l/min [21.1 US gal/min]
100 l/min [26.4 US gal/min]
125 l/min [33.0 US gal/min]
Q=150 l/min [39.6 US gal/min]
Δp=240 bar 3480 psi
200 bar 2900 psi
160 bar 2320 psi
120 bar 1740 psi
80 bar 1160 psi
Δp= 40 bar 580 psi
N=40kW
35kW
30kW
25kW
40hp
20hp
20kW
30hp
35hp
15hp
15kW
25hp
10kW
10hp
5hp
N=5kW
ηt=88%
87%
85%
80%
ηt=70%
min-1 (rpm)
151-869.10

OMT

Port thread versions



A	G main ports	**B**	UN main ports
E	ISO 228/1 - G3/4 O-ring boss port	**F**	1 1/16 - 12 UN
C	G drain port	**D**	UNF drain port
G	G: ISO 228/1 - G1/4 O-ring boss port	**H**	9/16 - 18 UNF

OMT

D: M10; 10 mm [0.39 in] deep

E: G 3⁄4; 17 mm [0.67 in] deep

The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L1 dimensions

Type		OMTS 160	OMTS 200	OMTS 250	OMTS 315	OMTS 400	OMTS 500
$L_{Max.}$	mm	146	151	157	166	177	191
	[in]	[5.75]	[5.94]	[6.18]	[6.54]	[6.97]	[7.52]
L_1	mm	16.5	21.5	27.8	37.0	47.5	61.5
	[in]	[0.650]	[0.846]	[1.094]	[1.457]	[1.870]	[2.421]
L_2	mm	96	101	107	116	127	142
	[in]	[3.78]	[3.98]	[4.21]	[4.57]	[5.00]	[5.59]
Weight	kg						
	[lb]						

Type	Lmax	L1	L2
OMTS 500			

OMTS

Installation

The cardan shaft of the OMTS 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 OMT.

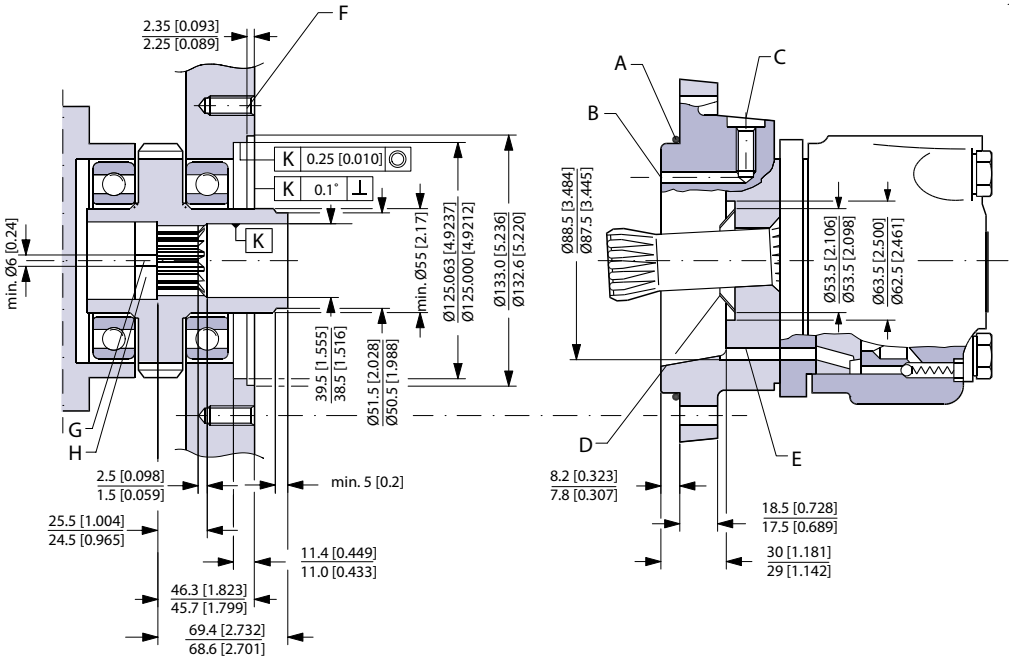
The conical sealing ring (code. no. 633B9022) is supplied with the motor.

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

We recommend an O-ring between motor and attached component. The O-ring (code no. 151B1040) 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.

Attached component dimensions

OMTS dimensions of the attached component in millimeter [inches]



151-452.10

A O-ring: 125 × 3 mm

B External drain channel

C Drain connection
G 1⁄4; 12 mm [0.47 in] deep

D Conical seal ring

E Internal drain channel

F M12; min. 18 mm [0.71 in] deep

OMTS

G Oil circulation hole

H Hardened stop plate

Attached component internal splines

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

Material:

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

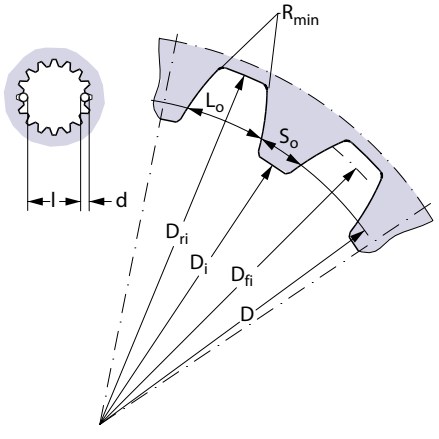
Hardening specification:

- On the surface: HV = 750 ± 50
- 0.7 ± 0.2 mm under the surface: HV = 560

Internal involute spline data; Standard ANS B92.1-1970, class 5 (corrected m · X = 1; m = 2.1166)

Flat root side fit		**mm**	**in**
Number of teeth	z	16	16
Pitch	DP	12/24	12/24
Pressure angle		30°	30°
Pitch dia.	D	33.8656	1.3333
Major dia.	D_{ri}	$38.4_0^{+0.4}$	$1.5118_0^{+0.0157}$
Form dia. (min.)	D_{fi}	37.6	1.4803
Minor dia.	D_i	$32.150_0^{+0.04}$	$1.2657_0^{+0.00157}$
Space width (circular)	L_o	$4.516^{\pm0.037}$	$0.1777^{\pm0.0014}$
Tooth thickness (circular)	S_o	2.170	0.0854
Fillet radius	$R_{min.}$	0.5	0.02
Max. measurement between pins*	l	$26.9_0^{+0.1}$	$1.059_0^{+0.004}$
Pin dia.	d	$4.834^{\pm0.001}$	$0.1903^{\pm0.00004}$

* Finished dimensions (when hardened).



151-455.10

OMTS

Motor or attached component drain connection

Use the drain line when pressure in the return line exceeds the permissible pressure on the shaft seal of the attached component.

Connect the drain line either at the:

1. Motor drain connection
2. 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.