MOTORS

Technical Information

OMSU Series 3 Orbital Motor

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White is a leading global provider of motor and steering solutions that power the evolution of mobile and industrial applications around the world.

Contents

Chapter 1
Technical Data

Topics:

Technical data

Type			OMSU							
Motor size			80	100	125	160	200	250	315	400
Geometric displacement	cm^3		80.5	100	125.7	159.7	200	250	314.9	393
Maximum speed	min^{-1}	cont.	810	750	600	470	375	300	240	190
		int.[1)]	1000	900	720	560	450	360	285	230
Maximum torque	daNm	cont.	20	25	32	36	46	50	63	67
		int.[1)]	24	30	38	48	60	63	79	79
		peak	26	32	40	51	65	72	90	98
Maximum output	kW	cont.	16	17.5	17.5	16	14	12.5	11.5	10.5
		int.[1)]	19	21	21	21	17.5	15	13.5	12.5
Maximum pressure drop.	bar	cont.	175	175	175	160	160	140	140	120
		int.[1)]	210	210	210	210	210	175	175	140
		peak[2)]	225	225	225	225	225	200	200	175
Maximum oil flow	l/min	cont.	65	75	75	75	75	75	75	75
		int.[1)]	80	90	90	90	90	90	90	90
Maximum starting pressure with unloaded shaft	bar		12	10	10	8	8	8	8	8
Minimum starting torque	daNm	at max. press. drop cont.	15.5	19.5	24.5	28.5	35.5	39	49	53
		at max. press. drop int.[1)]	19	23.5	30	37.5	47	49	61	61
Min. speed [(3)]	min^{-1}		10	10	8	8	6	6	5	5
Max. inlet pressure	bar	cont.	210	210	210	210	210	210	210	210
		int.[(1)]	250	250	250	250	250	250	250	250
		peak[(2)]	300	300	300	300	300	300	300	300
Max. return pressure with drain line	bar	cont.	140	140	140	140	140	140	140	140
		int.[(1)]	175	175	175	175	175	175	175	175
		peak[(2)]	210	210	210	210	210	210	210	210

Table 1 Technical data

(1) Intermittent operation: permissible values may occur for max. 10% of every minute.
(2) Peak load: permissible values may occur for max. 1% of every minute.
(3) At speeds lower than those given, the motor cannot be expected to run evenly.
(4) If no drain line is fitted, the built-in check valves ensure that the case pressure is equal to the pressure in the return line. The max. case pressure for OMSU is dictated by the technical data of the component to be attached.

Check valves

OMSU motors have built-in check valves.

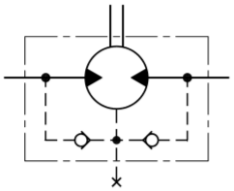
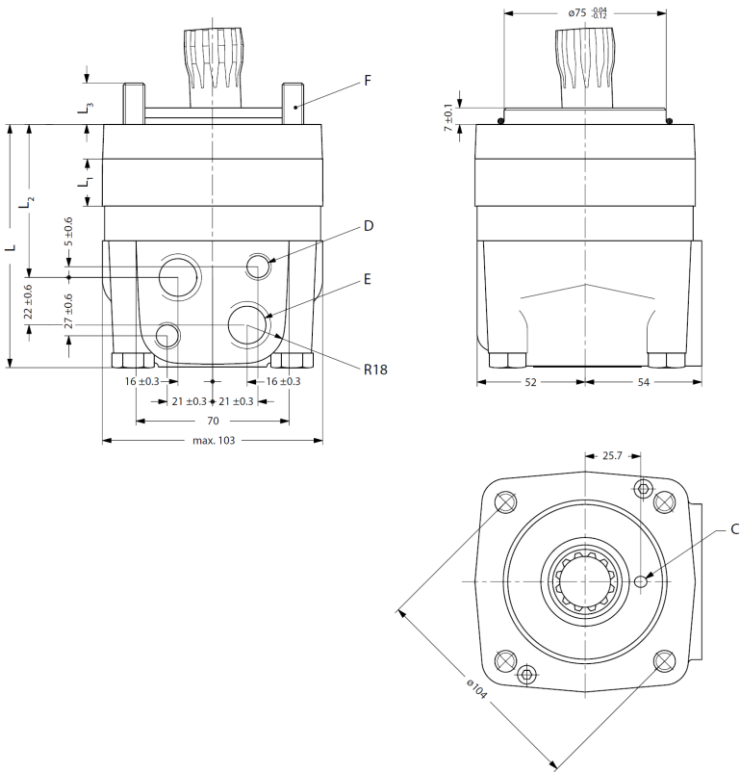


Figure 1 OMSU built-in check valves

Chapter 2
Dimensions

Topics:

OMSU dimensions



C: Drain hole ø5 +0.2 -0.1
D: M10; 11 mm deep
E: G 1/2; 15 mm deep

Figure 2 OMSU dimensions

Type		L_{max}	L_1	L_2	L_3
OMSU	**80**	107	14.0	63	22.0
	100	110	17.4	67	18.6
	125	115	21.8	71	18.2
	160	121	27.8	77	21.5
	200	128	34.8	84	21.5
	250	136	43.5	93	22.5

Table 2 OMSU dimensions

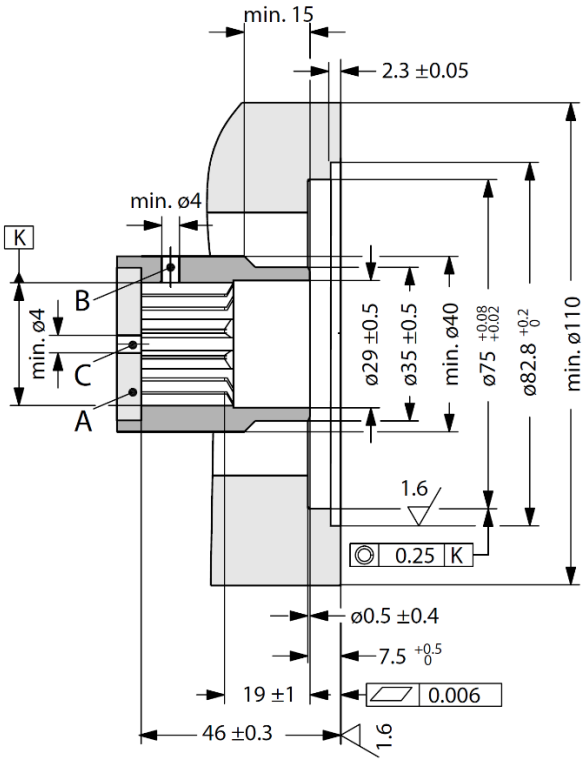
Chapter 3
General data

Topics:

- *Connection dimensions, attached component*
- *Internal spline data for the component to be attached*
- *Drain connection on OMSU or attached component*
- *Installing OMSU*
- *Mounting*
- *Maximum tightening torque*
- *Checking OMSU*
- *Exploded view OMSU*
- *OMSU spare parts list*

Connection dimensions, attached component

Connection dimensions



A: Hardened stop plate
B or **C:** Oil circulation holes

Figure 3 Connection dimensions

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).

Materials

Case hardening steel with a tensile strength corresponding at least to 20 MoCr4 (900 N/mm^2). See also SAE 8620 for further information on steel material.

Hardening specification

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

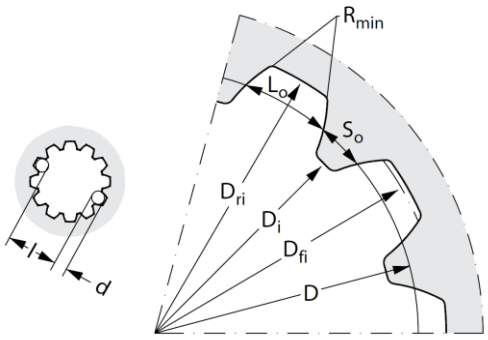


Figure 4 Finished dimensions (when hardened)

Internal involute spline data
Standard ANS B92. 1-1970, class 5 (corrected m • x = 0.8; m = 2.1166)

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

Table 3 Internal involute spline data

Drain connection on OMSU or attached component

The case pressure is released to the motor return pressure by the motor drain hole (ø 5 mm) and the incorporated check valves.

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 only be connected to the drain connection of the attached component, i.e. the OMSU motor has no external drain connection.

The drain line on the attached component allows oil to flow freely between component and the motor.

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 during operational stop.

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

Installing OMSU

To ensure that the splines connection of the cardan shaft receive sufficient oil, we recommended a conical sealing between shaft of the attached component and the motor intermediate plate as well as an oil circulation the attached component (see page 3). The conical sealing ring (code no. 633B9023) is supplied with the motor. We further recommend O-ring seal between motor and the counter part. The O-ring (code no. 633B1396) is supplied with the motor.

Mounting

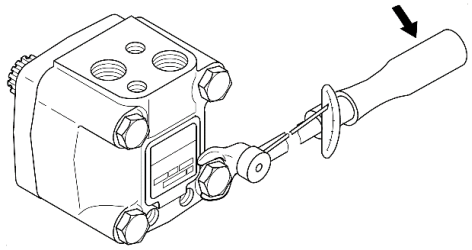


Figure 5 Mounting

Max. tightening torque	
75 $^{+5}{}_{0}$ Nm	[660 $^{+50}{}_{0}$ lbf•in]

Direction of rotation

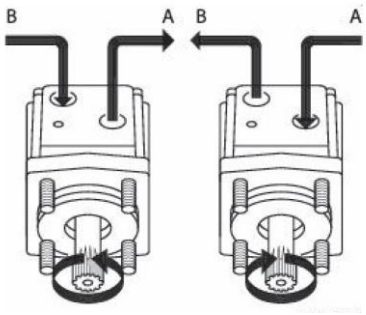


Figure 6 Direction of rotation

Maximum tightening torque

Maximum tightening torque	
Screwed connection	G 1/2 [7/8-14 UNF]
with steel washer	130 N•m [1150 lbf•in]
with aluminum washer	70 N•m [620 lbf•in]
with cutting edge	130 N•m [1150 lbf•in]
with O-ring Boss port	70 N•m [620 lbf•in]

Table 4 Maximum tightening torque

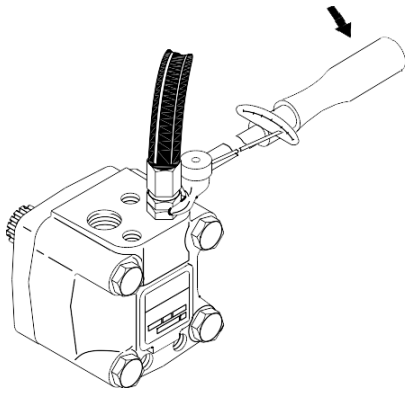


Figure 7 Tightening

Checking OMSU

In order to make sure that the OMSU counterpart is correct, the drain flow should be measured on the first of each new application. Any subsequent modification of the counterpart should imply new checking. When the motor is fitted onto the counter part with the correct tightening torque, the drain flow is measured at Q = 30 l/min and an oil viscosity of 35 mm^2/s at differential pressure:

Motor	Differential pressure
OMSU 80 - 160	140 bar
OMSU 200	110 bar
OMSU 250	90 bar
OMSU 315	70 bar
OMSU 400	55 bar

Table 5 Differential pressure

After a minimum of 5 min. of operation the drain flow shall be minimum 0.03 l/min and maximum 1.00 l/min at maximum pressure of bar 6 in the drain line during testing.

Exploded view OMSU

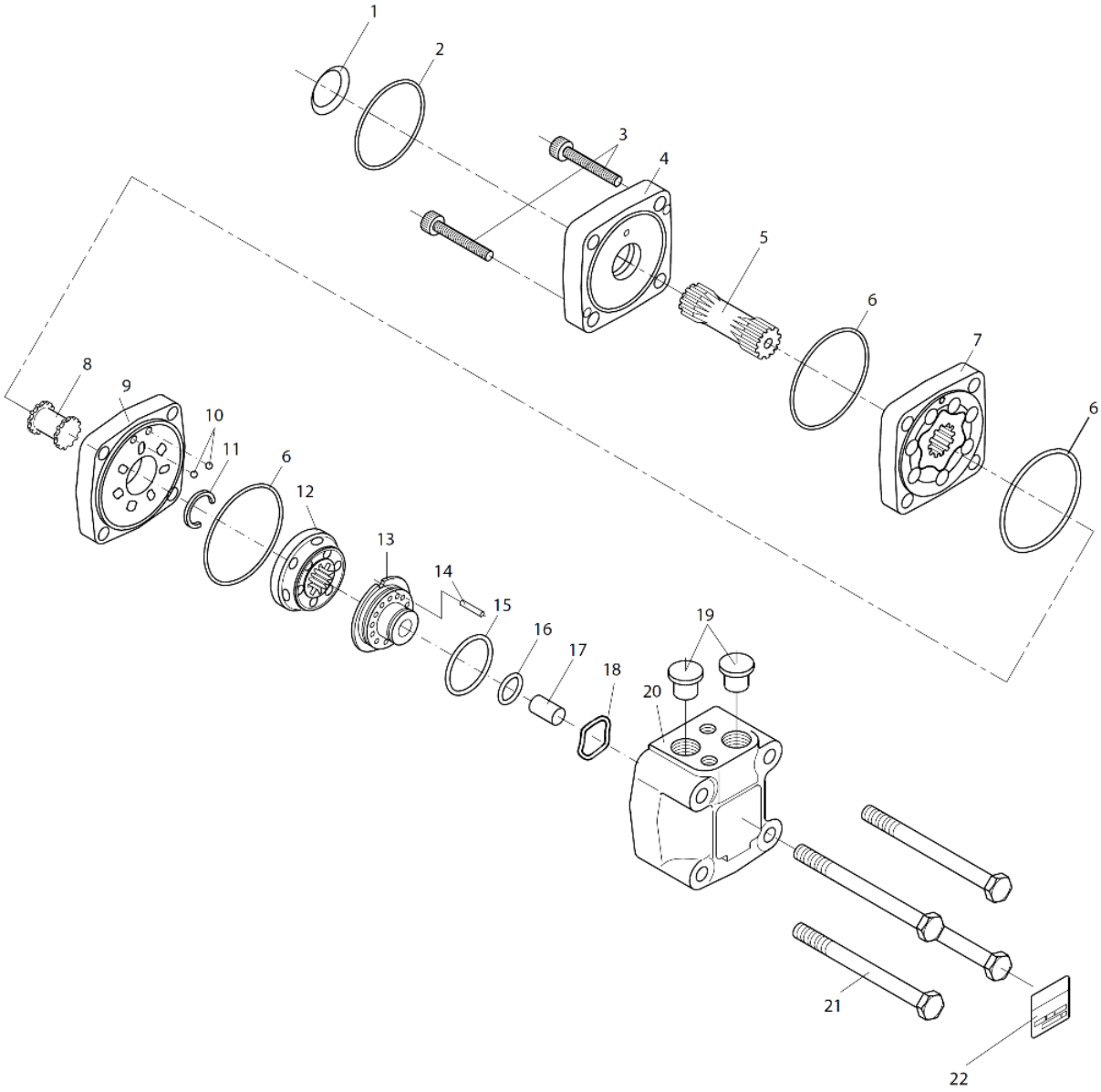


Figure 8 Exploded view

Tightening torque:
*Item 21 -> 75-80 Nm [660-705 lbf*in]*

OMSU spare parts list

Item	Spare parts			Code number	Number per motor
1	**Seal ring**			633B9023	1
2	**O-ring**	74 x 3 mm NBR ISO 1629		633B1396	1
3	**Screw M5**				
	OMSU 80		L = 45 mm	681X1512	2
	OMSU 100		L = 50 mm	681X1702	2
	OMSU 125		L = 55 mm	681X9282	2
	OMSU 160		L = 60 mm	681X1703	2
	OMSU 200		L = 70 mm	681X0354	2
	OMSU 250		L = 80 mm	681X0568	2
4	**Intermediate plate**			151F1717	1
5	**Cardan shaft**				
	OMSU 80		l = 70 mm	11075495	1
	OMSU 100		l = 73 mm	11077519	1
	OMSU 125		l = 78 mm	11077838	1
	OMSU 160		l = 84 mm	11075528	1
	OMSU 200		l = 91 mm	11077921	1
	OMSU 250		l = 99.5 mm	11077919	1
6	**O-ring**	82.5 x 2 mm NBR ISO R 1629		633B1431	3
7	**Gearwheel set**				
	OMSU 80		w = 14 mm	151F1091	1
	OMSU 100		w = 17 mm	151F1092	1
	OMSU 125		w = 22 mm	151F1093	1
	OMSU 160		w = 28 mm	151F1094	1
	OMSU 200		w = 35 mm	151F1095	1
	OMSU 250		w = 44 mm	151F1096	1
8	**Valve drive**			11030924	1
9	**Channel plate**			151F1822	1
10	**Check valve ball**	ø 3/16 in		689X1005	2
11	**Stop ring** (only OMSU 200, 250, 315 and 400)			151F1542	1

Item	Spare parts			Code number	Number per motor
12	**Disc valve**			151F1022	1
13	**Balance plate**			151F1738	1
14	**Guide pin**	ø 4 mm	l = 20 mm DIN 1481	682L9105	1
15	**O-ring 45 x 2 mm**				
	NBR, ISO R 1629			633B1429	1
	FPM, ISO R 1629			633B1455	1
16	**O-ring 24 x 2 mm**				
	NBR, ISO R 1629			633B1428	1
	FPM, ISO R 1629			633B1453	1
17	**Spacer**			151F1449	1
18	**Spring washer**			684X0097	1
19	**Seal plug G 1/2**			633X0074	2
20	**Valve housing**			151F1803	1
21	**Screw M10**				
	OMSU 80, 100, 125		l = 120 mm	681X1349	4
	OMSU 160		l = 130 mm	681X1350	4
	OMSU 200		l = 140 mm	681X1352	4
	OMSU 250		l = 150 mm	681X1353	4
22	**Name plate**				
A	Set of seals items 1, 6, 15, 16			151F0103	
B	Set of seals items 1, 2			151F1020	
NBR: (Buna N, Perbunan); FPM (Viton)					

Table 6 OMSU spare parts

Tables

Figures

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