

# A guide to select the correct bell-housing and drive coupling components

## DATA REQUIRED

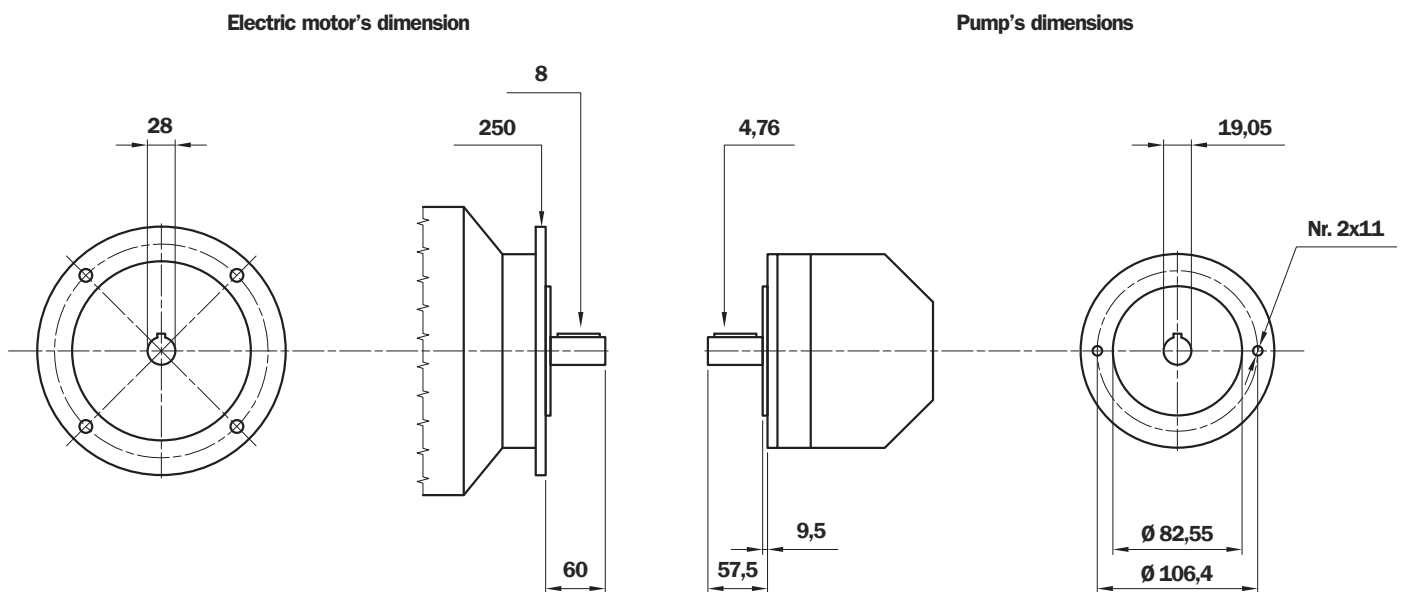
Electric motor power/motor size  
 Manufacturer and pump type

## TO VERIFY:

- 1 - Pump and motor shaft dimensions (see page 67)
- 2 - Shaft and flange pump (see pump data sheet)

Example:

- Electric motor 2 kW - 4 poles - Motor size 110/112
- Atos pump code PFE31 - Shaft 1



## Bell-Housing's length calculation

- $H = 60 + 18 + 57,5 = 135,5$  mm (18= Sp spider - see page 49)
- Choose type of bell-housing (LMC - LMS)
  - For LMC see tab. 3 at page 11
  - For LMS see tab. 22 at page 32
  - For MODUL 2/3 see at page 36

**Note:** The length of bell-housing must be  $\geq$  than the length calculated (135,5 mm)

## Case A - solution with LMC bell-housing

Tab. 3 at page 11 - for electric motor 2 kW LMC 250  
 LMC 250 bell-housing with height  $\geq 135,5$  - LMC250AFSQ

- The bell-housing code must be completed with drilling pump code (see tab. 35 at page 47)  
 For the specific case C= 82,5 - Nr. 2 holes M10: Code drilling O60
- Definitive bell-housing code **LMC250AFSQ060**

## Case B - solution with LMS bell-housing

Tab. 22 at page 32 - for electric motor 2 kW LMS 250  
 LMS 250 bell-housing with height  $\geq 135,5$  - LMS250AFSQ

- The bell-housing code must be completed with drilling pump code (see tab. 35 at page 47)  
 For the specific case C= 82,5 - Nr. 2 holes M10: Code for. 060
- Definitive bell-housing code **LMS250AFSQ060**

## Choose coupling

- **Motor half-coupling** (see tab. 38 at page 50)

- For electric motor Gr. 100/112, the half-coupling is **SGEA21M05060**

- **Spider** (see tab. 36 - 37 at page 49)

- For SGEA21, EGE2 - EGE2RR

(choose spider material on the base of the application, oil, temperature and cycle machine, etc.)

- **Pump half-coupling**

- Choose the drilling code tab. 44 - 45 at page 53 for shaft 19,05 - Ch. 4,76 - code: **G01**

- Half-coupling length = L BH length - THK Spider - THK Spigot

LMC= 138 mm - 60 - 18 - 9,5= 50,5 mm

LMS= 148 mm - 60 - 18 - 9,5= 60,5 mm

- LMC - Choose the half-coupling's length on tab. 39 at page 50  $\leq 50,5$  mm.

- LMS - Choose the half-coupling's length on tab. 39 at page 50  $\leq 60,5$  mm.

- LMC - Availabe length for SGEA21= 50 mm

- LMS - Availabe length for SGEA21= 60 mm

- LMC=LMS - Code half-coupling code: **SGEA21G01050**

**Software for automatic calculation available on the web site  
www.mpiltri.com - tools - software**

Vano / Pelton / Screw pumps

AKM913ZD066

**HYDRAULIC PUMP - Technical Data**

L1: 97.5  
d1: 19.05  
Ch1: 4.76  
e: 9.5  
Pd: 82.55  
De: 105  
W: 2  
F: M20

**Electric Motor**

N. Poles: 2P  
Type: B3-B5  
Size: 100-112  
Sec: 3-4  
Isp: 4-5,44

**ELECTRIC MOTOR - Technical Data**

L: 60  
d1: 28  
Pg: 250  
Ch: 8

Coupling material:  Aluminium  Cast iron  Alternative material

**Result**

Coupling: M01 - 21066  
Driving Pump: S000  
Pump Shaft: G01  
Motor Shaft: M05

**Result**

Monobloc Bellhousing:   
Modular Bellhousing:   
Silenced Bellhousing:

Monobloc Bellhousing:  
Pump half-coupling with grub screw  
For other solution please contact technical department

Modular Bellhousing: OK  
Silenced Bellhousing: OK

**CLICK HERE TO PROCEED**

**Note: For multi pumps we recommend to use a specific support on the base of the pump's dimensions and weight.**

## Half-coupling SGE\*\*\* series

The half-couplings series SGE\*\*\* allow secure transmission between the electric motor and the driven side; they are able to absorb shocks and vibration, in addition to compensating radial misalignment, angular and axial.

The assembly of the couplings can be horizontal/vertical, withstanding vibration and load reversals.

The complete range of couplings are extrapolated from the on-line software, with a length equal than the shaft on which must be mounted and they are completed with grub screw for fixing located on the key.

Available for cylindrical shaft with metric and imperial dimensions as well for splined shafts as per specification DIN, ISO and SAE.

### Admissible misalignment radial, angular and axial

#### Max admissible radial misalignment

Half coupling	R (mm)
SGE * 01	0,5
SGE * 21	1,0
SGE * 31	1,0
SGE * 40	1,0
SGE * 51	1,5
SGE * 60	1,5
SGE * 80	2,0
SGE * 90	2,0

#### Max admissible angular misalignment

Half coupling	$\beta$ (°)
SGE * 01	
SGE * 21	
SGE * 31	
SGE * 40	1,5°
SGE * 51	
SGE * 60	
SGE * 80	
SGE * 90	

#### Max admissible angular misalignment

Half coupling	A (mm)
SGE * 01	2,0
SGE * 21	2,5
SGE * 31	3,0
SGE * 40	3,5
SGE * 51	3,5
SGE * 60	3,5
SGE * 80	4,0
SGE * 90	5,0

### Normative ATEX 94/9/CE

Half-couplings SGE\*\*\* series are available to use in hazardous area.

The couplings are certified according to ATEX 94/9/CE (ATEX 95).

Category certified 2G - area 1 and 2.

Other information available on our web site "www.mpfiltri.com".

### MP Filtri couplings are developed with:

#### CAD 3D



#### FEM (calculation)



Drawings 3D available on website [www.mpfiltri.com](http://www.mpfiltri.com) at section TOOLS/2D-3D COMPONENTS

# Sizing of half-coupling

The half-couplings SGE\*\*\* series are in conformity to normative **DIN 740/2**.  
The max torque to transmit is always less than the max torque that the coupling can transmit.

## Examples verification of the coupling

### Torque transmitted by electric motor:

**Mt:**  $9560 \times \text{kW} / \text{rpm} = \text{Nm}$

**Me >**  $\text{Mt} \times \text{S} = \text{Nm}$

Where:

**Mt:** Torque transmitted by electric motor

**Me:** Torque transmitted by coupling (see table 14)

**kW:** Power of electric motor

**Rpm:** Revolutions per minute of electric motor

**S:** Service factor (see table 14)

**TABLE 1**

<b>Small pumps, uniform load, low operating pressures</b> e.g. rotary action machine tools - 5/8 work cycles per hour	<b>1.3</b>
<b>Small pumps, uniform load, high working pressures</b> e.g. lifting equipment - 120-150 work cycles per hour	<b>1.5</b>
<b>Pumps, non-uniform load</b> e.g. lifting equipment - 280-300 work cycles per hour	<b>1.7</b>

### Example

Electric motor, 4 pole - 4 kW

hydraulic pump, uniform load, low operating pressure

**Mt:**  $9560 \times 4 / 1500 = 25.45 \text{ Nm}$

**Me >**  $25.49 \times 1.3 = 33 \text{ Nm}$

Half-coupling SGEA21 meets the above requirement.

Select the half-coupling of the calculated size from the motor half-couplings table.

**Note:** When selecting the coupling, remember that for pumps with splined shaft, only cast iron couplings of the SGEG series can be used.

Determine the size of the coupling according to the type of installation and application envisaged, on the basis of the following formulas and tables:

**TABLE 2**

Half-coupling type	External diameter mm	Nominal torque Me - Nm	Maximum transmissible torque Me - Nm	
<b>ALUMINIUM</b>	SGEA01	43	15	20
	SGEA21	68	160	190
	SGEA31	85	340	380
	SGEA51	109,5	550	620
<b>CAST IRON</b>	SGEG01	40	20	30
	SGEG30	80	400	450
	SGEG40	95	550	620
	SGEG60	120	760	850
	SGEG80	160	2200	2500
	SGEG90	200	5500	6100
<b>STEEL</b>	SGES40	95	550	620
	SGES60	120	760	850
	SGES80	160	2200	2500

Nominal and maximum torque values are referred to couplings assembled with standard flexible spiders of the **EGE\*\*** series (see page 49).

Where higher torques are to be transmitted, use flexible spiders of the **EGE\*\*RR** series (see page 49).

# Noise

**Noise is a particularly pervasive problem so much so that there have been statutory regulations in place now for some years, designed to limit harmful occupational exposure. Many of the machines used in industry today are equipped with oil-hydraulic systems, which happen to be a major source of noise.**

## 1. Theory and definition of noise

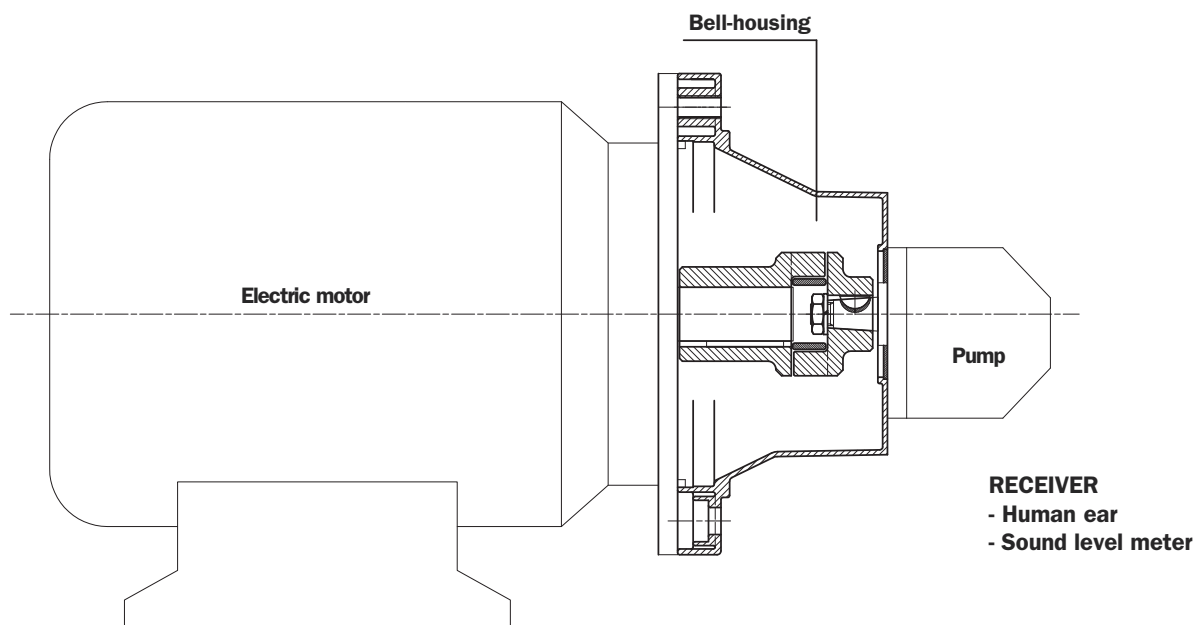
From a health and hygiene standpoint, noise can be defined as an unpleasant and undesirable sound, or an unpleasant and annoying or intolerable auditory sensation (noise being any sound phenomena that may be accompanied by sensations of disturbance and pain). By definition, acoustic phenomena are oscillatory in character, propagated in a flexible medium and causing pressure variations at the points, and the areas adjacent to those points, through which they pass.

## 2. Sound

Technically considered, certain elements must be present simultaneously for acoustic phenomena to occur:

- Sound source
- Transmission medium
- Receiver

### Motor and pump unit



The **electric motor** and the **pump**, together with the drive coupling, are the **SOURCE OF THE NOISE**.

The **Bell-housing** is the noise transmission medium.

Depending on whether the monobloc bell-housing is a rigid or low noise type, there will be variations in the flexible properties of the transmission medium.

The acoustic phenomena are dissimilar in the two cases, given the differences in pressure variation and particle displacement.

# Assembly of motor and pump unit

As mentioned in the presentation, low noise bell-housing will help to attenuate the transmission of vibrations and the emission of noise generated by the system.

Self-evidently, however, the mere adoption of a low noise bell-housing will achieve little unless the motor and pump are correctly installed on the machine, or on the tank of the hydraulic power unit.

- Should be followed in order to achieve best possible results and correct installation:

## 1. Motor and pump unit mounted horizontally on oil tank lid

- The suction pipe attached to the pump must be rigid, and fitted using a resilient bulkhead flange of the FTA series, which helps to cushion the vibrations propagated between the pipe and the tank lid. If pipes need to be bent, the radius of curvature must be at least 3 times the pipe diameter. Do not use elbow fittings, as these will significantly increase pressure losses.
- The pressure pipeline of the pump must be flexible, and long enough to include bends with the minimum radius of curvature recommended by the manufacturer for the specified operating pressure.
- The return pipeline running from the service to the filter must be flexible. Where oil is returned directly to the tank of the hydraulic power unit through a rigid pipe, it is advisable to use a resilient bulkhead flange of the FTR series, which helps to cushion the vibrations propagated between the pipe and the tank lid.
- Anti-vibration devices (resilient mounts or damping rods) must be located under the feet of the electric motor or the PDM foot brackets, depending on the mounting position of the motor.
- The lids of hydraulic oil tanks must be sturdy enough to support the load they carry.

## 2. Motor and pump unit mounted horizontally on machine

- As a matter of good practice, the oil tank and motor-pump unit should be mounted on a single supporting frame of strength sufficient to support the load.
- If the hydraulic system is fitted with a side-mounted filter, the suction pipeline to the pump must be flexible, and long enough to include bends with the minimum radius of curvature recommended by the manufacturer.
- If the suction filter is not side mounted, the pipeline should be rigid and installed in conjunction with a compensating coupling.
- The pressure pipeline of the pump must be flexible, and long enough to include bends with the minimum radius of curvature recommended by the manufacturer for the specified operating pressure.
- The return pipeline running from the service to the filter must be flexible. Where oil is returned directly to the tank of the hydraulic power unit through a rigid pipe, it is advisable to use a resilient bulkhead flange of the FTR series, which helps to cushion the vibrations propagated between the pipe and the tank lid.
- Anti-vibration devices (resilient mounts or damping rods) must be located under the feet of the electric motor or the PDM foot brackets, depending on the mounting position of the motor.

**Note:** The above guidelines are indicative only, and subordinate to the solutions adopted ultimately by design engineers.

**In conclusion:** For best results, in any event, the motor-and-pump unit should be incorporated into the hydraulic system in such a way that no one component is rigidly associated with another, resulting in the propagation of vibration, and consequently noise.

# Table of summary MODUL 2/3

	5.5 - 7.5 kW	11 - 22	30	37 - 45	55 - 90	110 - 200	250 - 400
	7.5 - 10.2 Hp	15 - 30 Hp	40.80 Hp	50.32 - 61.2 Hp	75 - 125 Hp	150 - 272 Hp	340 - 544 Hp
	Size 225 - D. 450	Size 160/180 D. 350	Size 200 - D. 350	Size 225 - D. 450	Size 250/280 D. 550	Size 315 - D. 660	Size 355/400 D. 800
<b>MODUL 3</b>	<p>BMT300 BMT350 FR1*</p> <p>AR*</p> <p>Ø 190 Ø 85</p> <p>Kit of assembly KVG5 (Q.ty 1) + Kit of assembly KVG1 (Q.ty 1)</p>						
	<p>BMT350 BMT400 BMT450 FP5 FP6 FP7</p> <p>AD*</p> <p>Ø 190 Ø 140 Ø 288</p> <p>Kit of assembly KVG5/7 (Q.ty 2)</p>						
<b>MODUL 2</b>	<p>BMT550 BMT660 BAD800 FP6 FP7 (BAD800 ONLY FP7)</p> <p>Ø 288</p> <p>Kit of assembly KVG6/7 (Q.ty 1)</p>						
	5.5 - 7.5 kW	11 - 22	30	37 - 45	55 - 90	110 - 200	250 - 400
7.5 - 10.2 Hp	15 - 30 Hp	40.80 Hp	50.32 - 61.2 Hp	75 - 125 Hp	150 - 272 Hp	340 - 544 Hp	
Size 225 - D. 450	Size 160/180 D. 350	Size 200 - D. 350	Size 225 - D. 450	Size 250/280 D. 550	Size 315 - D. 660	Size 355/400 D. 800	



# Monobloc bell-housings

## LMC series

### Motors from 0,5 to 45 kW

LMC series monobloc bell-housings are used as connecting elements between **B3 - B5** flanged **UNEL-MEC** electric motors and a wide range of hydraulic pumps available on the international market.

With special machining, they can be modified to serve as motors base that will accept standard flanges manufactured by **MP Filtri S.P.A.** (MODUL-2).

Thanks to their considerable versatility and to the extensive range of pump flanges available, **LMC** series monobloc bell-housings are compatible with electric motors from **size 80, rated 0.5 kW**, up to **size 225, rated 37/45 kW**, and therefore suitable for most applications..

### Motors from 55 to 200 kW

**LMC 550 - 660** series monobloc bell-housings, are suitable for electric motors **UNEL-MEC flanged B3 - B5** of power **55/75/90/110/200 kW**.

Sized to support very heavy weights and torques, they are particularly suitable for applications with very hard cycles machine.

Thanks to their very strong structure, can be used both for the horizontal and vertical mounting, with individual or tandem pumps.

On request they are available with drain hole to check oil leaks and with inspection hole to check the spiders conditions.

## Technical specifications

### LMC

#### Materials

- **Monobloc bell-housing**  
Pressure diecast aluminium alloy.
- **Pump flange**  
Pressure diecast aluminium alloy.
- **Foot bracket**  
Pressure diecast aluminium alloy.

#### Temperature

- $-30^{\circ}\text{C} \div +80^{\circ}\text{C}$   
For temperatures outside this range, consult the MP Filtri Technical and Sales Department.

#### Compatibility with fluids

- **Monobloc bell-housings compatible for use with:**

##### Mineral oils

Types HH-HL-HM-HR-HV-HG, to ISO 6743/4 standard

##### Water based emulsions

Types HFAE - HFAS, to ISO 6743/4 standard

##### Water glycol

Type HFC, to ISO 6743/4 standard

**Ask for anodized version**

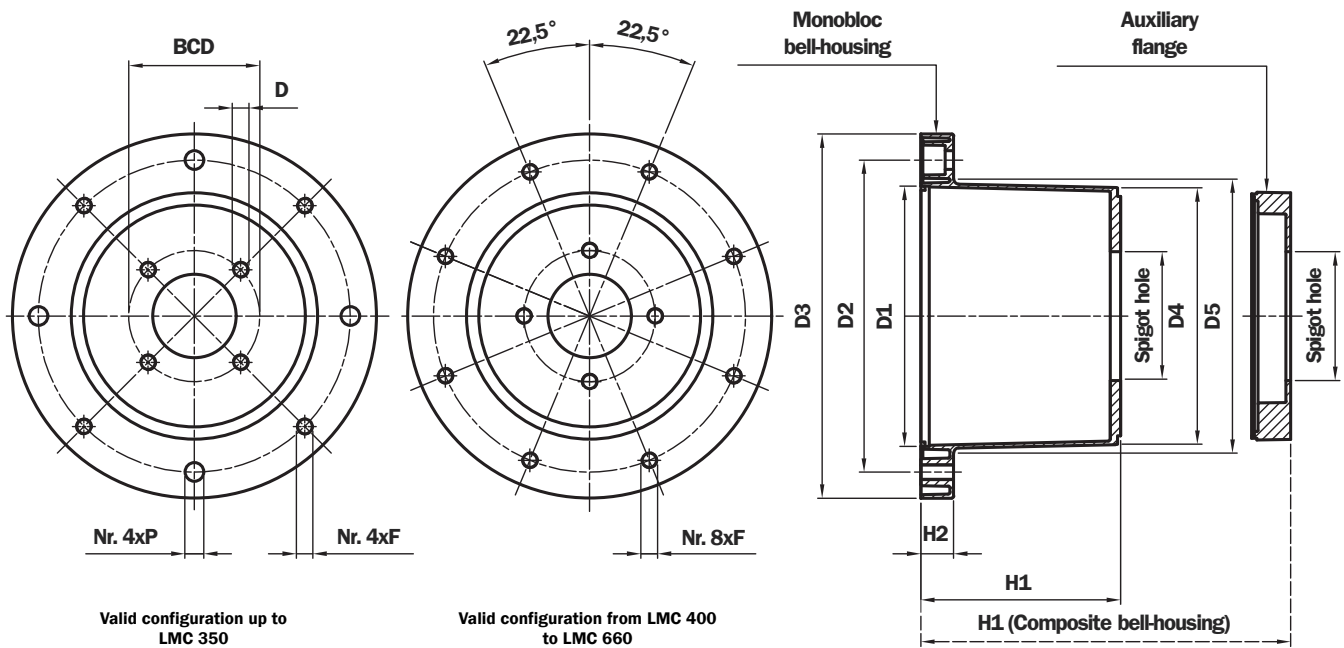
#### Special Applications

- **Any applications not covered by the normal indications contained in this catalogue must be evaluated and approved by the MP Filtri Technical and Sales Department**





# Monobloc bell-housing



The auxiliary flange, if specified, is supplied already fitted to the bell-housing (MODUL-2).

- For loose components see pages 15 - 16 - 17
- Check that the pump interface dimensions are compatible with those of the bell-housing

**Note:** The hole made in the tank cover should be 2 mm larger than dimension D5

## Machining tolerances

D1	F8
spigot hole	H7
H1	± 0,15 mm

## Concentricity of D1/Spigot hole

LMC 200 - LMC 350	0,20 mm
LMC 300 - LMC 660	0,25 mm

**TABLE 3**

Electric motor, 4-pole, 1500 rpm				Dimensions of LMC monobloc bell-housing											
Frame size	kW	Hp	Shaft	Bell-housing code	Foot bracket code	D1	D2	D3	D4	D5	H1	H2	F	P	Spigot hole Minimum
80	0.53-0.75	0.75-1	19x40	LMC 200	PDM A 200	130	165	200	125	135		18	M10	11	50
90	1.1-1.5	1.5-2	24x50	LMC 200	PDM A 200	130	165	200	125	135		18	M10	11	50
100-112	2.2-4	3-5.5	28x60	LMC 250	PDM A 250	180	215	250	175	186		19	M12	14	50
132	5.5-7.5	7.5-12.5	38x80	LMC 300	PDM A 300	230	265	300	230	235		23	M12	14	80
160	11-15	15-20	42x110	LMC 350	PDM A 350	250	300	350	240	254		31	M16	18	50/80*
180	18.5-22	25-30	48x110	LMC 350	PDM A 350	250	300	350	240	254		31	M16	18	50/80*
200	37	45	55x110	LMC 400	/	300	350	400	280	305		31	M16	-	80
225	37-45	50-60	60x140	LMC 450	/	350	400	450	320	350		31	M16	-	80
250	55	74,80	65x140	LMC 550	/	450	500	550	-	-		35	M16	-	100
280	75-90	102-122	75x140	LMC 550	/	450	500	550	-	-		35	M16	-	100
315	110-200	150-272	80x170	LMC 660	/	550	600	660	-	-		45	M20	-	100
					For dimension see page 55						See Tab. 4 - 5				

To determine dimension H1 of the bell-housing

see table 12

For dimensions of the foot bracket

see page 55

\* The minimum spigot hole  $\varnothing$  50 is related to the LMC350AFSY (see table 4)  
The minimum spigot hole  $\varnothing$  80 is related to the LMC350AFSU (see table 4)

# LMC bell-housing, dimension H1

**TABLE 4**

Monobloc bell-housing		
Code	H1	Weight (kg)
LMC200AFSJ***	100	0,75
LMC200AFSW***	125	0,95
LMC250AFSM***	114	1,50
LMC250AFSQ***	138	1,60
LMC250AFSR***	159	1,75
LMC300AFST***	155	3,20
LMC300AFSX***	170	3,30
LMC350AFSY***	178	4,80
LMC350AFSU***	194	4,90
LMC400AFSV***	201	6,50
LMC450AFSZ***	250	9,00
LMC550AFSN***	265	15,00
LMC550AFSO***	310	17,00
LMC660AFSP***	295	27,00
LMC660AFSS***	325	31,00

**TABLE 5a**

Modul 2 bell-housing		
Code	H1	Weight (kg)
LMC200AFRB***	125	1,85
LMC200AFRC***	133	1,95
LMC200AFRD***	158	2,10
LMC250AFRB***	156	2,50
LMC250AFRC***	161	2,75
LMC250AFRA***	185	4,20
LMC300AFRB***	191	4,45
LMC300AFRC***	193	4,60
LMC300AFRD***	201	4,95
LMC300AF5A***	192	4,50
LMC300AF5B***	198	4,80

**TABLE 5b**

Modul 2 bell-housing		
Code	H1	Weight (kg)
LMC350AF6A***	239	6,80
LMC350AF6B***	252	7,30
LMC400AF5A***	228	7,50
LMC400AF5B***	234	7,90
LMC400AF6A***	247	8,50
LMC400AF6B***	260	9,00
LMC450AF5A***	226	10,00
LMC450AF5B***	234	10,40
LMC450AF6A***	295	11,20
LMC450AF6B***	308	11,60

**Note:** The three asterisks in the designation code represent the three digits identifying the pump interface (see page 47).

## Specified tightening torques for auxiliary flange

- FR\* 15 Nm
- F5\* 100 Nm
- F6\* 180 Nm

## Recommended tightening torques for motor/pump assembly bolts

- M6 10 Nm
- M8 15 Nm
- M10 50 Nm
- M12 84 Nm
- M14 135 Nm
- M16 205 Nm
- M18 280 Nm
- M20 400 Nm
- M22 530 Nm
- M24 690 Nm

These values are calculated to exploit the performance of the bolt at 70% of its elastic limit.

This means in practice that the shank of the bolt will be stressed typically to 60-70% of its limit of elasticity in the course of being tightened.

The values indicated are valid for hexagon head bolts to UNI 5737 and hexagon socket screws to UNI 5931, property class 8.8, tightened by degrees using a torque wrench.

If bolts or screws are tightened using impact or hammer action drivers, the applied torque should be reduced by 10%.

## Comparative table

MP Filtri		OMT	Hydrapp	Raja	KTR
Nuovo codice	Vecchio codice	code	code	code	code
LMC200A***	LMB200A100***	TH20A***	/	R200/99-115/...	PK200/3/...
LMC200A***	/	TH1***	HLC1	R200/120-135/...	PL200/8/...
LMC250A***	LMB250A109***	TH2***	HLC3	R250/120-135/...	PL250/6/...
LMC300A***	LMB300A130***	TH3***	HLC5	R300/155-170/...	PL300/4/...
LMC350A***	LMB350A179***	TH4***	HLC8	R350/173-194/...	PK350/4/...
LMC400A***	/	TH15***	HLC12	R400/194-210/...	PK400/4/...
LMC450A***	/	TH18***	/	R450/250-210/...	PK450/4/...

