STANDARD PWM FLEXIBLE UNIT INSTALLATION & MAINTENANCE MANUAL

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1 GENERAL NOTES

It is essential that a competent person carry out all the instructions contained in the following documents. Should any problems be anticipated or encountered then **Lamiservice** personnel are available for site visits or, alternatively, repairs and overhauls can be undertaken in our works.

Prior to performing any maintenance works (including inspections) it is essential that the power supply is isolated and that no accidental movement of rotating machinery is possible.

This product is designed for a specific purpose. It is vital that it is not used for any purpose other than that for which it is designed and supplied, and that the limits of it's capacities, as detailed here or in any other document, are not exceeded.

No liability will be accepted and any warranty, either expressed or implied, will be null and void should any component of whatever kind, including nuts, bolts and washers, be used in the assembly, or modifications be made to all or part of the product which are not supplied, specified or agreed by **Lamiflex do Brasil**.

2 DO'S

The following instructions should be read and understood prior to starting any assembly or maintenance work on the PWM disc coupling.

Prior to fitting any component, care should be taken to ensure that it is clean and free from any dirt.

When tightening any bolts or screws, this should be done evenly, cylinder head fashion, to 50% torque then to 100% torque in the same sequence. Where specified it is essential that torquetightening figures are not exceeded nor should it be allowed for them to be below specification.

Whilst installing and removing the transmission unit*, the unit should be supported to ensure that the weight is not imposed on one side only.

Record the **Lamiflex** order number, coupling type and size and any relevant information for future use.

Contact **Lamiflex** for refurbishment works and spare components.

3 DONT'S

Do not use any component that is not supplied or approved by **Lamiflex do Brasil** in the assembly of this product.

Do not attempt, where the weight of the unit is excessive, to lift the coupling without the use of lifting equipment.

The inherent balance of these couplings could be disturbed if they are allowed to be knocked either by striking or rolling. Care should be taken when transporting and fitting to avoid such knocks. This is particularly when a coupling is specifically balanced.

* refer to figure 3 for definition of Transmissions Unit

4 COUPLING DESCRIPTION

The PWM couplings are developed to meet General applications, that require extra reliabilty and a "fuse" system that cease the torque transmission when diaphragms fail.

The PWM couplings are not lubricated by the fact that they are Diaphragm, are exempt from the need for adjustment, rebalancing, cleaning and replacement parts other than fatigue or overload operation.

Because their dimensional accuracies the PWM engagements reach high speeds with optimum levels of balance, which may be increased when necessary, within the parameters of ISO 1940 or API standards. For these cases, will be issued Balancing Certificate.

All line couplings PWM are provided with Diaphragm in stainless steel and other parts in carbon or Stainless Steel.

Information of PWM

- Specially developed for critical applications
- Design easy to install allows assembly and disassembly without the requiring removal of hubs.
- No wearing parts.
- Operates at high temperatures
- Reduced Weight and Inertia.

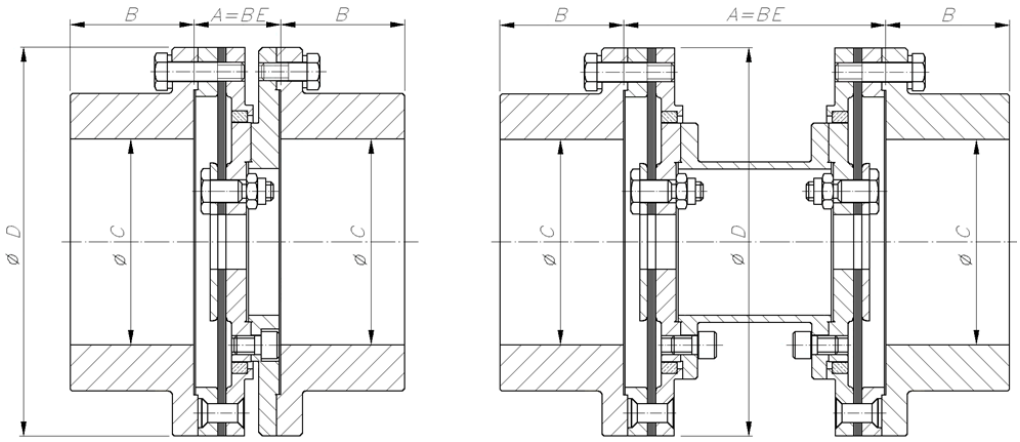

Figure 1

Size	Rating	Torque	Max Speed	Coupling Dimensions					Weight			
				Non Spacer	Spacer	Ø B	Ø C Max Bore	Ø D	Central Assembly			Hub (Rough Bore)
				Ø A // BE	Ø A // BE (Minimum)				Non Spacer	Complete (BE min)	Extra per Metro	
	HP/1000rpm	Nm	rpm	mm	mm	mm	mm	mm	Kg	Kg	Kg	Kg
00004	4	28	24.000	26,2	70,00	25,00	25,0	73,0	0,6	1,0	1,4	0,4
00008	8	57	20.000	26,2	75,0	32,0	38,0	98,0	1,0	1,6	2,0	0,9
00020	20	142	16.000	27,0	80,0	40,0	50,0	123,0	1,7	2,6	3,0	1,9
00040	40	285	14.000	35,7	110,0	40,0	70,0	148,0	3,1	5,1	3,9	3,7
00080	80	570	12.000	37,7	114,0	55,0	90,0	170,0	4,4	7,0	5,0	6,0
00110	110	783	11.000	38,1	115,0	60,0	95,0	180,0	5,3	8,5	6,2	7,3
00140	140	997	10.000	38,5	121,0	65,0	100,0	189,0	5,7	8,8	6,8	8,5
00270	270	1.923	8.000	47,6	143,0	80,0	120,0	218,0	8,6	14,0	11,3	15,5
00610	610	4.344	8.800	52,4	170,0	92,0	140,0	262,0	13,0	22,0	20,0	25,0
00810	810	5.768	8.200	52,4	170,0	95,0	150,0	281,0	16,0	26,0	25,0	28,0
01210	1.210	8.616	7.800	54,8	175,0	105,0	160,0	297,0	18,0	32,0	32,5	36,0
01600	1.600	11.394	7.500	62,7	203,0	115,0	170,0	316,0	25,0	44,0	35,5	46,0

Table 1

* The Inclusion of additional features such as packing rings, shims, and/or electrical insulation etc, will increase the minimum dimensions by the appropriate amount.
** If the model to be installed is not listed, check the project drawing for checking the items.

5 OPERATING CONDITIONS

In operation the flexible elements are subjected to both tensile and bending stresses, each having an influence on the allowable magnitude of the other. It is important, therefore, that the operating limits of the various deflections for which the coupling is designed to accommodate, are kept, as far as practicable, within those indicated on the "Allowable Misalignment Curve"

In practice, the initial alignment of the coupling should be as close as possible and within the alignment limits given in the section 8.0 "Installation Instructions". This will allow for changes during operation to remain within allowable limits.

As the Lamiflex units are designed to transmit the torque in friction between the driving and driven bolts and the flexible elements, it is essential that, should the need arise, these bolts should be correctly tightened to the torque indicated on the assembly drawing or in the "Installation and Maintenance Instructions".

Torque and speed should remain within the originally specified conditions.

6 LIMITATION OF PRODUCT USE

Unless otherwise agreed with Lamiflex, these products must selected in accordance with the recommended selection procedure and must only be used within the performance criteria set out below:

- The rated torque capacities, which are stated in the product catalogue and/or product arrangement drawing.
- A continuous temperature range of -20 °C to 150 °C
- Within the permissible operating limits for angular, radial and axial misalignment.

In practice alignment and coupling installation must be within the ranges.

7 MAINTENANCE INSTRUCTIONS

The general maintenance of the couplings consist of checking the points listed below during normal maintenance schedule of engines and equipment moved.

Axial, Angular & Parallel misalignment to ensure that these are still within the acceptable limits and that no major movements have occurred. All bolts to ensure that they are correctly tightened.

Inspect the flexible elements visually for signs of fatigue cracking local to the washer anchoring points or general signs of fretting corrosion. Slight bowing or “S” like distortion is not detrimental to the operation of the unit. Note that any cracking will begin at the outermost edge of the outside blade. This means that this inspection is still possible without disturbing the element bolting. The element packs should be replaced at the earliest opportunity should cracking / damage be detected.

Lamiflex do Brasil use self locking nuts. This gives a high level of performance over many reinstallations.

Note: Any requirement for spare parts should be made quoting the original purchasers **Lamiflex do Brasil** order number and the coupling serial number. (This will be etched on the major coupling flanges) and will appear on all documentation.

8 ALIGNMENT INSTRUCTIONS

Each company has its own method for aligning machinery all of which are well documented in both internal and freely available documents and books. Hence it is not our intention to describe methods for setting machines. Instead, the following gives guidelines for quick checks for alignment suitable after initial installation and for general maintenance checks.

8.2 Axial Alignment

The limits of axial misalignment should not exceed 10% of the maximum capacity of coupling misalignment absorption capacity, as Table 2 below:

Size	Max Axial Misaligment Per Flexível Unit	Max Parallel Misaligment Assembling
	mm	mm
00004	0,40	0,50
00008	0,60	0,50
00020	0,60	0,60
00040	1,00	0,80
00080	1,10	0,80
00110	1,10	0,80
00140	1,10	0,90
00270	1,10	1,00
00610	1,30	1,20
00810	1,30	1,20
01210	1,30	1,20
01600	1,40	1,40
02020	1,80	1,60
02700	2,00	1,60
04000	2,40	1,90
06000	2,80	2,00

Table 2

8.3 Parallel / Radial / Angular Alignment

Having basically aligned the machinery shafts using one of the established techniques, the coupling may be installed as per the instructions. It is then worth performing a check to establish that the overall alignment is correct for the particular coupling. This may be simply performed by one of the following two methods:

Attach a dial indicator securely to the back of one of the coupling flanges, with the needle in contact with the flange face the other side of the flexible element as near the outside periphery as possible.

Rotate the machinery & coupling and locate the minimum reading position. At this position, set the dial reading to zero. Rotate the machinery again and record the maximum reading over 360 degrees.
Divide this maximum value by the coupling flange diameter to gain a value in mm/mm, which should be no greater than that shown in the following list. (This should be repeated at both flexible elements in a spacer coupling).

An alternative method is, where possible, to accurately measure the distance across the flanges that sandwich the flexible element (element gap) to obtain a maximum and minimum value. The difference between these two values should be divided by the flange outside diameter to obtain a value in mm/mm, which should be no greater than that shown in the following list. (This should be repeated at both flexible elements in a spacer coupling).

The maximum misalignment during assembly does not exceed 10% of the maximum allowable misalignment of the assembly drawing.

NOTE: These values are for reference, in some cases, may be exceeded. If in doubt, do not hesitate to contact **Lamiservice**.

Misalignment definitions:

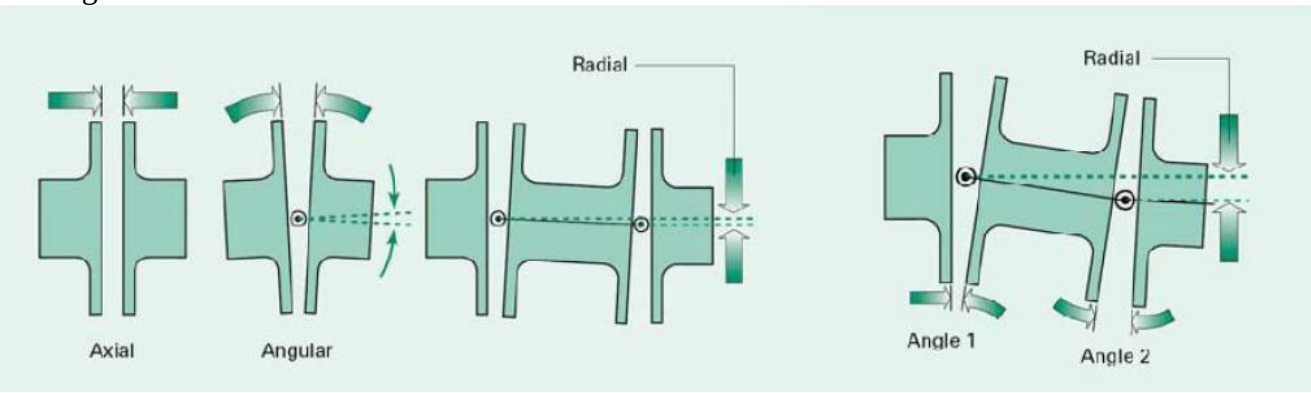

Figure 2

9 INSTALLATION INSTRUCTION FOR FLEXIBLE UNIT

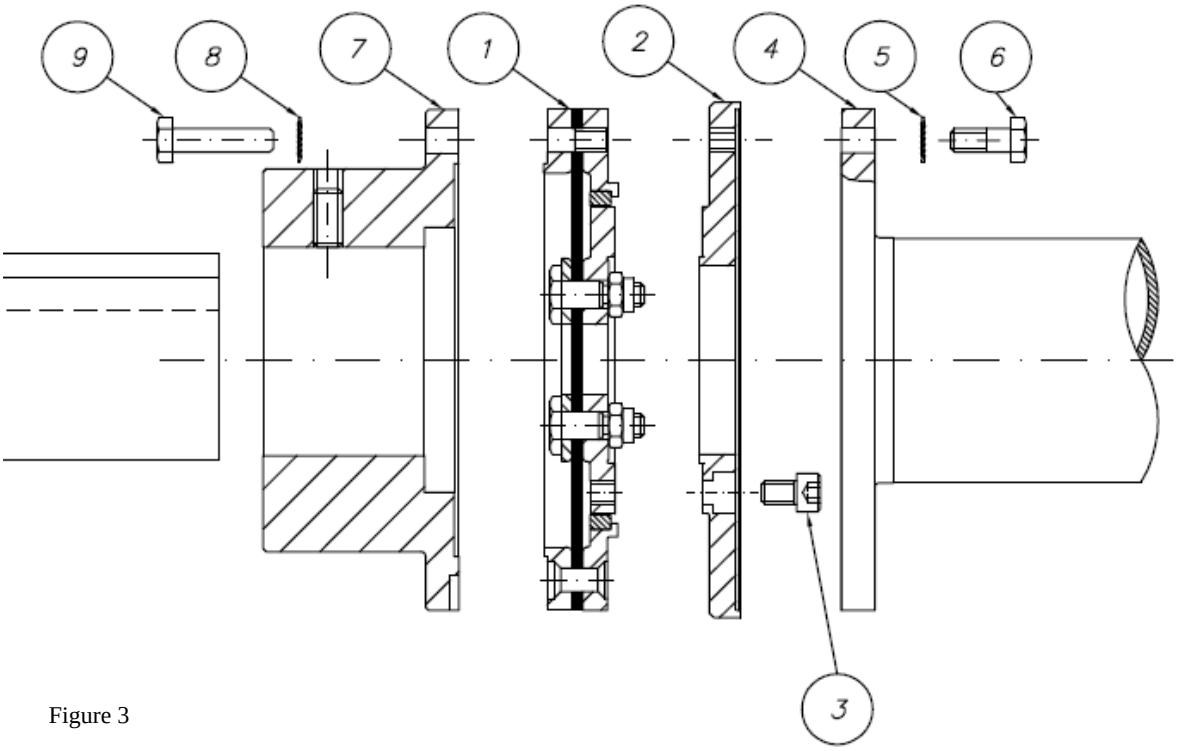

Figure 3

The flexible unit assembly in the spacer design must follow the numerical order in the picture 3.

1 – The flexible unit 1 must the attached by the bolt 3 with the Disc Plate 2;
2 – Place the Flexible unit in the spacer with the bolt 6;
3 – Insert the transmission unit in the Hubs, attach the bolt 9.

11 TIGHTENING TORQUE OF BOLTS

Size	Torque N.m	
	Hub Bolt	Spacer Bolt
00004	9	7
00008	9	9
00020	21	9
00040	21	21
00080	21	21
00110	21	21
00140	21	21
00270	21	38
00610	65	65
00810	65	65
01210	115	65
01600	170	115

Table 3