

# **EXTERNAL HYDRAULIC VIBRATORS**

## **OPERATION AND MAINTENANCE MANUAL**

"Traslation of original instruction"

## EXTERNAL HYDRAULIC VIBRATORS - VSO SERIES

Due to their excellent qualities as resistance, life, safety, handiness and simple use the SOMAI external hydraulic vibrators are the best in the vibration sector.

The accurate choice of the materials and components and the precise execution are a guarantee for our vibrators.

### DESCRIPTION

The SOMAI hydraulic vibrators are machines designed to generate vibrations. They have a main body of ductile cast iron. Inside it turns a shaft, which is supported by two bearings. The shaft carries a centrifugal mass, which with its rotation produces a rotating centrifugal force that generates the vibrations.

These vibrators are generally used in the building sector to vibrate formworks for concrete constructions and to make them more solid. In industry they can also be used to compact, filter and transport various pieces or materials.

The rotation of the shaft with the eccentric mass is caused by a hydraulic pump mounted outside and fixed on the rotating shaft.

The hydraulic operation guarantees high performances with compact sizes and offers a series of advantages, i.e.

- Safe and guaranteed operation. Hydraulic vibrators withstand heat, humidity, acid or saline environments. They do not generate sparks and therefore they can be safely used even in environments threatened by explosion or fire.
- Speed adjustment. The vibrator speed can be continuously adjusted from zero to the maximum value.
- Resistance. Hydraulic vibrators are resistant and compact. They are protected against chemical and mechanical damages thanks to a solid housing.
- They can be overloaded without being damaged. A hydraulic vibrator can be loaded until it gets blocked without suffering any damage. It can withstand an unlimited number of start-ups and speed variations without overheating.
- Silent operation. The roller bearings guarantee a silent operation without creeping parts and a long life.
- Maintenance: The hydraulic vibrators have got a simple construction. They consist of only a few mobile parts and therefore they function without any trouble. Maintenance is reduced to a minimum.

SOMAI vibrators are available in a wide range of powers and frequencies and can therefore fulfill any installation requirement.

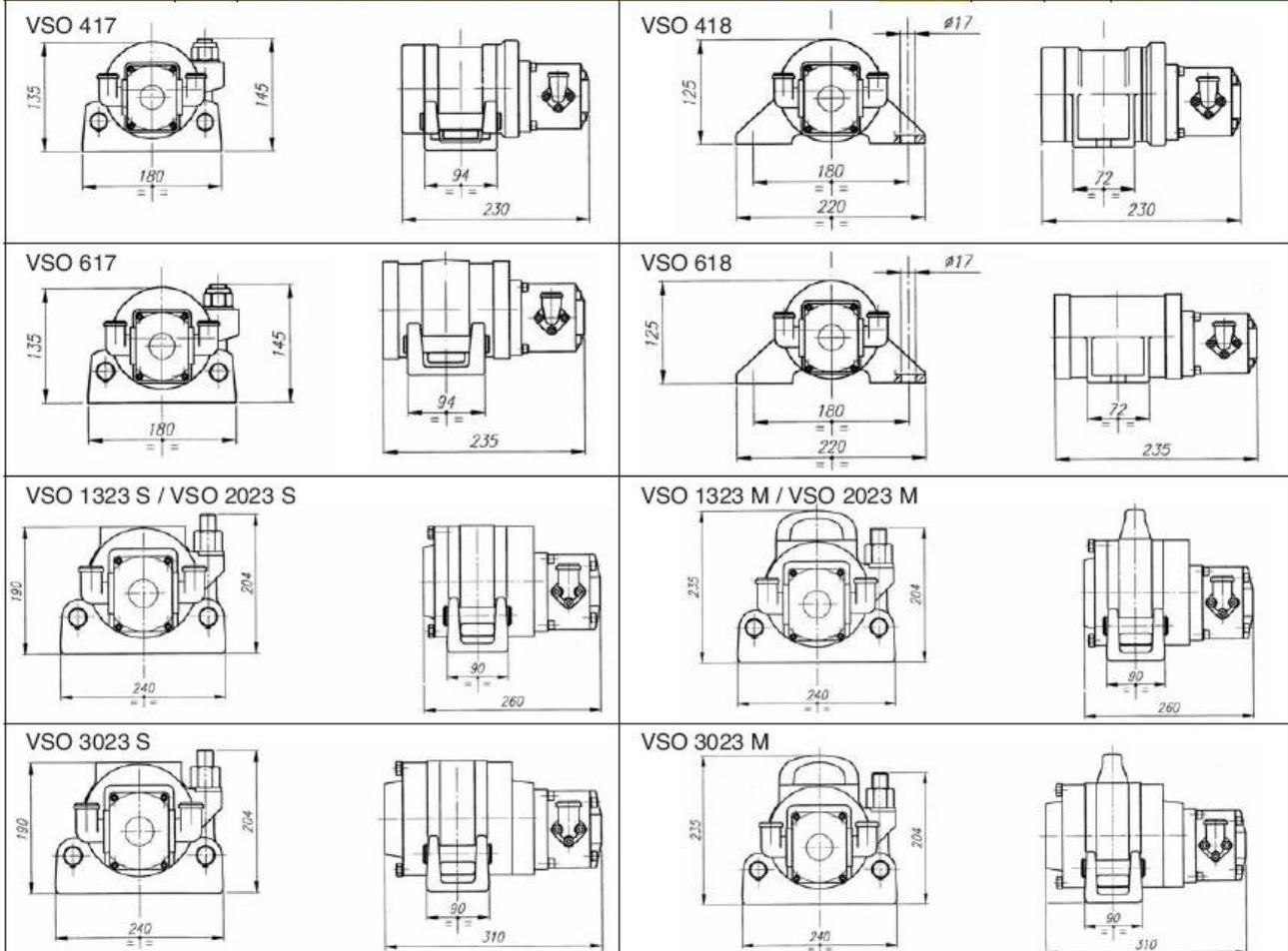
With its qualified assistance center SOMAI will help you to choose the best suitable solution regarding the vibrator type and its positioning.

The vibrator is equipped with a label like the example on this page, on which are indicated its characteristic features and the CE certification mark.



## TECHNICAL FEATURES

Tipo/Type	Forza Centrifuga Centrifugal Force		Frequenza Frequency	Pe Kgmm	Pressione Olio Oil Pressure	Cilindrata Cubic Capacity	Portata Centralina Maximum oil Quantity	Attacco Connection		* Rumore Noise	Peso Weight	Fissaggio Fixing	
	Kg	KN						Giri/1' RPM	Bar			cm <sup>3</sup>	L/1'
VSO 417	400	3,92	4000	22,36	80	3	12	1/4"	3/8"	71	11	M17	-
VSO 418	400	3,92	4000	22,36	80	3	12	1/4"	3/8"	71	11	-	M16
VSO 617	565	5,54	4000	31,6	80	3	12	1/4"	3/8"	71	12	M17	-
VSO 618	565	5,54	4000	31,6	80	3	12	1/4"	3/8"	71	12	-	M16
VSO 1323	1300	12,75	4000	72,68	100	6	24	1/2"	1/2"	72	20	M23	-
VSO 2023	2000	19,62	4000	111,82	100	6	24	1/2"	1/2"	72	22	M23	-
VSO 3023	2670	26,20	4000	149,10	100	6	24	1/2"	1/2"	72	25	M23	-



For a detailed description of the technical features of the various SOMAI vibrator types please consult the relative tables.

As far as the general construction features are concerned, the following points should be stressed:

- The fixing on the vibrated structure can be performed by means of screws or vices according to the different models.
- All the pieces, which are subject to mechanical stresses, are built of high-strength materials, which guarantee a long life.
- The hydraulic operation makes it possible to adjust the vibration power and the frequency during operation so that the vibrator can be used for a wide range of applications.

## GENERAL SAFETY RULES



The operators who use the vibrators must have the requisites, which are prescribed by the ruling standards on behalf of the workers' protection. They have to be equipped with and make use of the necessary individual protection devices prescribed in **Legislative Decree 81 – 09/04/2008** (Consolidated law on health and safety at work) and this applies above all to safety shoes, working gloves and eventual means for the protection of the ears and the eyes.

High-pressure oil may be very dangerous.

Before using the vibrator please carefully read the instructions of the present manual and check the installation, which has to be carried out according to the instructions on the following pages. Please pay attention to the labels on the vibrator. Before starting the machine make sure that no components are visibly damaged.

Learn to use all the stop and emergency controls before starting operation. All the safety and stop devices and all the protections must be efficient, in a good condition and in the correct position.

Make sure that the structure, which has to be vibrated, is elastically insulated and that there are no loose pieces or materials, which due to vibration could fall down and damage the operator or other persons working on the plant.

Before any repair or maintenance operation make sure that the connection with hydraulic line is detached and cannot be erroneously connected.

Please keep in mind that the operations can be carried out by qualified and trained personnel only.

For the manual handling of the vibrators please strictly follow the rules contained in **Legislative Decree 81 – 09/04/2008**.

**Risks caused by noise:** The dBA values indicated in the tables with the technical features represent the values measured during operation at 1 metre of distance. The values were found by measurements carried out in our test laboratory. The vibrator has been mounted onto an elastically insulated structure, which was constructed in the way that the noise emitted by the structure itself and not by the vibrator was reduced to a minimum.

After having fixed the vibrator in its definite position on the plant, which has to be vibrated, **it is absolutely necessary** to measure the times of the operator's personal exposure to noise. If this value should exceed the value of 80 dBA of personal exposure during the day - and this also depends on the operation times -, could be caused damages on the auditory system and on other organs or parts of the body (extra-auditory effects). For example a vibrator mounted on a form for the production of concrete products can generate a noise of 88/92 dBA. If mounted on a silo, it can produce 85/90 dBA and on a vibrating table 85/95 dBA. This is the reason why the noise has to be measured in real working conditions. A label applied on the vibrator invites you to perform noise measurements.

**Legislative Decree 81 - 09/04/08**, on the protection of workers against the risks deriving from exposure to chemical, physical and biological agents at work, establishes the following limit values of exposure and the values at which action must be taken, in relation to the level of daily exposure to noise and peak acoustic pressure:

- respective limit values of exposure  $LEX = 87 \text{ dB(A)}$  and  $p_{peak} = 200 \text{ Pa}$  (140 dB(C) with reference to  $20 \text{ }\mu\text{Pa}$ );
- highest values at which action must be taken: respectively  $LEX = 85 \text{ dB(A)}$  and  $p_{peak} = 140 \text{ Pa}$  (137 dB(C) with reference to  $20 \text{ }\mu\text{Pa}$ );
- lowest values at which action must be taken action: respectively  $LEX = 80 \text{ dB(A)}$  and  $p_{peak} = 112 \text{ Pa}$  (135 dB(C) with reference to  $20 \text{ }\mu\text{Pa}$ )

Due to the fact that it is impossible to determine a priori the eventual noise increase caused by the structure, which is subject to vibration, the technical office of SOMAI is at your disposal for noise measurements and for suggestions regarding an optimization of the operation in view of noise. In the following paragraph you find some important hints.

### **Operational instructions for the noise reduction in plants with incorporated vibrators.**

As the risk derived from the noise exposure is directly linked with an equivalent sound level and therefore with the exposure time, it is very important to keep the vibration time as low as possible under strict observation of the instructions for the relative working procedures.

The vibrators should not work if it can be avoided, for instance when forms are empty or during waiting times.

Environmental noise can be further reduced in the following way:

- Make sure that there are no loose bolts or fastenings.
- Please do not hang up devices or hooks on the vibration structures.
- Do not leave tools on the structures, especially if they are of metal.
- Please perform accurate checks and rapid maintenance operations in order to eliminate abnormal noise generated by broken parts, loosening of the fixing elements on the structures, disconnections, unsoldering etc.

**Risks caused by the vibrations.** The vibrator is mounted onto elastically suspended structures, which receive the vibrations. The position of the operator must be completely independent from these structures. If this is not the case, you should measure the vibrations transmitted to the operator and, if necessary, adopt the protection measures prescribed by the ruling safety standards.

## **INSTALLATION**

### **Mechanical connection**

Fix the vibrator onto the vibration structure by means of the special fixing holes or the cradle connection according to the relative version. In both cases the fixing screws have to be firmly tightened. If the vibrator is equipped with fixing holes, make sure that the support surface of the screws is completely flat so that the screws do not run the risk of loosening during operation. It is necessary to check the initial tightening after the first operating period.

If the vibrator is mounted in a suspended position and an eventual crash might cause danger to persons, you should use an additional steel cable to connect it with the structure so that in case of a loose bolt the vibrator does not fall down.

### **Hydraulic connection**

The hydraulic connection has to be carried out by qualified and trained personnel only.

Make sure that the section of the tubes is suitable for the consumption indicated in the tables. Please also control if the tube length does not cause an excessive pressure drop on the supply line of the vibrator.

Please check if the tubes and the relevant devices are in a good state.

Please make sure that the tubes do not impede the normal circulation and that they are not damaged.

The connection of the clamps with the rubber hoses must resist against the test pressure of the tubes. The tubes must be suitable for the relative operating pressures.

The maximum supply pressure must correspond to the values indicated in the table.

### **Hydraulic Station**

The hydraulic station should erogate no more than the maximum oil quantity (litres/minute) indicated in the table on page 2. **In case of stations with higher or variable outputs** have to be mounted between the vibrator and the station a flux limiter and a high-pressure valve.

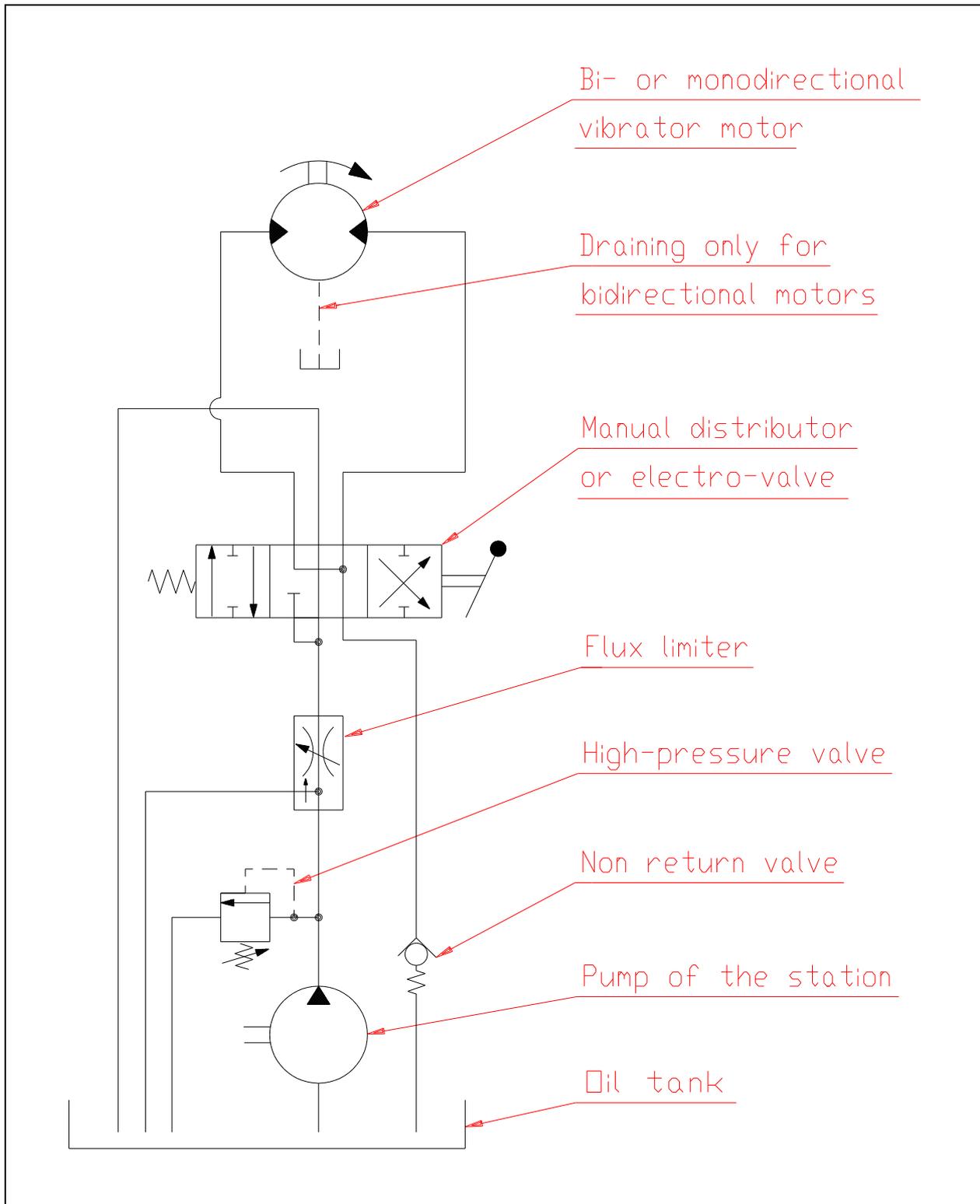
### **Manual distributor or electro-valve**

The vibrator should not be stopped all at once, since the inertia of the eccentric masses damages the motor. For this reason the distributor and the electro-valve have to be of the type with an H-shape centre (motor rod) to allow the circulation of the oil put into motion by the inertia of the vibrator. Moreover should be introduced on the discharge tube between the distributor and the tank a non return valve calibrated at 6-8 bars in order to guarantee a small pressure in the circuit.

ATTENTION!! For all the connections please observe the scheme.

Normally the vibrators are equipped with a bidirectional motor and an additional exit for draining. On request we can supply monodirectional motors without draining. Also in this case should be observed the above-mentioned instructions.

## HYDRAULIC SCHEME



## USE AND OPERATION

**Supply pressure: 80 bar or 100 bar (see table)**

Before starting the vibrator please check if it is well fixed on the vibrated structure.

## DELIVERED ACCESSORIES

Every vibrator is equipped with:

- two 90° joints for the oil charge and discharge

## **MAINTENANCE**

### **Legislative Decree 81 – 09/04/2008:**

The plants, the machines, the appliances, the tools, the utensils and the instruments as well as the protection devices have to fulfill the necessary criteria of resistance and suitability in relation to safety in the working environment and must be kept in a good state of conservation and efficiency.

**The maintenance interventions have to be performed by qualified and specially trained staff under observation of the previously described safety measures.**

**Before any intervention on the vibrator please** close the supply over the vibrator and wait until the vibrator has come to a stop. Detach the oil supply. After the first operation period please recontrol the initial fixing of the vibrator on the vibrated structure.

The SOMAI vibrator is built of special anti-wear steel and does not need any particular maintenance, especially if it is well lubricated.

The rubber tubes have to be replaced as soon as they show signs of rupture or cracking.

## **STORING**

For the manual transport of the vibrators please strictly observe the rules of Legislative Decree 81 – 09/04/2008.

Before storing the vibrator please observe the prescriptions of the previous paragraph.

The vibrator has to be cleaned with care.

Please store it in a dry room at a temperature of at least 5°C.

## **GUARANTEE**

The guarantee covers the parts of the machine, which according to the technicians of the producer present defects of construction or assembly. The guarantee does not cover the parts, which are subject to wear or which present defects caused by the wrong use and the unobservance of the instructions given in the present Operation and Maintenance Manual. The validity of the guarantee is one year from the date of delivery.

The guarantee expires, if parts are used, which are no original SOMAI spare parts.

SOMAI declines any responsibility for damages or difficulties, which arise from the unobservance of the safety rules and the instructions specified in the present manual

Abbreviations: DPR = Decreto del Presidente della Repubblica Italiana  
= Decree of the President of the Italian Republic  
DL = Decreto Legge = Decree with the force of law