

ENGLISH (Translated from Italian)

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B MACHINE AND MANUFACTURER IDENTIFICATION

Available models: VISCOMAT 120/1 12V DC, VISCOMAT 60/1 12V DC, VISCOMAT 60/2 12V DC, VISCOMAT 120/1 24V DC, VISCOMAT 60/1 24V DC, VISCOMAT 60/2 24V DC.

MANUFACTURER: PIUSI SPA - VIA PACINOTTI - Z.I. RANGAVINO - 46029 SUZZARA (MN)

IDENTIFICATION PLATE (EXAMPLE WITH THE FIELDS IDENTIFIED):

	PIUSI SPA 46029 SUZZARA (MN) ITALY		PRODUCTION YEAR YEAR 2004
	F00309000		
	PIUSI SPA 46029 SUZZARA (MN) ITALY		MODEL VISCOMAT 120/1 12V DC
	F00309010		
	PIUSI SPA 46029 SUZZARA (MN) ITALY		TECHNICAL SPECIFICATIONS 12 V DC 200 W 25.5 A 2900 rpm - Pmax 11 bar - Qmax 5.5 l/min
	F00309020		
	PIUSI SPA 46029 SUZZARA (MN) ITALY		MANUAL VISCOMAT 60/1 12V DC
	F00309010		
	PIUSI SPA 46029 SUZZARA (MN) ITALY		TECHNICAL SPECIFICATIONS 12 V DC 300 W 35 A 2900 rpm - Pmax 5.5 bar - Qmax 11.6 l/min
	F00309010		

ATTENTION Always check that the revision level of this manual coincides with what is shown on the identification plate.

C DECLARATION OF INCORPORATION OF PARTLY-COMPLETED MACHINERY

The undersigned: **PIUSI S.p.A - Via Pacinotti c.m. - z.i.Rangavino 46029 Suzzara (Mantova) - Italy**

HEREBY STATES under its own responsibility, that the partly-completed machinery:

Machine designed for the transfer of lubricant oil

- VISCOMAT 60/1 12V DC
- VISCOMAT 60/2 12V DC
- VISCOMAT 60/1 24V DC
- VISCOMAT 60/2 24V DC
- VISCOMAT 120/1 12V DC
- VISCOMAT 120/1 24V DC

refer to Lot Number shown on CE plate affixed to product

Serial number: refer to the year of production shown on the CE plate affixed to the product

is intended to be incorporated in a machine (or to be with other machines) so as to create a machine to which applies Machine Directive 2006/42/EC, may not be brought into service before the machine into which it is to be incorporated has been declared in conformity with the provisions of the directive 2006/42/EC.

is in conformity with the legal provisions indicated in the directives:

- Machine Directive 2006/42/EC
- Electromagnetic Compatibility Directive 2004/108/EC

To which the essential safety requirements have been applied and complied with what indicated on annex I of the machine directive applicable to the product and shown below: 1.1.3 - 1.1.5 - 1.3.1 - 1.3.2 - 1.3.3 - 1.3.4 - 1.3.8 - 1.4.1 - 1.4.2.1 - 1.5.1 - 1.5.2 - 1.5.4 - 1.5.5 - 1.5.8 - 1.5.11 - 1.6.1 - 1.6.3 - 1.6.4 - 1.7.1 - 1.7.2 - 1.7.3 - 1.7.4.

The documentation is at the disposal of the competent authority following motivated request at Piusi S.p.A. or following request sent to the email address: doc_tec@piusi.com. The person authorised to compile the technical file and draw up the declaration is Otto Varini as legal representative.

Suzzara, 29/12/2009

D MACHINE DESCRIPTION

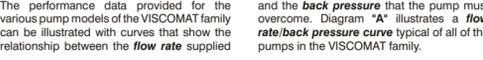
PUMP: Electric self-priming rotary external gear pump, equipped with a by-pass valve.

MOTOR: Brush motor powered by continuous current, low voltage, with intermittent cycle, closed type, IP55 protection class according to CEI EN 60034-5, flange-mounted directly to the pump body.

E TECHNICAL SPECIFICATIONS

The performance data provided for the various pump models of the VISCOMAT family can be illustrated with curves that show the relationship between the **flow rate** supplied

and the **back pressure** that the pump must overcome. Diagram "A" illustrates a **flow rate/back pressure curve** typical of all of the pumps in the VISCOMAT family.



Point "1" is the point at which the pump is functioning with practically no back pressure, in which case the pump supplies the maximum flow rate (Q max).

Point "2" is the functioning point characterized by the maximum back pressure (P max) at which the pump supplies the minimum flow rate (Q min).

When the back pressure exceeds the value P max, thanks to the special design of the by-pass, there is a sudden opening of the by-pass, with a consequent sudden reduction of the flow rate supplied.

At flow rate zero (point "3") the entire flow rate supplied by the pump is recirculated in the by-pass, and the pressure in the delivery line reaches the value of P By-pass.

VISCOMAT pumps can, therefore, function in the face of any back pressure between zero and P max, supplying a flow rate varying little as a function of the back pressure between the values of Q max and Q min.

The values for Q min, Q max, P max and P by-pass are provided for each model of pump in the Table below:

PUMP MODEL	Q max. (litres/min)	Q min. (litres/min)	P max. (bar)	P by-pass (bar)	Corrente Max (A)*
VISCOMAT 120/1 12V	5,5	4,5	9	11	26,5
VISCOMAT 120/1 24V	5,5	4,5	9	11	13,5
VISCOMAT 60/1 12V	4,5	3,2	5	6	18,5
VISCOMAT 60/1 24V	4,2	3,2	5	6	9,5
VISCOMAT 60/2 12V	11,6	9,5	4	5,5	35
VISCOMAT 60/2 24V	12	10,8	4	5,5	18

* data refer to pump performance with oil of viscosity 500cSt

* refers to functioning with maximum back pressure.

VISCOMAT pumps can pump oils of very different viscosities, within the limits indicated in the TECHNICAL INFORMATION, without requiring any adjustment of the by-pass.

Diagram "B" illustrates how the characteristic curve changes in the case of the maximum and minimum viscosities (respectively equal to 50 cSt and 2000 cSt), showing that, at the maximum working back pressure (Pmax), the flow rate Q min suffers a variation of between 10% and 15% with respect to the value relative to a viscosity of 500 cSt.

in the pump's performance will be more noticeable the greater the back pressure against which the pump is working.

Diagram "B" illustrates how the characteristic curve changes in the case of the maximum and minimum viscosities (respectively equal to 50 cSt and 2000 cSt), showing that, at the maximum working back pressure (Pmax), the flow rate Q min suffers a variation of between 10% and 15% with respect to the value relative to a viscosity of 500 cSt.

As the viscosity of the oil varies, the variation

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PUMP MODEL	Fuses (A)	Voltage (V)	Absorption (A)	Power (W)	Q Max (l/min)	P by-pass** (bar)
VISCOMAT 120/1 12V	40	12	26,5	200	5,5	11
VISCOMAT 120/1 24V	30	24	13,5	200	5,5	11
VISCOMAT 60/1 12V	25	12	18,5	150	4,5	6,5
VISCOMAT 60/1 24V	15	24	9,5	150	4,2	6,5
VISCOMAT 60/2 12V	40	12	35	300	11,6	4,7
VISCOMAT 60/2 24V	30	24	18	300	12	4,7

* data refer to functioning with maximum back pressure and oil with viscosity 500cSt

** data refer to operations in by-pass mode

ATTENTION

Under different suction conditions higher pressure values can be created that reduce the flow rate compared to the same back pressure values.

To obtain the best performance, it is very important to reduce loss of suction pressure as much as possible by following these instructions:

- Shorten the suction tube as much as possible
- Avoid useless elbows or throttling in the tubes
- Keep the suction circuit filter clean
- Use a tube with a diameter equal to, or greater than, indicated (see Installation)

The power absorbed by the pump depends on the functioning point and the viscosity of the oil being pumped.

The data for MAXIMUM CURRENT provided in the Table refer to pumps functioning at the point of maximum compression P max, with oils of a viscosity equal to approximately 500 cSt.

F OPERATING CONDITIONS

F1 ENVIRONMENTAL CONDITIONS

TEMPERATURE: min. +5°C / max. +60°C

RELATIVE HUMIDITY: max. 90%

The temperature limits shown apply to the pump components and must be respected to avoid possible damage or malfunction.

It is understood, nevertheless, that for a given oil, the real functioning temperature range also depends on the variability of the viscosity of the oil itself with the temperature. Specifically:

- The minimum temperature allowed (+5°C) could cause the viscosity of some oils to greatly exceed the maximum allowed, with the consequence that the absorbed current of the pump would be excessive, risking damage to the pump motor.
- The maximum temperature allowed (+60°C) could, on the other hand, cause the viscosity of some oils to drop well below the minimum allowed, causing a degradation in performance with obvious reductions in flow rate as the back pressure increases.

F2 ELECTRICAL POWER SUPPLY

Depending on the model, the pump must be supplied by a continuous current line whose nominal values are shown in the table in Paragraph E2 - ELECTRICAL SPECIFICATIONS.

The maximum acceptable variations from the electrical parameters are:

voltage: +/- 5% of the nominal value

ATTENTION

Power from lines with values outside of the indicated limits can damage the electrical components.

F3 WORKING CYCLE

The pumps are designed for INTERMITTENT use with a 30 - minute work cycle under conditions of maximum back pressure.

ATTENTION

Functioning under by-pass conditions is only allowed for brief periods of time (2-3 minutes maximum). After a work cycle of 30 minutes, wait for the motor to cool.

F3 FLUIDS PERMITTED / FLUIDS NOT PERMITTED

PERMITTED:

- OIL with a viscosity from 50 to 2000 cSt (at working temperature) (viscosity from 50 to 600 cSt for VISCOMAT 60/2 12V and VISCOMAT 60/2 24V)

NOT PERMITTED:

- GASOLINE
- INFLAMMABLE LIQUIDS with PM < 55°C
- WATER
- FOOD LIQUIDS
- CORROSIVE CHEMICAL PRODUCTS

- SOLVENTS

G MOVING AND TRANSPORT

Given the limited weight and size of the pumps (see paragraph R - DIMENSIONS AND WEIGHTS), moving the pumps does not require the use of lifting devices.

The pumps were carefully packed before shipment. Check the packing material on delivery and store in a dry place.

H INSTALLATION

H1 DISPOSING OF THE PACKING MATERIAL

The packing material does not require special precautions for its disposal, not being in any way dangerous or polluting. Refer to local regulations for its disposal.

H2 PRELIMINARY INSPECTION

- Check that the machine has not suffered any damage during transport or storage.
- Clean the inlet and outlet openings, removing any dust or residual packing material.
- Make sure that the motor shaft turns freely.
- Check that the electrical specifications correspond to those shown on the identification plate.

H3 MECHANICAL INSTALLATION

Viscomat series pumps can be installed as follows:

a) Horizontally:

b) To the wall. With pump body upwards:

c) To the wall. With pump body aside only with check valve installed:

d) To the wall. With check valve installed:



It is recommended to install a check valve in order to resume the system operation quickly and easily even after the first priming.

ATTENTION

Under conditions C and D, a check valve is to be installed. Moreover, during the initial start-up phase, the suction tube is to be filled with oil.

Fix the pump using screws of a diameter suitable for the provided fixing holes as indicated in the drawing "Dimensions and weights".

ATTENTION

THE MOTORS ARE NOT OF AN ANTI-EXPLOSIVE TYPE. Do not install them where inflammable vapours could be present.

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H4 HYDRAULIC CONNECTION

- Make sure that the hoses and the suction tank are free of dirt and filling residue that might damage the pump and accessories.
- Always install a metal mesh filter in the suction hose.
- Before connecting the delivery hose,

partially fill the pump body with oil to avoid the pump running dry during the priming phase.

- Do not use conical threaded joints that could damage the threaded pump openings if excessively tightened.

The MINIMUM recommended characteristics for hoses are as follows:

SUCTION HOSE

- diameter: 20 mm
- nominal pressure: twice the P by-pass pressure (see table, par. E1)
- appropriate for use with suction

DELIVERY HOSE

- diameter: 1/2" per le versioni 60/1 e 120/1
- diameter: 3/4" per la versione 60/2
- nominal pressure: twice the P by-pass pressure (see table, par. E1)

ATTENTION

It is the installer's responsibility to use tubing with adequate characteristics. The use of hoses that are inappropriate for use with oil can cause damage to the pump or people as well as pollution.

The use of hoses and/or line components that are inappropriate for use with oil or have inadequate nominal pressures can cause damage to objects or people as well as pollution.

The loosening of connections (threaded connections, flanges, gasket seals) can likewise cause damage to objects or people as well as pollution.

Check all of the connections after installation and on a regular on-going basis with adequate frequency.

To avoid affecting the proper functioning of the pump, use a hose-end fitting with a thread of length less than 15mm.

H5 CONSIDERATIONS REGARDING DELIVERY AND SUCTION LINES

DELIVERY

The choice of pump model to use should be made keeping in mind the viscosity of the oil to be pumped and the characteristics of the system attached to the delivery of the pump.

The combination of the oil viscosity and the characteristics of the system could, in fact, create back pressure greater than the anticipated maximums (equal to P max), so as to cause the (partial) opening of the

As viscosity increases, the suction pressure at which cavitation phenomena begin decreases. In the case of oils with viscosities equal to approximately 500 cSt, the suction pressure must not exceed values of the order of 0.3 - 0.5 bar to avoid triggering cavitation phenomena.

In the case of oils with viscosity greater than 1000 cSt the suction pressure can reach values on the order of 0.7 - 0.8 bar without compromising the proper functioning of the pump. For Viscomat 60/2, the suction limit is reached with oil viscosity equal to 600 cSt.

Beyond these suction pressure values, cavitation phenomena begin as evidenced by accentuated running noise that over time can cause pump damage, not to mention a degradation of pump performance.

SUCTION

VISCOMAT series pumps are characterized by excellent suction capacity. In fact, the characteristic flow rate/back pressure curve remains unchanged even at high pump suction pressure values.

The values indicated above refer to the suction of oil that is substantially free of air. If the oil being pumped is mixed with air, the cavitation phenomena can begin at lower suction pressures.

In any case, for as much as was said above, it is important to guarantee low suction pressures (short hoses and possibly of larger diameter than the inlet opening of the pump, fewer curves, filters of wide cross-section and kept clean).

As viscosity increases, the suction pressure at which cavitation phenomena begin decreases. In the case of oils with viscosities equal to approximately 500 cSt, the suction pressure must not exceed values of the order of 0.3 - 0.5 bar to avoid triggering cavitation phenomena.

In the case of oils with viscosity greater than 1000 cSt the suction pressure can reach values on the order of 0.7 - 0.8 bar without compromising the proper functioning of the pump. For Viscomat 60/2, the suction limit is reached with oil viscosity equal to 600 cSt.

Beyond these suction pressure values, cavitation phenomena begin as evidenced by accentuated running noise that over time can cause pump damage, not to mention a degradation of pump performance.

ATTENTION

It is a good system practice to immediately install vacuum and air pressure gauges at the inlets and outlets of the pump which allow verification that operating conditions are within anticipated limits. To avoid emptying the suction hose when the pump is turned off, the installation of a foot valve is recommended.

H6 LINE ACCESSORIES

The pumps are supplied without line accessories. The most common line accessories

are listed below. Their use is compatible with the proper use of the pumps.

DELIVERY

- Easy Oil nozzles
- Meters
- Flexible tubing

SUCTION

- Foot valve with filter
- Rigid and flexible tubing

ATTENTION

It is the installer's responsibility to provide the line accessories necessary for the safe and proper functioning of the pump.

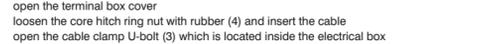
The use of accessories that are inappropriate for use with oil can cause damage to the pump or people as well as pollution.

H7 ELECTRICAL CONNECTIONS

The electrical box of Viscomat 120/1 and 60/2 comes with a terminal board for connection of the power cord (optional). In case of connection of the cable kit with pliers (Piusi optional), proceed as follows:

- open the terminal box cover
- loosen the core hitch ring nut with rubber (4) and insert the cable
- open the cable clamp U-bolt (3) which is located inside the electrical box
- fix the eyelet (for screw M4) of the positive cable (blue) to the terminal, in position 1 (see reference in the diagram)
- fix the eyelet (for screw M4) of the negative cable (brown) to the terminal, in position 2 (see reference in the diagram)
- tighten the U-bolt (3)
- screw the ring nut (4).

With the Piusi cable kit, make sure that the red pliers are connected to the positive pole (+) and the black pliers are connected to the negative pole (-)



VISCOMAT DC 12V WITH 40 A FUSE
Minimum cable section = 6 mm³

VISCOMAT DC 24V WITH 30 A FUSE
Minimum cable section = 4 mm³

CABLE KIT + PLIERS (BATTERY KIT) VISCOMAT 60/1

- Cables fitted with faston type plugs for power connection;
- WHITE cable (or BROWN): positive pole (+)
- BLACK cable (or BLUE): negative pole (-);
- Terminal strip box (protection IP55 in conformance with EN 60034-5-97 regulations) complete with:
 - start/stop switch;
 - protection fuse against short circuits and overloads with following features: 25A for 12V models or 15A for 24V models.

To carry out the electrical connection of Viscomat 60/1, follow the diagram below:

12V version Fuse: 25A

24V version Fuse: 15A

In the event of power connection with cable which is not supplied by Piusi, it is necessary to observe the following characteristics: