rovatti pompe

Products you can rely on

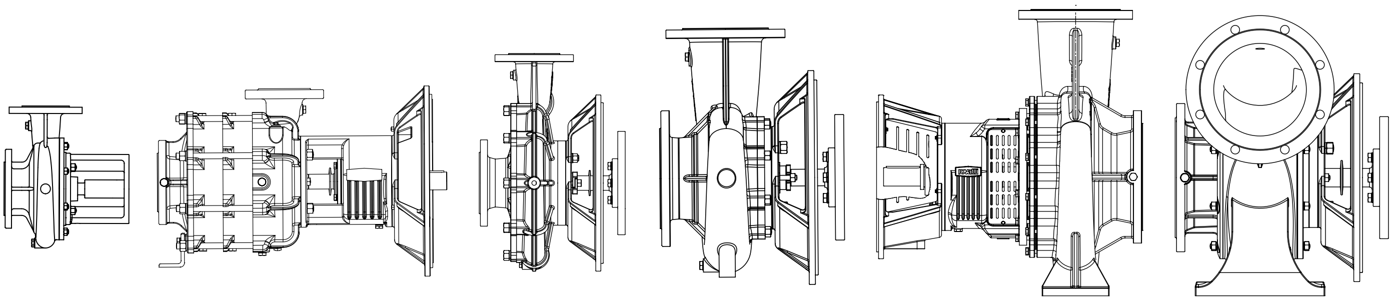
I	EN	F	D	ES

Manuale d'uso e manutenzione
Instructions for use and maintenance
Manuel d'utilisation et d'entretien
Betriebs-und Wartungsanleitung
Manual de uso y mantenimiento

Pompe flangiate per motore termico
Flanged pumps for thermic engines
Pompes bridées sur moteurs thermiques
Flanschkreiselpumpen
Bombas con bridas para motor térmico

Serie - Series - Série - Baureihe - Serie

FL - FK - FP - FQ - FS - FNSF



TRADUZIONE DELLE ISTRUZIONI ORIGINALI
ORIGINAL INSTRUCTIONS
TRADUCTION DES INSTRUCTIONS ORIGINALES
ÜBERSETZUNG DER ORIGINALANLEITUNG
TRADUCCIÓN DE LAS INSTRUCCIONES ORIGINALES

CE

MGPF185R1

Index

1. Machine identification

1.1 Manufacturer's identification

Manufacturer	Rovatti A. & Figli Pompe S.p.a.
Address	42042 Fabbrico (Reggio Emilia) Italy Tel. +39 0522 66 50 00 Fax + 39 0522 66 50 20 mail info@rovatti.it www.rovatti.it

1.2 Identification

This manual describes the operating instructions relative to:
- Horizontal centrifugal single-stage or 2-stage flanged pumps for thermic engines **FL** series;
- Horizontal centrifugal multistage SAE flanged pumps for thermic engines **FK** series;
- Horizontal centrifugal single-stage SAE flanged pumps for thermic engines **FP** series;
- Horizontal centrifugal single-stage SAE flanged pumps for thermic engines **FQ** series;
- Horizontal centrifugal single-stage SAE flanged pumps for thermic engines **FS** series;
- Horizontal centrifugal single-stage SAE flanged pumps for thermic engines **FNSF** series.

1.3 Identification plate

All products described in this manual are provided with an identification plate (**fig. 1**) reporting the characteristic data. In case of warranty claim, it's important to inform the manufacturer of all characteristic data.

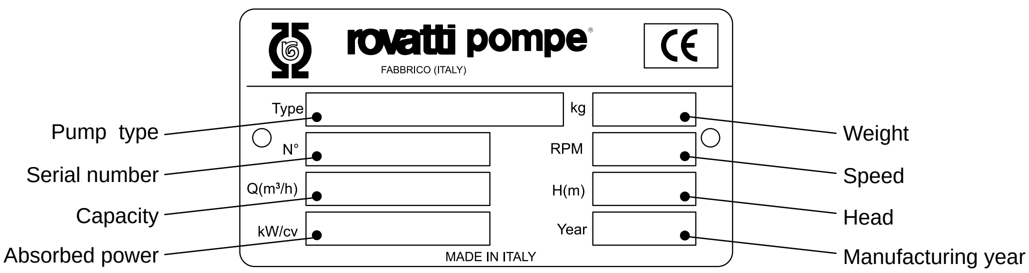


fig. 1

2. Description of the manual

2.1 Introduction

The good functioning of the product, its reliability and life depend on the severe respect of the present prescriptions by the installer and the end user. Read carefully and take note of prescriptions, suggestions and indications necessary for a correct use.

2.2 Purpose of the manual

This manual has been prepared considering the needs of the user that bought our product. You can find topics and instructions illustrating the correct use of the product in order to maintain characteristics, functionality and quality of the product unchanged over the time. The instructions for use contained in the present manual refer to products in standard execution and functioning in normal conditions; therefore, for the use of a pump-motor unit, the present instructions must be integrated with the documentation provided by the motor/engine manufacturer. Keep this manual and any eventual further documentation in a suitable place on hand of operators when necessary.

2.3 Update procedure

The manual is subject to revisions and modifications by Rovatti A. & Figli Pompe s.p.a. without prior notice. Once updated, the manual in the new version will be supplied with the sold product.

3. Preliminary information

3.1 Standard references

Horizontal centrifugal single-stage or 2-stage flanged pumps for thermic engines **FL** series, horizontal centrifugal multistage SAE flanged pumps for thermic engines **FK** series, horizontal centrifugal single-stage SAE flanged pumps for thermic engines **FP** series, horizontal centrifugal single-stage SAE flanged pumps for thermic engines **FQ** series, horizontal centrifugal single-stage SAE flanged pumps for thermic engines **FS** series and horizontal centrifugal single-stage SAE flanged pumps for thermic engines **FNSF** series have been designed and manufactured in compliance with:

Machine Directive 2006/42/CE
Standard EN-ISO 12100
EN809

3.2 Simbology

Below are listed the symbols used in this manual to ensure safety for persons, machines and all electrical and mechanical equipment:

Generical danger	The non observance of the prescription involves the risk of damages to persons and/or things
Electric danger	The non observance of the prescription involves electric shock risk
Technical danger	The non observance of the prescription involves the risk of technical damages to the product and/or to the installation

3.3 General warnings

Operations reported in this manual, with particular reference to **transport, installation, electrical and mechanical connections, starting, maintenance or off-service operations** must be carried out by skilled personnel well experienced with the rules concerning safety of the working environment and who has taken vision and carefully verified the content of this manual and/or any other documentation enclosed to the product. It must also be considered and followed any more restrictive local regulations.

3.4 Operators skills

Below are listed the operators skills:

Generic operator	Not skilled personnel, who can drive the machine using the controls on the push-button panel; simply re-start or re-set the machine after forced interruption.
Mechanical maintener	Skilled engineer who can drive the machine in normal conditions; operate on the mechanical components for setting, maintenance and repairs, if any. He's not allowed to operate on the electric system when live.
Electrical maintener	Skilled engineer who can drive the machine in normal conditions; make all electric operations necessary to setting, maintenance and repair. He can operate inside control and jack boxes, when live.
Rovatti technical operator	Skilled engineer. He's available for clients directly by Rovatti A. & Figli Pompe Spa or by one of their agent, when particularly difficult operations are required.

3.5 Protective equipment required

During installation, maintenance or off-service operations all individual protective devices are necessary to operate in safety conditions (proper gloves, clothes, protection masks, etc.). To prevent accidents be sure that unauthorized persons cannot approaching or standing in dangerous areas.

3.6 Residual risks

Danger due to moving mechanical components	Hazard of getting caught and drawn into machine pinch points by loose clothing that become entangled. Pinch points are represented by all rotating or revolving parts and by power transmission apparatus. Follow lockout procedure before servicing. Do not operate without proper protective guards. Stay clear of the machine area while operating
Danger due to edges and angles	Whenever possible we have provided for corner guards and eliminated protruding parts. Use proper protective guards, like gloves, eye-glasses etc. during maintenance and cleaning operation
Danger due to electric hazard	The terminal block connecting the electric network to general panel remains live also when in stand-by for servicing operation. Before making any connection or maintenance on these parts disconnect electric power from network supply cable to the machine. We recommend to mount a disconnecting switch upstream in order to insulate the power supply, to ensure safety maintenance operations
Danger due to thermal hazard	Thermal hazards on this type of machine are concentrated in determinated areas. While operating the temperature of these areas can reach and exceed 50°C. Avoid any direct contact with these components. Wait for complete cooling in order to prevent burns

3.7 Prohibitions

In particular, employees must not:

- mount on the pump to prevent falls;
- remove or modify without authorization any security device, security signal or security control;
- perform operations on its own initiative that could compromise the safety of themselves or other operators;
- wear bracelets, rings and necklaces that can be hanged or dragged by moving parts, creating danger conditions;
- use the machinery if there is any malfunction;
- apply any precarious repairs.

3.8 Noise level

The acustic pressure levels of the products, properly installed and functioning within the use limits foreseen in the relative technical catalog are reported on the annex.

3.9 Unintented and/or improper uses

Do not use the machine in the following conditions:

- **waterless;**
- **without the protection grids properly installed;**
- **exceeding the limits specified on the identification plate;**
- **for pumping different liquids from those specified in the relative catalog**.

Do not use the machine for different purposes than those specified in the relative product catalog. Any different use from those specified in the relative product catalog is to be considered improper and therefore potentially dangerous to the safety of workers, as well as to invalidate the contractual warranty.

3.10 Warranty

Warranty of the products are subject to **ROVATTI A. & FIGLI POMPE S.p.A**. **general sale conditions**. For more information about Rovatti terms and conditions, plase visit "**www.rovatti.it**". Warranty is recognized when all mechanical, hydraulic, electric norms and correct use indicated on the present manual are respected.

4. Description of the machine

4.1 Purpose of the machine

The machines described in this manual are widely used in livestock systems, filling tanks and reservoirs, irrigation systems, spraying systems, liquid transfer and fire-fighting.

4.2 Use conditions

For all machines described in this manual it is necessary to respect the following use limits:

Max pumped liquid temperature	**90°C**
Max. solids contents	**40 g/m^3**
Max running time with closed delivery (Q = 0)	**2 min.**
Max speed	**See tab. 1 and tab. 2**
Max. operating pressure *	**See tab. 1 and tab. 2**
Max. suction pressure	**See tab. 1 and tab. 2**

Pump	Max speed [min^{-1}]	Max. suction pressure [bar]	Max. operating pressure * [bar]
FL320	3600	2	12
FL416BN	3600	2	12
FL416	3600	2	12
FL420BN	3600	2	12
FL420AN	3600	2	12
FL420A	3600	2	12
FL420/2	3600	2	12
FL512	3600	2	12
FL516	3600	2	12
FL517A	3600	2	12
FL520	3600	2	12
FL524	3600	2	12
FL526	3400	2	12
FL526/2	3400	2	12
FL612	3600	2	12
FL616	3600	2	12
FL619A	3600	2	12
FL619B	3600	2	12
FL621	3600	2	12
FL626	3400	2	12
FL626/2	3400	2	12
FL626AM	3250	2	12
FL816	3600	2	12
FL822A	3600	2	12
FL822B	3600	2	12
FL824	3300	2	12
FL830	2800	2	12
FL830A	2900	2	12

tab. 1

* Including suction pressure

	Pump				Europa range	Max speed [min^{-1}]	Max. suction pressure [bar]	Max. operating pressure * [bar]
SAE 1 Flange	**SAE 2 Flange**	**SAE 3 Flange**	**SAE 4 Flange**	**SAE 5 Flange**				
			F42K65-22/n	F52K65-22/n	●	2600	6	22
			F42K65-32/n	F52K65-32/n	●	2600	6	22
		F32K65-42/n	F42K65-42/n	F52K65-42/n	●	2600	6	22
	F23K80-45/n	F33K80-45/n	F43K80-45/n	F53K80-45/n	●	2600	6	22
	F23K80-60/2/3/4	F33K80-60/2/3/4	F43K80-60/2/3/4	F53K80-60/2/3/4	●	2600	6	22
	F23K80-60/5/6	F33K80-60/5/6	F43K80-60/5/6	F53K80-60/5	●	2200	6	22
	F23K80-60/7	F33K80-60/7	F43K80-60/7		●	2000	6	22
	F23K80-90/2/3/4	F33K80-90/2/3/4	F43K80-90/2/3/4	F53K80-90/2/3/4	●	2600	6	22
	F23K80-90/5	F33K80-90/5	F43K80-90/5		●	2200	6	22
	F23K80-90/6/7	F33K80-90/6/7	F43K80-90/6/7		●	2000	6	22
	F23K100-120/n	F33K100-120/n	F43K100-120/n		●	2000	6	22
	F24K100-120/n	F34K100-120/n			●	2000	6	22
	F23K100-160/n	F33K100-160/n	F43K100-160/n		●	2000	6	22
	F24K100-160/n	F34K100-160/n			●	2000	6	22
				F52K65/2/3		2300	6	18
	F23K65/3/4	F33K65/3/4	F43K65/3/4			2300	6	18
				F52K80/2/3		2300	6	18
	F23K80/3/4	F33K80/3/4	F43K80/3/4			2300	6	18
	F23K100/2	F33K100/2	F43K100/2			2300	6	18
	F23K100/3	F33K100/3	F43K100/3			2000	6	18
	F23K100/4	F33K100/4	F43K100/4			1450	6	18
	F23K100H/2	F33K100H/2	F43K100H/2			2300	6	18
	F23K100H/3	F33K100H/3	F43K100H/3			2000	6	18
	F24K125/2	F34K125/2				1800	4	18
	F24K125/3	F34K125/3				1600	4	18
	F24K125/2A	F34K125/2A				2000	4	18
	F24K125/3A	F34K125/3A				1800	4	18
	F24K150/2	F34K150/2				1800	4	18
	F24K150/3	F34K150/3				1600	4	18
	F24K150/2A	F34K150/2A				1800	4	18
	F24K150/3A	F34K150/3A				1600	4	18
				F52P65		2600	4	12
				F52P65K		2600	4	12
				F52P80A		2600	4	10
				F52P85		2600	4	10
				F52P80K		2600	4	10
		F(S)33P80AM	F(S)43P80AM	F53P80AM		2600	4	10
				F52P100B		2600	4	10
				F52P100A		2600	4	10
	F(S)23P100M	F(S)33P100M	F(S)43P100M	F53P100M		2600	4	10
	F(S)23P105	F(S)33P105	F(S)43P105	F53P105		2600	6	16
	F(S)23P100K	F(S)33P100K	F(S)43P100K	F53P100K		2300	6	16
	F(S)23P125	F(S)33P125	F(S)43P125			2600	4	12
	F(S)24P125K	F(S)34P125K				2200	6	16
	F(S)24P125KA	F(S)34P125KA				2200	6	16
	F(S)24P150K	F(S)34P150K				2200	6	16
	F(S)24P150KA	F(S)34P150KA				2200	6	16
	F(S)23QN150	F(S)33QN150	F(S)43QN150			2500	2	6
	F(S)23SN200	F(S)33SN200	F(S)43SN200			1800	1	5
		FS33S250	FS43S250			1750	1	4
FN14SF100-400						1750	2	10/16
FN14SF125-315						1750	4	10/16
FN14SF125-400						1750	2	10/16
FN14SF150-315						1750	5	10/16
FN14SF150-400						1750	2	10/16
	FN24SF100-400					1750	2	10/16
	FN24SF125-315					1750	4	10/16
	FN24SF125-400					1750	2	10/16
	FN24SF150-315					1750	5	10/16
	FN24SF150-400					1750	2	10/16
		FN34SF100-400				1750	2	10/16
		FN34SF125-315				1750	4	10/16
		FN34SF125-400				1750	2	10/16
		FN34SF150-315				1750	5	10/16
		FN34SF150-400				1450	2	10/16
FN15SF150-500						1750	1	10/16
FN15SF200-315						1750	5	10/16
FN15SF200-400						1750	1	10/16
FN15SF250-315						1750	5	10/16
FN15SF250-400						1750	3	10/16
	FN25SF150-500					1750	5	10/16
	FN25SF200-315					1750	3	10/16
	FN25SF200-400					1750	1	10/16
	FN25SF250-315					1750	5	10/16
	FN25SF250-400					1750	3	10/16
		FN35SF150-500				1750	5	10/16
		FN35SF200-315				1750	3	10/16
		FN35SF200-400				1750	1	10/16
		FN35SF250-315				1750	5	10/16
		FN35SF250-400				1450	3	10/16

tab. 2

* Including suction pressure

The presence of abrasive substances causes wearing and premature deterioration of the internal components of the pump. The presence of pollutants, such as residues of hydrocarbon, solvents, detergents, natural gas, may cause heavy damages producing the blowing of the rubber components (bearings, wear rings) and even the consequent pump rotor locking.

In case of use in conditions different from the suggested ones or constructive modifications made without previous authorization, warranty foreseen in the general sale conditions will be no longer valid and the manufacturer will not be responsible of eventual damages caused to persons, animals or things.

4.3 General characteristics

The pumps described in this manual are suitable for pumping non-abrasive, chemically and mechanically non-aggressive waters. These pumps are suitable for a direct coupling to thermic engines; with special flange for **FL** series and with SAE norm flanges for **FK**, **FK Europa**, **FP**, **FQ**, **FS** and **FNSF** series. The pumps are suitable for many application fields and characterized by flexibility, wide performance range and easy installation.

4.4 Pumps identification

The pumps described in this manual are available in several versions, indicated by the designation of the pump:

Flanged pump for thermic engine						
FL						
Model						
320 ÷ 830A						
Impeller size						
E	F	G	H	I	L	M
Coupling type *						
CA	SB	F				
Flange type						
1 ÷ 33						
Flange length option						
a	b	c				
Seal type **						
TM	TB					

Example: FL612E-CA1a-TM

Coupling type *	
-CA	**Tapered coupling**
-SB	**Cylinder coupling (see annex)**
-F	**Flywheel coupling**
Seal type **	
-TM	**Mechanical seal**
-TB	**Gland packing**

SAE flanged pump for thermic engine								
F								
High efficiency range (for FNSF range)								
N								
Support (for pumps with bearings support)								
S								
SAE flange size								
1	2	3	4	5				
Support size								
2	3	4	5S					
Model								
K	P	QN	S	SN	F			
Nominal ø suction port [mm]								
65 ÷ 300								
Nominal ø outlet [mm] (for FNSF range)								
150 ÷ 250								
Nominal capacity in m³/h (for Europa range)								
22 ÷ 160								
Number of stages (for multistage pumps)								
2	3	4	5	6	7			
Version (for FP series)								
A	AM	B	K	KA	M			
Impeller size								
E	F	G	H	I	L	M	N	O
Seal type ***								
TM	TB							

Example: F43QN150F-TB

Seal type ***	
-TM	**Mechanical seal**
-TB	**Gland packing**

5. Transport, handling and storage

5.1 Transport and handling

When packed, the products described in this manual can be moved with a forklift but, if the case, it is possible to move them even with a crane. Once unpacked, identify the weights of the product (detectable on the identification plates) and use the lifting hooks points (**fig. 2 ÷ 7).**

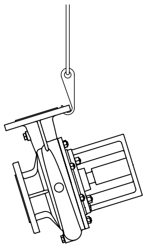
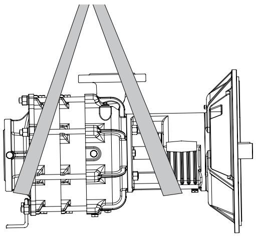
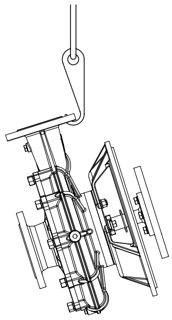
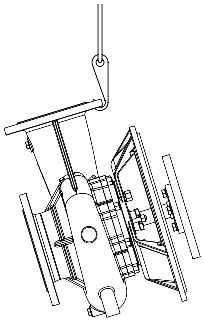
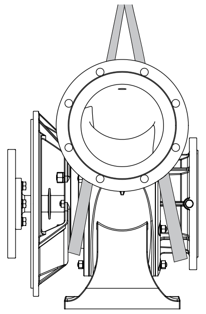
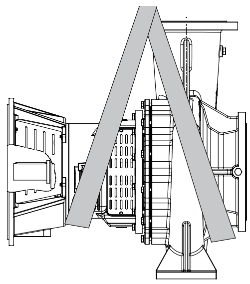
To reduce risks during lifting and handling operations, be sure to operate in safety conditions checking that equipments are complying with safety norms and are suitable for the weight, dimensions and shape of the product. Handle the product with protective gloves to avoid cut risks to hands. When lifting and placing the pump be sure of its stability before releasing the lifting equipment.

5.2 Storage

The products described in this manual must be stored in covered and dry rooms. **In case of a long storage period (over 3 months) and/or storage at low ambient temperature, empty the pump (the water may freeze and cause serious damages) and protect it with special product against oxidation; rotate the shaft periodically by hand, to avoid its possible locking.**

5.3 Packing disposal

The products described in this manual are normally packed in wooden boxes that must be disposed as prescribed by the local regulations prevailing in the country in which the disposal occurs. For further informations contact the relevant authorities.

FL series	FK series	FP series	FQ series	FS series	FNSF series
 **fig. 2**	 **fig. 3**	 **fig. 4**	 **fig. 5**	 **fig. 6**	 **fig. 7**

6. Installation

6.1 Inspections before installation

Check the product upon receipt to be sure has not been damaged during transport and that the data reported on the identification plate of the product correspond to the submitted order.

Pumps described in this manual are only provided for the horizontal installation (fig. 8). Ensure that pump and motor are correctly aligned and re-check the alignment after a short operational period (rectify if necessary). A wrong alignment causes serious damage both for pump and motor. Before installing the pump be sure that the rotating components rotate freely. Be sure that the support base is solid, regular and adequate to the pump’s weight (refer to the identification plate).

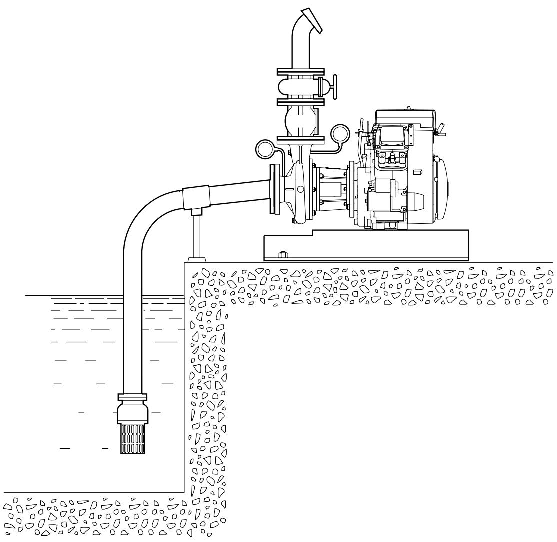
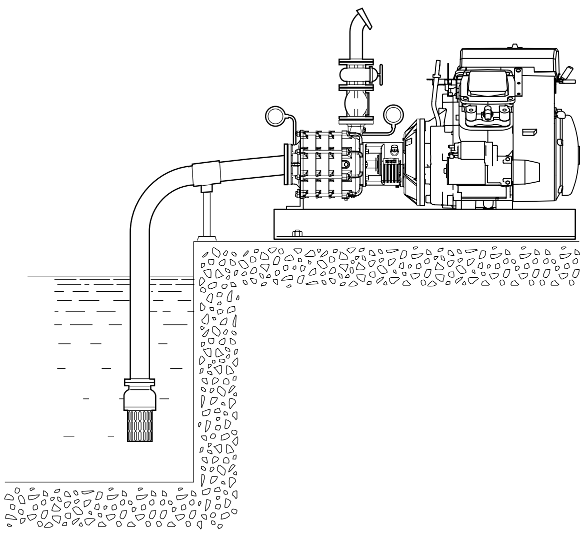
Typical installation	
Flanged pump	**SAE flanged pump**
	

fig. 8

6.2 Installation

The site chosen for the instalaltion must be well ventilated and the discharge of the engine must be placed outside the environment. **Leave a space around the unit equal to the volume of the same; this will allow an air circulation able to ensure the correct engine cooling. Suction and delivery pipes must bu correctly mounted and must not be subject to stress during pump operation.**

Ensure in suction that:

- NPSH available is 1 meter approx. higher than the NPSH requested by the pump and that friction losses in suction pipe, bends, foot valve and filter do not exceed 1 meter.
- Suction pipe has a diameter larger than the inlet of pump and that the horizontal section of the suction pipe does not exceed a gradient of 2%.
- All joints are perfectly airtight.
- Anchorages and supports to prevent damages and possible breakage of suction flange are properly secured.
- Foot valve is vertically positioned and equipped with adequate sized grid to protect against possible obstructions (free surface of filter must be minimum twice suction pipeline surface).
- The suction pipe has not narrow bends and diameter variations.

Ensure in delivery that:

- All pipes and fittings are adequately dimensioned to reduce pressure losses and to withstand the maximum operating pressure of the pump.
- A gate valve is fitted to regulate delivery flow.
- The suction pipe has not narrow bends and diameter variations.
- Anchorages and supports to prevent damages and possible breakage of delivery flange are properly secured.

7. Starting

7.1 Preliminary information before starting

The starting of the pump-motor unit must be performed by qualified and experienced personnel. For starting operations you must also refer to the documentation provided with the motor. Before starting the pump-motor unit, carry out a final check on hydraulic connections. Never run the pump without water; dry functioning, even brief, can destroy the hydraulic components.

Activate all security procedures and check the efficiency of the protections. Isolate the area within a radius of 2 metres and avoid access to unauthorized persons.

7.2 Bearings lubrication

The pumps described in this manual are available in 2 different executions. While the pumps without bearings do not require preventive checks, **pumps with oil lubricated bearings are supplied without oil and, before starting, it is necessary to proceed with oil filling. The quantity and type of oil is specified in tab. 3.**

7.3 Starting

To correctly start the pump-motor unit, proceed as follows:

- Carefully fill the pump body and the suction pipes checking that no air is trapped inside. If possible turn the shaft manually maneuvering the coupling.
- Start the pump-motor unit with gate valve slightly open.
- With running pump, gradually open the gate valve to obtain the desired operating performance.
- On pumps equipped with gland packing, make sure that the packing leaks approx. 20 to 60 drops per minute to allow adequate cooling and shaft lubrication. If necessary, adjust the flow slowly and progressively loosening or tightening the packing nuts (this adjustment must be performed with running pump): **careful not to touch moving parts**.

The pump operation must stay within the limits and must take place without abnormal vibration and noise. Maintain the data provided on the operating plate. The use of the pump with different data can cause irreparable damage.

Pump					Europa range	Oil quantity [ml]	Oil type		
Flange SAE 1	Flange SAE 2	Flange SAE 3	Flange SAE 4	Flange SAE 5			Ambient temperature up to 35°	Ambient temperature over 35°	Arab countries
			F42K65-22	F52K65-22	●	800	SAE 10W/20	SAE 30	SAE 15W/50
			F42K65-32	F52K65-32	●	800			
		F32K65-42	F42K65-42	F52K65-42	●	800			
	F23K80-45	F33K80-45	F43K80-45	F53K80-45	●	800			
	F23K80-60	F33K80-60	F43K80-60	F53K80-60	●	800			
	F23K80-60	F33K80-60	F43K80-60	F53K80-60	●	800			
	F23K80-60	F33K80-60	F43K80-60		●	800			
	F23K80-90	F33K80-90	F43K80-90	F53K80-90	●	800			
	F23K80-90	F33K80-90	F43K80-90		●	800			
	F23K80-90	F33K80-90	F43K80-90		●	800			
	F23K100-120	F33K100-120	F43K100-120		●	800			
	F24K100-120	F34K100-120			●	2500			
	F23K100-160	F33K100-160	F43K100-160		●	800			
	F24K100-160	F34K100-160			●	2500			
				F52K65		800			
	F23K65	F33K65	F43K65			800			
				F52K80		800			
	F23K80	F33K80	F43K80			800			
	F23K100	F33K100	F43K100			800			
	F23K100	F33K100	F43K100			800			
	F23K100	F33K100	F43K100			800			
	F23K100H	F33K100H	F43K100H			800			
	F23K100H	F33K100H	F43K100H			800			
	F24K125	F34K125				2500			
	F24K125	F34K125				2500			
	F24K125	F34K125				2500			
	F24K125	F34K125				2500			
	F24K150	F34K150				2500			
	F24K150	F34K150				2500			
	F24K150	F34K150				2500			
	F24K150	F34K150				2500			
		FS33P80AM	FS43P80AM			800			
	FS23P100M	FS33P100M	FS43P100M			800			
	FS23P105	FS33P105	FS43P105			800			
	FS23P100K	FS33P100K	FS43P100K			800			
	FS23P125	FS33P125	FS43P125			800			
	FS24P125K	FS34P125K				2500			
	FS24P125KA	FS34P125KA				2500			
	FS24P150K	FS34P150K				2500			
	FS24P150KA	FS34P150KA				2500			
	FS23QN150	FS33QN150	FS43QN150			800			
	FS23SN200	FS33SN200	FS43SN200			800			
		FS33S250	FS43S250			800			
FN14SF100-400						800			
FN14SF125-315						800			
FN14SF125-400						800			
FN14SF150-315						800			
FN14SF150-400						800			
	FN24SF100-400					800			
	FN24SF125-315					800			
	FN24SF125-400					800			
	FN24SF150-315					800			
	FN24SF150-400					800			
		FN34SF100-400				800			
		FN34SF125-315				800			
		FN34SF125-400				800			
		FN34SF150-315				800			
		FN34SF150-400				800			
FN15SF150-500						800			
FN15SF200-315						800			
FN15SF200-400						800			
FN15SF250-315						800			
FN15SF250-400						800			
	FN25SF150-500					800			
	FN25SF200-315					800			
	FN25SF200-400					800			
	FN25SF250-315					800			
	FN25SF250-400					800			
		FN35SF150-500				800			
		FN35SF200-315				800			
		FN35SF200-400				800			
		FN35SF250-315				800			
		FN35SF250-400				800			

tab. 3

8. Maintenance

8.1 Bearings lubrication

For pumps provided with oil lubrication bearings, you must provide oil replacement after the first 80 hours of operation. It is necessary to repeat this operation every 400 / 1000 operation hours. Provide oil replacement also in case of sudden oil lowering.
For oil replacement refer to **tab. 3.**
DON'T WASTE THE ENVIRONMENT WITH USED OIL.

When the pump remains inactive for a long period (especially during cold seasons), drain out the water from the drainage plug in order to prevent freezing damages. It is advisable to protect the rotating internal parts with antirust oil (without solvent) and, when possible, rotate the pump shaft periodically by hand.

9. Off service and demolition

In case of dismantling and demolition, the pump components are not so dangerous and do not require special precautions. In order to facilitate recycling, all materials composing electrical system and thermoplastic components shall be separated from the machine.

INFORMATION TO USERS - under Article 13 of Law 25, July 2005, n° 151 "Implementation of Directives 2002/95/EC, 2002/96/EC and 2003/108/EC: Restriction of the use of certain Hazardous Substances in electrical and electronic equipment and Waste of Electrical and Electronic Equipment"

Suitable separate collection, followed by decommissioned pump recycling, treatment and environmentally-sound disposal, helps to avoid possible negative effects on health and the environment and promotes re-use and/or recycling of the materials of which the equipment is made. Owners who dispose of the product illegally will be liable to the administrative penalties envisaged by the regulations in force. In case of off service and demolition, follow scrupulously the local antipollution norms. Proceed to the differentiated disposals according to the following brief list of the different materials composing the pumps in the standard version.

Support - Pump body - Impeller - Diffuser	**Cast iron**
Shaft - Screws	**Steel**

DON'T WASTE THE ENVIRONMENT WITH OUT OF USE MATERIALS

10. Spare parts

In order to see spare parts tables or to order spare parts please refer to the spare parts catalog "**Rovatti Spares Pro**" available on **www.rovatti.it.**

11. Troubleshooting

It is important to always check that the installation complies with current regulations and that the operating conditions comply with the specifications for which the pump was purchased (refer to the identification plate fixed on the machine). The following is a diagram indicating the most frequent faults and their possible causes / remedies. For any further information contact the Rovatti Service Centres.

Faults	Possible causes	Remedies
Insufficient capacity	Inadequate pump or pipeline	Contact the installer of the pumping unit
	Pump or pipeline inadequately filled or with airpockets	Eliminate air from pump and pipeline
	Excessive suction head	Contact the installer of the pumping unit
	Worn hydraulic components	Contact Assistance Service
	Incorrect pumped liquid	Stop the pumping unit and contact Assistance Service
Inexistent flow	Inadequate pump or pipeline	Contact the installer of the pumping unit
	Pump or pipeline inadequately filled or with airpockets	Eliminate air from pump and pipeline
	Excessive suction head	Contact the installer of the pumping unit
Water leakages from and gaskets	Worn or damaged gaskets	Contact Assistance Service for gaskets replacement
Water leakages from pump shaft seal	Gland packing insufficiently tightened or too worn	Check the gland packing condition and tightening
	Damaged mechanical seal	Contact Assistance Service for replacement
	Gland packing in unsuitable material	Contact Assistance Service for replacement
Noise or vibrations	Pump or pipeline inadequately filled or with air pockets	Eliminate air from pump and pipeline
	Excessive suction head	Contact the installer of the pumping unit
	Excessive wearing of hydraulic components	Contact Assistance Service
	Pump and motor misaligned or wrongly coupled	Contact the installer of the pumping unit
	Vibrations due to pipe resonance	Contact the installer of the pumping unit
	Missing bearings lubrication	Check oil quantity and integrate if necessary
	Unbalanced rotor	Contact Assistance Service
	Defective or worn bearings	Contact Assistance Service for replacement
Pump overheating	Gland packing too tightened	Loosen the gland packing
	Insufficient capacity	Open the discharge valve to increase the capacity
Bearings overheating	Excessive wearing of hydraulic components	Contact Assistance Service
	Pump and motor misaligned or wrongly coupled	Contact the installer of the pumping unit
	Insufficient/excessive bearings lubrication	Check oil quantity and integrate if necessary
Sudden oil level lowering	Damaged bearing or wear ring	Stop the pumping unit and contact Assistance Service

Appendice - Annex - Annexe - Anhang - Anexo

Livello di pressione sonora media ad 1 metro di distanza dalla pompa in campo libero
Average sound pressure level at 1-metre distance from the pump in an open field
Niveau de pression sonore moyenne à 1 mètre de distance de la pompe en champ libre
Durchschnittlicher Geräuschpegel der installierten Pumpe gemessen in ca. 1 m Entfernung im freien Feld
Nivel de presión acústica mediana a 1 metro de distancia de la bomba en campo libre

Serie - Series - Série - Baureihe - Serie
FL

Potenza motore - Motor power Puissance moteur Motorleistung - Potencia del motor **[kW]**	**3600 min^{-1} db [A]**	**3000 min^{-1} db [A]**	**2600 min^{-1} db [A]**
1,1	< 70	< 70	< 70
1,5	< 70	< 70	< 70
2,2	< 70	< 70	< 70
3	< 70	< 70	< 70
4	< 70	< 70	< 70
5,5	< 70	< 70	< 70
7,5	< 70	< 70	< 70
9,2	< 70	< 70	< 70
11	70	< 70	< 70
15	71	< 70	< 70
18,5	72	< 70	< 70
22	73	70	< 70
30	74	71	70
37	-	72	-
45	-	73	-

Serie - Series - Série - Baureihe - Serie
FK

Potenza motore - Motor power Puissance moteur Motorleistung - Potencia del motor **[kW]**	**2300 min^{-1} db [A]**	**1450 min^{-1} db [A]**
1,1	< 70	< 70
1,5	< 70	< 70
2,2	< 70	< 70
3	< 70	< 70
4	< 70	< 70
5,5	< 70	< 70
7,5	< 70	< 70
9,2	70	< 70
11	70	< 70
15	71	< 70
18,5	72	70
22	73	71
30	74	72
37	75	73
45	76	74
55	76	75
75	77	76
90	77	76
110	78	77
132	78	77

Se il livello di rumorosità deve essere garantito, aggiungere +3db per tolleranze di misura e costruttive
If the noise level is to be guaranteed, please add +3db for measure or constructive tolerance
Si le niveau sonore doit être garantie, ajouter +3db pour tolérances de mesure et de construction
Muss der geräuschpegel gewährleistet werden, so sind 3 db als toleranz für messung und konstruktion hinzuzufügen
Si se debe garantizar el nivel sonoro, sumar + 3 db en concepto de tolerancia de medición y/o construcción

Appendice - Annex - Annexe - Anhang - Anexo

Livello di pressione sonora media ad 1 metro di distanza dalla pompa in campo libero
Average sound pressure level at 1-metre distance from the pump in an open field
Niveau de pression sonore moyenne à 1 mètre de distance de la pompe en champ libre
Durchschnittlicher Geräuschpegel der installierten Pumpe gemessen in ca. 1 m Entfernung im freien Feld
Nivel de presión acústica mediana a 1 metro de distancia de la bomba en campo libre

Serie - Series - Série - Baureihe - Serie
FK Europa

Potenza motore - Motor power Puissance moteur Motorleistung - Potencia del motor **[kW]**	**2600 min^{-1} db [A]**	**2000 min^{-1} db [A]**	**1450 min^{-1} db [A]**
1,1	< 70	< 70	< 70
1,5	< 70	< 70	< 70
2,2	< 70	< 70	< 70
3	< 70	< 70	< 70
4	< 70	< 70	< 70
5,5	< 70	< 70	< 70
7,5	< 70	< 70	< 70
9,2	< 70	< 70	< 70
11	< 70	< 70	< 70
15	< 70	< 70	< 70
18,5	< 70	< 70	< 70
22	70	< 70	< 70
30	71	70	< 70
37	72	71	70
45	73	72	
55	73	73	
75		74	
90		74	

Serie - Series - Série - Baureihe - Serie
FP - FQ - FS

Potenza motore - Motor power Puissance moteur Motorleistung - Potencia del motor **[kW]**	**2600 min^{-1} db [A]**	**2000 min^{-1} db [A]**	**1450 min^{-1} db [A]**
1,1	< 70	< 70	< 70
1,5	< 70	< 70	< 70
2,2	< 70	< 70	< 70
3	< 70	< 70	< 70
4	< 70	< 70	< 70
5,5	< 70	< 70	< 70
7,5	< 70	< 70	< 70
9,2	< 70	< 70	< 70
11	< 70	< 70	< 70
15	70	< 70	< 70
18,5	71	70	< 70
22	71	70	< 70
30	72	71	70
37	73	72	72
45	75	74	72
55	76	75	73
75	77	76	74
90	77	76	74
110	78	77	75
132	78	77	76

Se il livello di rumorosità deve essere garantito, aggiungere +3db per tolleranze di misura e costruttive
If the noise level is to be guaranteed, please add +3db for measure or constructive tolerance
Si le niveau sonore doit être garantie, ajouter +3db pour tolérances de mesure et de construction
Muss der geräuschpegel gewährleistet werden, so sind 3 db als toleranz für messung und konstruktion hinzuzufügen
Si se debe garantizar el nivel sonoro, sumar + 3 db en concepto de tolerancia de medición y/o construcción

Appendice - Annex - Annexe - Anhang - Anexo

Livello di pressione sonora media ad 1 metro di distanza dalla pompa in campo libero
Average sound pressure level at 1-metre distance from the pump in an open field
Niveau de pression sonore moyenne à 1 mètre de distance de la pompe en champ libre
Durchschnittlicher Geräuschpegel der installierten Pumpe gemessen in ca. 1 m Entfernung im freien Feld
Nivel de presión acústica mediana a 1 metro de distancia de la bomba en campo libre

Serie - Series - Série - Baureihe - Serie FNSF		
Potenza motore - Motor power Puissance moteur Motorleistung - Potencia del motor **[kW]**	**1750 min^{-1} db [A]**	**1450 min^{-1} db [A]**
1,1	< 70	< 70
1,5	< 70	< 70
2,2	< 70	< 70
3	< 70	< 70
4	< 70	< 70
5,5	< 70	< 70
7,5	< 70	< 70
9,2	< 70	< 70
11	< 70	< 70
15	< 70	< 70
18,5	< 70	< 70
22	< 70	< 70
30	< 70	< 70
37	72	71
45	73	72
55	74	73
75	75	74
90	76	75
110	77	76
132	77	76
162	78	77
200	79	78
250	80	79

Se il livello di rumorosità deve essere garantito, aggiungere +3db per tolleranze di misura e costruttive
If the noise level is to be guaranteed, please add +3db for measure or constructive tolerance
Si le niveau sonore doit être garantie, ajouter +3db pour tolérances de mesure et de construction
Muss der geräuschpegel gewährleistet werden, so sind 3 db als toleranz für messung und konstruktion hinzuzufügen
Si se debe garantizar el nivel sonoro, sumar + 3 db en concepto de tolerancia de medición y/o construcción

Appendice - Annex - Annexe - Anhang - Anexo

Istruzioni di montaggio per pompe con accoppiamento cilindrico (-SB)
Mounting instruction for pumps with cylindrical coupling (-SB)
Instructions de montage pour pompes avec accouplement cylindrique (-SB)
Montageanleitung für Pumpen mit zylindrische Kupplung (-SB)
Instrucciones de montaje para bombas con acoplamiento cilíndrico (-SB)

1	**Pulire accuratamente le parti relative all'accoppiamento di pompa e motore ed ingrassare (o ungere) leggermente la sporgenza d'albero.**	Carefully clean the coupling elements of the pump and the coupling elements of the motor and grease the shaft projection.	Nettoyer soigneusement les parties relatives à le couplage de la pompe et du moteur, et graisser (huiler) légèrement la saillie d'arbre.	Die für die Ankopplung der Pumpe bestimmten Teile sorgfältig reinigen und den überstehenden Bereich der Welle leicht schmieren (oder einfetten).	Limpie en profundidad las partes relativas al acoplamiento de la bomba y el motor y engrase (o unte) ligeramente el saliente del eje.
2	**Inserire l'apposito attrezzo di montaggio in dotazione (fig.1) fra l'albero ed il coperchio della pompa (fig. 2).**	Insert the provided assembly tool (fig.1) between the shaft and the pump cover (fig.2).	Insérer l'outil de montage approprié fourni (fig.1) entre l'arbre et le couvercle de la pompe (fig. 2).	Das im Lieferumfang enthaltene Spezialgerät für die Montage (Abb.1) zwischen der Welle und dem Pumpendeckel einführen (Abb.2).	Inserte la herramienta de montaje específica suministrada (fig.1) entre el eje y la tapa de la bomba (fig. 2).
3	**Accoppiare pompa e motore battendo con leggeri colpi di mazzuolo sulla bocca di aspirazione della pompa. Posizionare correttamente la bocca di mandata e serrare a fondo le viti delle flange di accoppiamento.**	Couple pump and motor with light hammer blows on the suction port of the pump. Correctly position the delivery port and tighten the screws of the coupling flanges.	Coupler la pompe et le moteur en battant avec de légers coups de maillet sur la bouche d'aspiration de la pompe. Positionner correctement la bouche de refoulement et serrer à fond les vis des brides de couplage.	Pumpe und Motor koppeln, dafür mit einem Holzhammer leicht auf den Saugstutzen der Pumpe klopfen. Den Austrittstutzen korrekt positionieren und die Schrauben der Kupplungsflansche fest anziehen.	Acople la bomba y el motor, golpeando con golpes ligeros de mazo en la boca de aspiración de la bomba. Coloque correctamente la boca de impulsión y apriete a fondo los tornillos de las bridas de acoplamiento.
4	**Con l'ausilio di un trapano manuale (munito di punta da Ø 6 mm) incidere, attraverso il foro filettato dell'albero pompa, l'albero motore per una profondità di 2 mm. Inserire il grano (M8) avvitando a fondo e bloccarlo con un leggero colpo di punteruolo che intacchi il filetto oppure con appositi liquidi frena-filetto (fig.3).**	With a hand drill (tip Ø 6 mm) puncture, through the threaded hole of the pump shaft, the motor shaft to a depth of 2 mm. Place the dowel pin (M8) screwing tight and lock it with a light drift blow capable to nick the screw thread or with special thread fluids.	À l'aide d'une perceuse manuelle (munie de pointe de Ø 6 mm) peser, à travers le trou fileté de l'arbre de la pompe, l'arbre du moteur sur une profondeur de 2 mm. Insérer le goujon (M8) en vissant à fond et le bloquer avec un léger coup de perçoir qui entaille le filet ou bien avec des liquides freine-filet appropriés (fig.3).	Mit Hilfe eines Handbohrers (mit einer Spitze mit Ø 6 mm) über die Gewindebohrung der Pumpenwelle die Motorwelle bis auf eine Tiefe von 2 mm anbohren. Den Stift (M8) einsetzen, ihn fest anziehen und zum Blockieren leicht mit einem Dorn darauf schlagen, damit er in das Gewinde eingreift, bzw. spezielle Flüssigkeiten zur Hilfe nehmen (Abb.3).	Con la ayuda de un taladro manual (con punta de Ø 6 mm) incida, a través del orificio roscado del eje de la bomba, el eje motor, por una profundidad de 2 mm. Introduzca el tornillo prisionero (M8) enroscando a fondo y bloquéelo con un golpe ligero de punzón para que se adhiera la rosca o bien, con líquidos seguros de roscas (fig.3).
	IMPORTANTE: togliere l'attrezzo di montaggio (fig. 1) prima di procedere con le operazioni successive.	IMPORTANT: Remove the assembly tool (fig. 1) before proceeding with subsequent operations.	IMPORTANT : enlever l'outil de montage (fig. 1) avant de procéder aux opérations suivantes.	WICHTIG: Bevor mit den nächsten Schritten fortgefahren wird, muss das Montagegerät (Abb.1) entfernt werden.	IMPORTANTE: retire la herramienta de montaje (fig. 1) antes de proceder con las operaciones sucesivas.

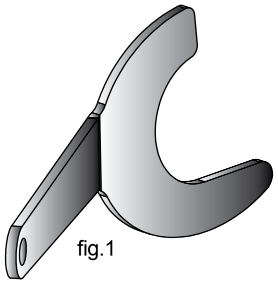


fig.1

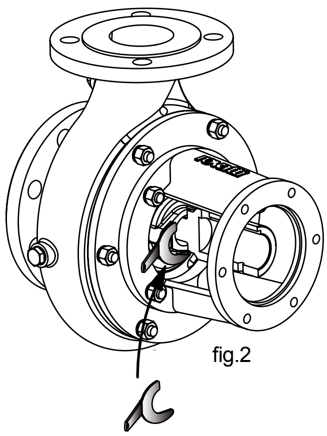


fig.2

Lato motore
Motor side
Côte moteur
Motorseite
Lado motor

Lato pompa
Pump side
Côte pompe
Pumpenseite
Lado bomba

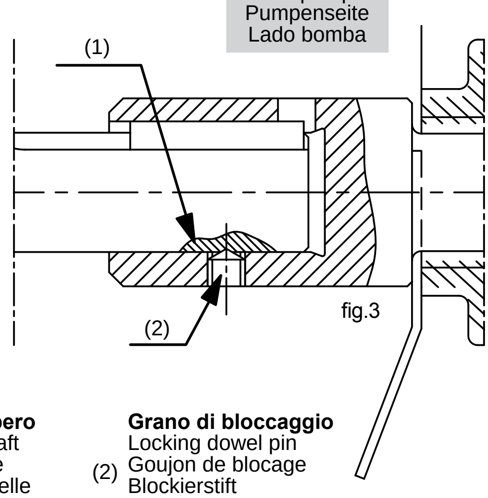


fig.3

(1) **Incisione sull'albero**
Etching on the shaft
Incision sur l'arbre
Anbohrung der Welle
Incisión en el eje

(2) **Grano di bloccaggio**
Locking dowel pin
Goujon de blocage
Blockierstift
Tornillo prisionero de bloqueo

Dichiarazione CE di Conformità
EC Declaration of Conformity
Déclaration CE de Conformité
Konformitätserklärung CE
Declaración CE de Conformidad

Ai sensi dell’**allegato II A** - della Direttiva **2006/42 CE**
According to **Annex II A** - Directive **2006/42 EC**
Conformément à l’**annexe II A** - Directive **2006/42 CE**
Gemäß **Anhang II A** - Richtlinie **2006/42 CE**
De acuerdo con el **anexo II A** - Directiva **2006/42 CE**

ROVATTI A. & FIGLI POMPE S.p.a.
via Trento n° 22/24 - 42042 FABBRICO (RE) - ITALY

dichiara, sotto la propria responsabilità, che le macchine:
declare, under their responsibility, that the machines:
déclare, par la présente et sous sa propre responsabilité, que que les machines:
erklärt unter eigener Verantwortung, daß die Maschinen:
declara, bajo propia responsabilidad, que las máquinas:

FL - FK - FP - FQ - FS - FNSF

Sono conformi alla Direttiva Macchine **2006/42/CE** e, dove applicabile,
agli standard **EN-ISO 12100**, **EN 809**

Are in conformity with the provisions of the Machine Directive **2006/42/CE** and, where applicable,
to the standards **EN-ISO 12100**, **EN 809**

Sont conformes à la Directive Machines **2006/42/CE** et, le cas échéant,
aux normes **EN-ISO 12100**, **EN 809**

Den Richtlinien für Maschinen **2006/42/CE** und ggf.
die Normen erfüllen **EN-ISO 12100**, **EN 809**

Corresponde a las exigencias básicas de la Directiva Máquinas **2006/42/CE** y, si procede,
a las normas **EN-ISO 12100**, **EN 809**

Si rammenta che la presente dichiarazione perde validità in caso di modifiche sulla macchina eseguite senza l’approvazione scritta del fabbricante
We must inform you that this declaration becomes void in the event of any modification of the machine without prior written approval of the manufacturer
Il est rappelé que la présente déclaration perd sa validité dans le cas où ce matériel serait modifié sans l’accord écrit de la société signataire
Es wird darauf hingewiesen, dass vorliegende Erklärung ungültig wird falls Änderungen an der Maschine ohne schriftliche Genehmigung des Herstellers vorgenommen werden
Se recuerda que la presente declaración pierde su validez en caso de manipulación de la máquina sin acuerdo escrito del constructor

Fascicolo tecnico presso - Technical file at - Dossier technique auprès de - Technische Unterlagen bei - Expediente técnico en

Rovatti A. & Figli Pompe S.p.A. - Via Trento, 22 / 24 - 42042 - Fabbrico - Reggio Emilia - Italy

Direzione Tecnica
TIZIANO GALAVOTTI

ROVATTI A. & FIGLI POMPE S.P.A.
Direzione Generale
ANDREA ROVATTI

fig.3

rovatti pompe

Products you can rely on

MGPF185R1

HEADQUARTERS:
42042 FABBRICO (REGGIO EMILIA)
ITALY
Tel +39 0522 66 50 00
Fax +39 0522 66 50 20
info@rovatti.it
www.rovatti.it

2000 DIVISION:
42047 ROLO (REGGIO EMILIA)
ITALY
Tel +39 0522 66 72 17 / 0522 66 72 25
Fax +39 0522 66 09 79
info@rovatti.it
www.rovatti.it

IPERSOM DIVISION:
42042 FABBRICO (REGGIO EMILIA)
ITALY
Tel +39 0522 66 08 15
Fax +39 0522 66 02 70
info@rovatti.it
www.rovatti.it

COMPANY WITH QUALITY SYSTEM CERTIFIED BY DNV GL = ISO 9001 =

CE