



# AQUAFIT

MONOBLOC ELECTRIC PUMPS

**OPERATING INSTRUCTION**



## **Gruppo Aturia S.p.A.**

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# FOREWORD, WARRANTIES AND LIMITATIONS

## 1) FOREWORD

The purpose of this instruction manual is to ease as much as possible the installation, operation and servicing of AQUAFIT monobloc centrifugal pumps. We strongly recommend to read it attentively and to consult it whenever work is done on the pump. Inobservance of the instructions here reposted or improper use of the pump by unskilled personnel may result in heavy damage to things and/or injuries to the person due to the presence of moving parts, pressurized fluids and electrical connections.

**MARELLI technical assistance is readily available: for any doubt or possible problem, please contact us also by phone.**

## 2) VERIFICATION OF SHIPMENT.

Check the equipment at delivery against the accompanying documents, paying particular attention to its completeness and to possible damages occurred during transportation. The same should be done for any ancillary equipment.

## 3) WARRANTY AND LIMITATIONS.

The warranty does not include possible damages or failure caused by mishandling, wrong electrical connections and incorrect assembling; the warranty also excludes in all cases reimbursements for the equipment or for "major damage".

We declines any responsibility for damages to persons and things due to improper use of the machinery here described.

Consumables are not subject to warranty.

# CHAPTER 1

## GENERAL DESCRIPTION

### 1.1 Construction Features

AQUAFIT pumps are centrifugal horizontal pumps coupled by means of a spindle to a three-phase totally enclosed asynchronous motor with external ventilation for motor cooling. Pump casing is provided with fastening feet for pumps with motor up to size 132; for bigger motor sizes B3/B5, the pump is without feet.

Sealing is ensured by a mechanical shaft seal.

Typical performances refer to continuous duty with clear water (specific weight: 1,000 kg/m<sup>3</sup>) with a manometric suction head of 2 meters if not otherwise specified.

For higher heads, please contact MARELLI to check for the pump best suited to the service.

Pump nameplate reports the following data:

- Manufacturer
- Pump type
- Serial number
- Delivery (litres per minute)
- Head (meters)
- Month/year of construction
- Break power (in kW)
- Rounds per minute (min-1)

### 1.2 Applications

AQUAFIT pumps are mainly employed in the following applications:

- Heating and air conditioning systems.
- Water lifting from lakes, rivers, wells, etc.
- Irrigation system on ground surface or by sprinkling.
- Water supply for small communities or isolated houses.
- Pressure systems.

AQUAFIT pumps should always operate within the following operating limits:

- Max operating pressure: 10 bar.
- Max liquid temperature: +130°C
- Min liquid temperature: - 10°C
- Max ambient temperature: +40°C
- Max liquid viscosity: 5°E
- Max n° of startups/hour: 20 (at regular intervals)

ATTENTION: Condensate may develop inside the motor.

### 1.3 Noise levels

The following table reports the noise level produced by AQUAFIT pumps running within their operating limits and installed according to the instructions given in this manual. (Average values measured at 1 meter from the pump and elaborated according to ISO curve A – standard R1680.

MOTOR POWER (kW)	POLES	NOISE LEVELS dB(A)
0,25 – 2	2	< 70
3	2	72
4 – 6,3	2	78
7,5 – 15	2	80
18,5 – 22	2	81
30 – 37	2	83
0,25 - 9	4	< 70

## CHAPTER 2

### TRANSPORT AND STOTAGE

#### 2.1 Transport

Before transportation, please perform the following checks:  
Weight of pumps/motor unit  
Overall dimensions of pump/motor unit  
Suitability of lifting points.

The electric pump can be dispatched in the following ways:

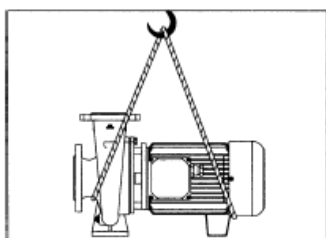
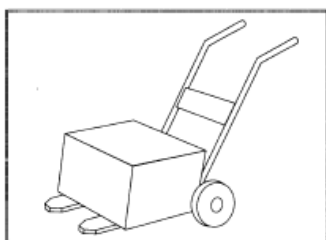
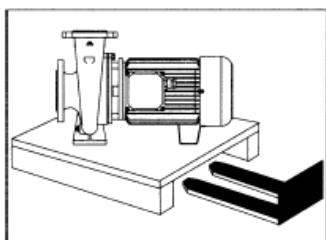
- A) Box
- B) Single pallet
- C) Pallet with other pumps

The pump should be transported in horizontal position and handled with equipment suited to its weight and to the shape of its packing (see side pictures).

Lifting by hand is allowed only for weights lower than 20 kilograms.

#### 2.2 Storage

During storage, please observe the following precautions:  
Store the pump in a dry, sheltered environment.  
Check that ambient temperature never falls lower than 5°C.  
Restore the motor after long storage (more than 6 months).



## CHAPTER 3

### GENERAL SAFETY INSTRUCTIONS

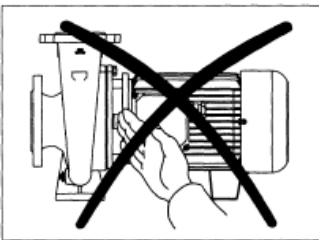
#### 3.1 General Instructions

The pump(s) should be used only for the applications specified in par. 1.2. Recommended operational limits must be strictly observed. In case of applications not specified on this manual, please contact MARELLI to check for pump suitability, installation safety and pump life.

We recommended to install the pump in a safe place.

#### ATTENTION

In case of emergency, switch off line voltage and warn service personnel.



#### 3.2 Precautions during Operation

Never put your hands or any kind of object into pump openings where the shaft rotates (see side picture). Protect motor and electric parts in general according to current regulations.

If warm is pumped, do not touch the pump.

#### 3.3 Residual Risks

Take care not to:

Kick the pump.

Pressurize the pump beyond recommended limits.

Use the pump improperly.

Damage the pump by wrong handling.

## CHAPTER 4

### INSTALLATION

#### 4.1 Installation

For what concerns handling and installation, please refer to section 2.1.

the pump can be bolted in position through the openings in its feet or in motor feet, or fastened straight to piping (see pictures).

Pipes should always be connected so to avoid any kind of stress to the pumps. Suction pipe should be absolutely airtight, with a diameter larger or (at most) equal to the pump suction nozzle diameter.

Fluid velocity inside the piping should never exceed 2 mt./sec At suction and 3 mt./sec. at delivery.

In suction pipes, absolutely avoid slopes toward the pump as that could form harmful air bubbles; if necessary, use wider bends. In case of suction from basins, install a foot valve with strainer. We recommended the use of gate valves upstream and downstream the pump. Leave enough space for motor ventilation.

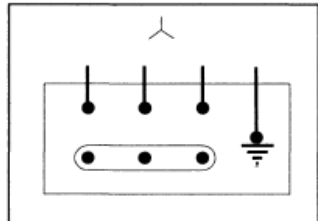
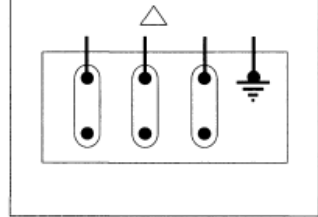
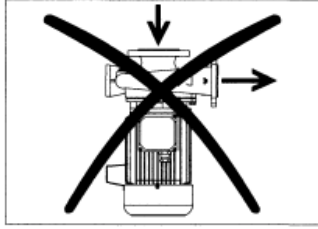
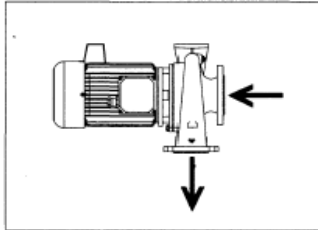
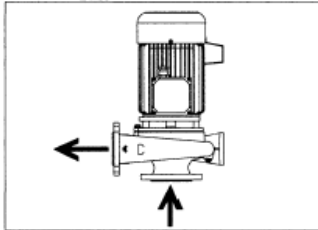
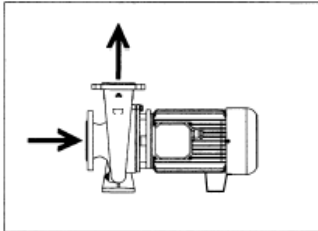
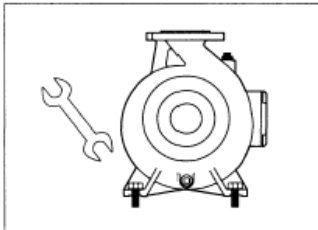
#### 4.2 Electrical Connections

Electrical connections should be made only by specialized personnel, strictly following the instructions of pump and electrical equipment manufacturers.

Remove terminal board cover by unscrewing its screws. connect electrical lines as shown in the picture aside and inside the terminal board.

#### NOTE

We recommended to install upstream the motor a safety switch to protect the motor against voltage drop or overload. Please refer to voltage data on motor nameplate for its correct sizing.



## CHAPTER 5

### COMMISSIONING AND START-UP

#### 5.1 Start-up

Before starting the pump it is necessary to prime it, i.e. to fill with liquid pump and suction pipe through the suited filling hole.

In case of double-impeller pumps, bleed trapped air by means of the suited bleeding valve (see picture).

Check rotation direction against the arrow on pump/motor casing (see picture); if motor rotation does not match the one show by the arrow, reverse motor phases (in case of a three-phases motors).

Once the pump has been primed, close delivery gate valve, start the pump and open slowly delivery gate valve (startup with gate valve closed reduces starting voltage peak).

#### ATTENTION

Never leave delivery gate valve closed for more Than a minute as the pump can dangerously overheat. Avoid dry running.

During operation, check shaft seal: it is a mechanical seal, and therefore there should be no leaks.

Check also that the pump runs within its operating limits and that voltage values reported on control panel do not exceed motor nameplate rated values. If necessary, partially close gate valve or adjust pressure switches intervention.

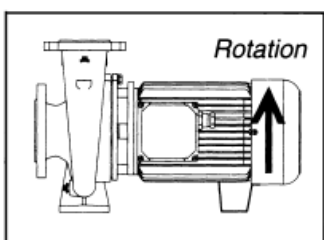
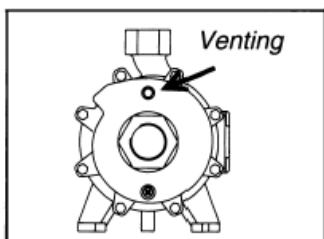
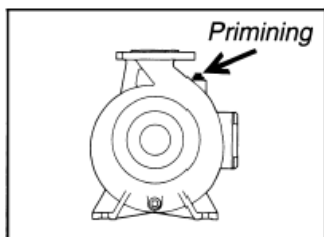
A slight dripping from the mechanical seal is quite normal and should not be of concern.

However, if some malfunctioning is detected during startup, stop immediately the pump and investigate the problem starting with the Fault Finding chart (chapter 7).

#### ATTENTION

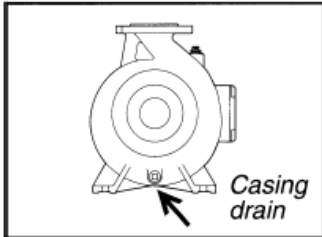
The system should be fully completed before starting the pump, especially for what concerns electrical, mechanical and hydraulic component. All safety system must be correctly operating.

**Junction box cover must always be fixed on motor.**





## CHAPTER 6



### MAINTENANCE

#### 6.1 Ordinary Maintenance

Once started the pump, check it as frequently as possible by means of system instrumental like pressure gauges, vacuum meters and ammeters. The pump needs normally no maintenance, except a periodical check for:

Absorbed power, suction head and final pressure.

Mechanical seal operation (there should be no leaks).

Bearing operation.

If a danger of frost exists, drain the pump completely during idle periods in winter.

Before starting the unit again, make sure the rotor is not jammed or clogged by scales or similar. If so, turn the motor fan with a screwdriver till the rotor can freely turn.

As far as the cooling system are concerned, make sure that no condensate has developed inside the motor, otherwise place the motor in vertical position and make exhaust holes shields to release condensate. This operation must be carried out by skilled personnel only.

Pumps and system can now be primed again as described In chapter 5.1.

# CHAPTER 7

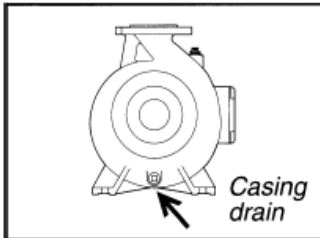
## FAULT FINDING

PROBLEM	PROBABLE CAUSE	REMEDY
1.  THE PUMP GIVEN NO WATER	1.1 PUMP AND SUCTION PIPE NOT WELL PRIMED, WITH AIR TRAPPED IN THE SYSTEM.	PRIME AGAIN PUMP AND SUCTION PIPE.
	1.2 AIR ENTER THE SYSTEM THROUGH SUCTION PIPE OPEN TAPS.	CORRECT INSTALLATION.
	1.3 SUCTION HEAD TOO HIGH.	CORRECT INSTALLATION.
	1.4 WRONG ROTATION DIRECTION.	SEE PAR. 5.1
	1.5 THE TOTAL HEAD REQUIRED BY THE SYSTEM IS HIGHER THAN RATED PUMP HEAD.	THE PUMP IS NOT SUITED TO THE DUTY REQUIRED.
2.  UNSUFFICIENT DELIVERY	2.1 FOREIGN BODIES AT IMPELLER CHANNELS OR THE SAME CAUSES AS POINTS 1.1, 1.3, 1.4, 1.5.	REMOVE THE CAUSES.
	2.2 UNDERSIZED SUCTION PIPE VALVE, OR WRONG POSITIONING OF SUCTION PIPE.	CORRECT INSTALLATION.
	2.3 WORN IMPELLER AND/OR PUMP CASING.	SEE CHAP.8.
3.  UNSUFFICIENT PRESSURE	3.1 LIQUID VISCOSITY HIGHER THAN SPECIFIED AND/OR THE SAME CAUSES AS POINT 1.4, 1.5, 2.3.	PUMP NOR SUITED TO THE VISCOSITY AND/OR REMOVE THE CAUSES.

<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
4. EXCESSIVE BREAK POWER	4.1 PUMP PERFORMANCES ARE DIFFERENT THAN RATED.	DELIVERY GATE VALVE PARTIALLY CLOSED..
	4.2 LIQUID SG HIGHER THAN SPECIFIED.	PUMP NOT SUITED TO THE SERVICE OR DELIVERY GATE VALVE PATIALLY CLOSED.
	4.3 ABNORMAL INTERNAL RUBBING (ROTATING PARTS RUB AGAINST FIXED PATRS).	REPAIR THE PUMP, SEE CHAP. 8.
5. THE SEAL LEAKS EXCESSIVELY	5.1 WORN MECHANICAL SEAL.	SEE CHAP. 8.
	5.2 WORN SHAFT AT MECH SEAL POSITION.	REPAIR THE PUMP, SEE CHAP. 8.
6. THE PUMP VIBRATES AND IT IS NOISY	6.1 UNBALANCED ROTATING ASSEMBLY.	REPAIR THE PUMP, SEE CHAP. 8.
	6.2 MOTOR BEARINGS FAILURE.	SEE CHAP. 8.
	6.3 THE PUMP RUNS WITH TOO LOW OR TOO HIGH CAPACIT; ALSO THE SAME CAUSES AS POINTS 1.3, 2.1, 2.2.	OPERATE THE PUMPS DIFFERENTLY; REMOVE THE CAUSES OF THE MISFUNCTIONING.
	6.4 PUMP AND/OR PIPING NOT FIRMLY FASTENED.	CORRECT INSTALLATION.

## CHAPTER 8

### REPAIRING THE PUMP



#### Before disassembling the pump

Switch off line voltage.

Close suction and delivery gate valves.

Leave the pump cool off line in case warm liquid has been pumped.

Drain the pump through the suited draining hole (see picture).

#### Removing the pump from installation

A) Full remove from the installation:

Remove bolts from suction and delivery flanges.

Remove all screws fastening the pump to the ground and lift it with a suited hoist (see section 2). For repairing, please send the pump to the manufacturer or to an authorized shop.

B) Partial remove from the installation

Unscrew the screw between pump casing and lantern and remove assembly motor/lantern cover/impeller without removing the pipes to which pump casing remains connected. For double impellers pumps, however, it is necessary to remove also the delivery casing.

Use a suited hoist when moving/lifting the pump; see section 2.

C) Mechanical seal replacement

When replacing the mechanical seal, ensure the complete cleaning of each part and use all necessary care to avoid damaging the seal by knocks, jolts, cutting edges, etc. Take care not foul sealing faces, especially with grease or oil.

To re-install the pump, please refer to section 4 and 5.

## CHAPTER 9

### SPARE PARTS

#### 9.1 Spare parts ordering

For a faster processing of your order, when ordering spare parts please specify:

- Pump type
- Pump serial number
- Part name and number as listed on sectional drawing
- Pump type and serial number are as easily found on pump nameplate.

## CHAPTER 10

### DECOMMISSIONING AND DISMANTLING

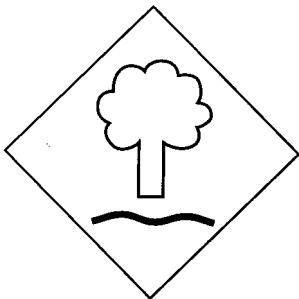
#### 10.1 Dismantling

When the pump will be stopped and dismantled, the various materials composing it should be properly disposed of. It is important to make sure that no residual polluting liquids are trapped within the pump.

The materials used in pump construction are:

- Steel and cast iron
- Aluminum
- Rubber and plastic
- Copper and brass

The disposal of polluting liquids and materials should follow current environment regulations. Environment protection is an increasingly pressing problem.

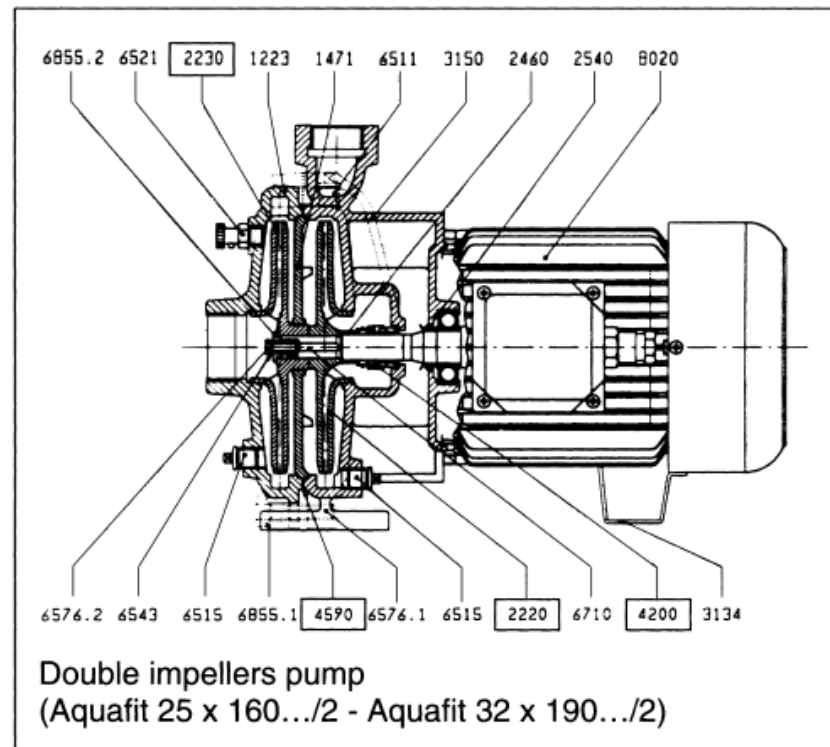
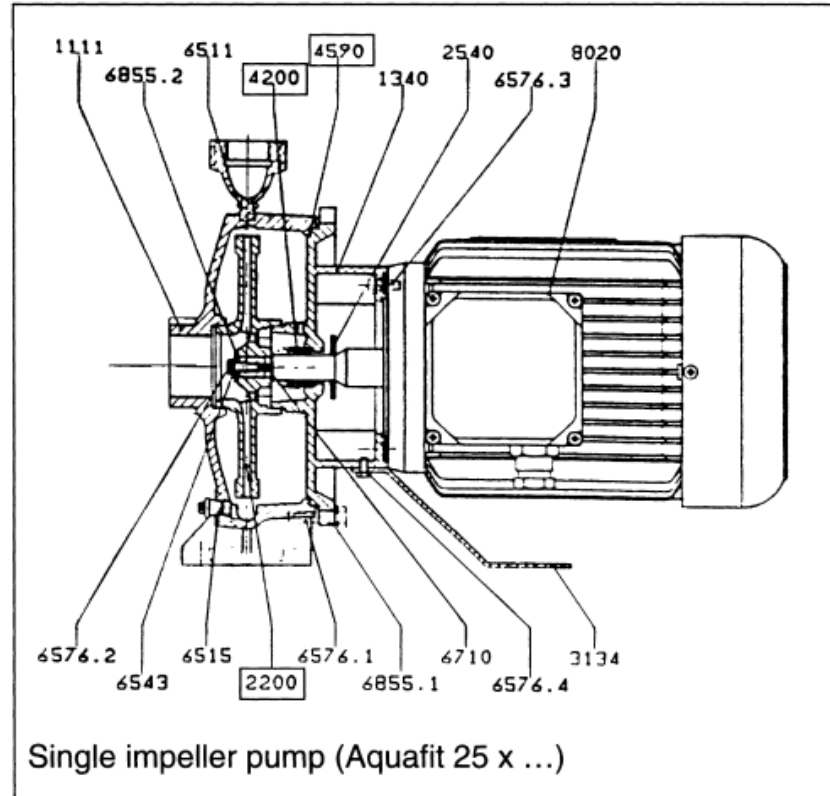


# SECTIONAL VIEWS

- 1111 - Pump casing
- 1222 - Gland cover
- 1223 - Suction cover
- 1340 - Lantern-cover
- 1340.1 Lantern
- 1471 - Diffuser plate
- 2200 - Impeller
- 2220 - Clockwise impeller
- 2230 - C.clockwise impeller
- 2460 - Spacer ring
- 2540 - Baffle
- 2912 - Impeller nut
- 3134 - Mounting foot
- 3150 - Pump casing
- 4200 - Mechanical seal
- 4590 - Gasket
- 6511 - Filling plug
- 6515 - Drain plug
- 6521 - Venting plug
- 6543 - Spring washer
- 6576.1 - Hexagonal head screw
- 6576.2 - Hexagonal head screw
- 6576.3 - Hexagonal head screw
- 6576.4 - Hexagonal head screw
- 6580 - Hexagonal nut
- 6710 - Tab
- 6855.1 - Washer
- 6855.2 - Washer
- 8020 - Motor

Recommended spare parts

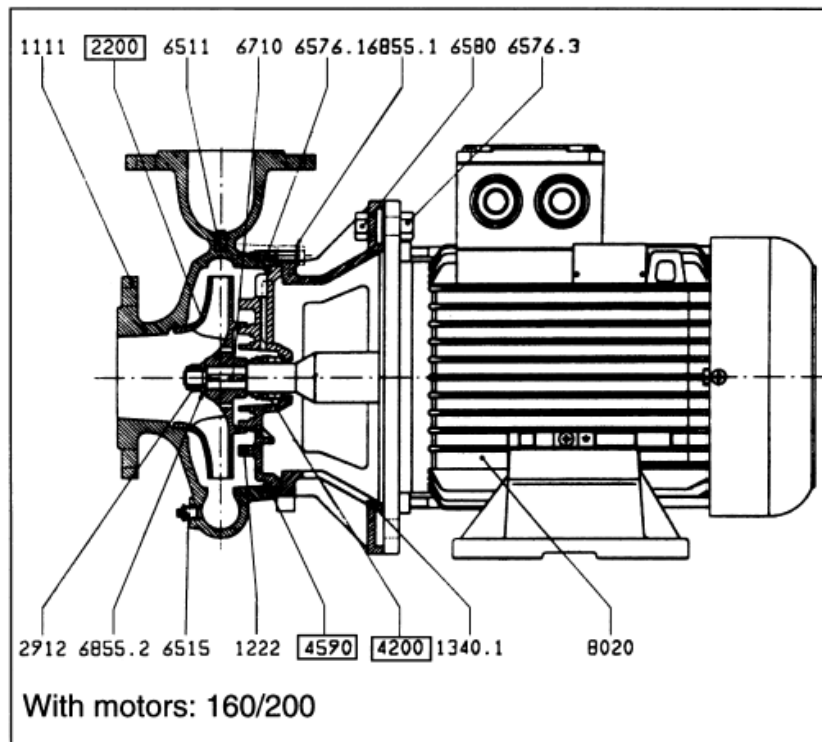
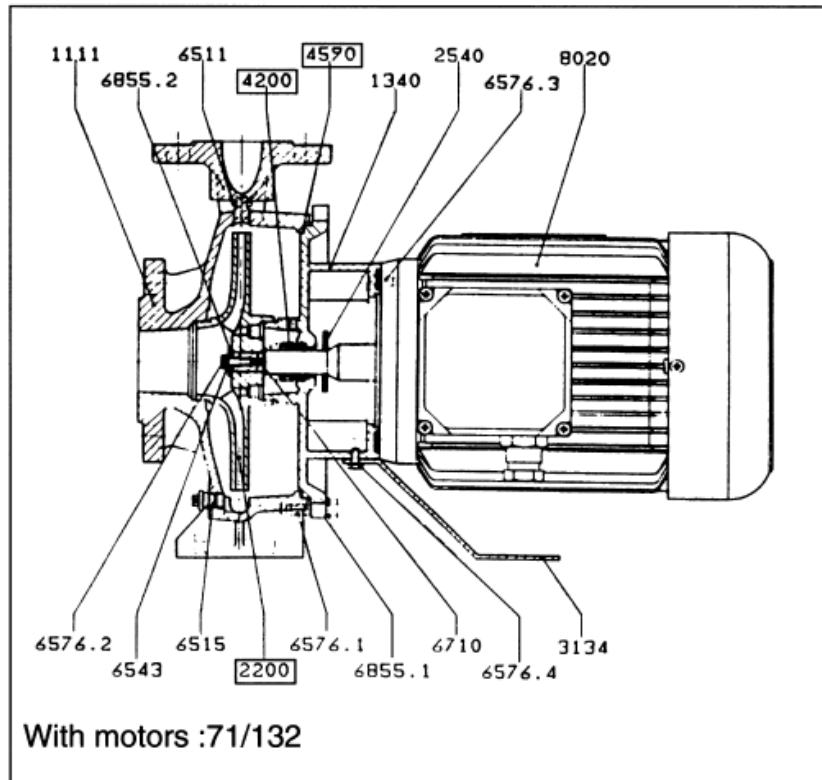
## Threaded versions



## Flanged versions

- 1111 - Pump casing
- 1222 - Gland cover
- 1223 - Suction cover
- 1340 - Lantern-cover
- 1340.1 Lantern
- 1471 - Diffuser plate
- 2200 - Impeller
- 2460 - Spacer ring
- 2540 - Baffle
- 2912 - Impeller nut
- 3134 - Mounting foot
- 3150 - Pump casing
- 4200 - Mechanical seal
- 4590 - Gasket
- 6511 - Filling plug
- 6515 - Drain plug
- 6521 - Venting plug
- 6543 - Spring washer
- 6576.1 - Hexagonal head screw
- 6576.2 - Hexagonal head screw
- 6576.3 - Hexagonal head screw
- 6576.4 - Hexagonal head screw
- 6580 - Hexagonal nut
- 6710 - Tab
- 6855.1 - Washer
- 6855.2 - Washer
- 8020 - Motor

Recommended spare parts



**DICHIARAZIONE DI CONFORMITA'**  
( secondo allegato II A - Direttiva Macchine 2006/42/CE )  
**DECLARATION OF CONFORMITY**  
( according to enclosure II A - Machinery Directive 2006/42/EC )

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**Sezione 1**  
*Section 1*

**DESCRIZIONE MACCHINA**  
*Machinery Description*

Costruttore  
*Manufacturer*

**GRUPPO ATURIA S.p.A.**

Tipo  
*Type*

**AQUAFIT**

Descrizione  
*Description*

**Elettropompa centrifuga MONOBLOCCO**  
*Monobloc centrifugal electric pump*

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**Sezione 2**  
*Section 2*

**NORME / DIRETTIVE APPLICABILI**  
*Applicable Directives / Standards*

Direttiva Macchine            2006/42/CE  
*Machinery Directive*        2006/42/EC

Norma Armonizzata        UNI EN 809  
*Harmonised Standard*      *UNI EN 809*

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**Sezione 3**  
*Section 3*

**DICHIARAZIONE**  
*Declaration*

Noi, Gruppo Aturia S.p.a. /Piazza Aturia,9 /Gessate/ Mi/, dichiariamo che é garantita la conformità ai requisiti essenziali di sicurezza e di tutela della salute della Direttiva Macchine 2006/42/CE.

*We, Gruppo Aturia S.p.a. /Piazza Aturia,9/Gessate/ Mi/, declare that is in conformity with all the essential health and safety requirements of the Machinery Directive 2006/42/CE.*

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**RESPONSABILE**  
*Authorized/Responsible Officer*

Firma  
*Signed*

  
\_\_\_\_\_  
*Gallieni Ing. Stefano*

data/date:            04/2011

Qualifica  
*Title*

Direttore Generale  
*General Manager*

**Persona Giurudica Responsabile del Fascicolo Tecnico**  
*Legal Person Responsible of Technical File*

Gruppo Aturia S.p.A.  
P.zza Aturia, 9 – 20060 Gessate (MI) - Italy

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**GRUPPO ATURIA s.p.a. - 20060 - Piazza Aturia, 9 Gessate, Mi (Italy) Tel.02/95423.200 - Fax. 02/95423.202**





**REGULATION (EU) N. 547/2012 of 25-06-2012 implementing Directive 2009/125/CE**

We, **GRUPPO ATURIA S.p.a. – P.za Aturia, 9 – Gessate (MI) – Italy**, declare under our exclusive responsibility that the following directive *integrates* the EC Declaration of Conformity contained in the present manual of instructions.

Minimum efficiency index:  $MEI \geq 0,40$

The benchmark for most efficient water pumps is  $MEI \geq 0.70$

The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with the full impeller diameter. The trimming of the impeller will adapt the pump to a fixed duty point, leading to reduced energy consumption. The minimum efficiency index (MEI) is based on the full impeller diameter.

The operation of this water pump with variable duty points may be more efficient and economic when controlled, for example, by the use of a variable speed drive that matches the pump duty to the system.

information on benchmark efficiency is available at :

[[www.europump.org](http://www.europump.org)].

Benchmark efficiency graph for  $MEI = 0.7$  and  $MEI = 0,4$  for this pump can be found at :

[[www.europump.org/efficiencycharts](http://www.europump.org/efficiencycharts)]

Gessate (MI), 01/01/2015



Stefano Gallieni

CEO Gruppo Aturia