

## INSTALLATION AND OPERATING INSTRUCTIONS

### Starkan MF



**Please read all these notes carefully,**

#### CE CONFORMITIES:

For Declaration of Conformities refer to Armstrong.

#### INTRODUCTION

1. This leaflet contains specific information regarding the safe installation, operation and maintenance of Starkan MF pumps.
2. These instructions must be read and understood by anyone responsible for the installation, operation and maintenance of this equipment.
3. Our equipment has been designed and constructed to be safe and without risk to health and safety when properly installed, used and maintained, providing that our instructions are carefully adhered to. If in doubt contact Armstrong, quoting the serial number.

#### WARNING SYMBOLS



Safety instruction where an electrical hazard is involved.



Safety instruction where non-compliance would affect safety.



Safety instruction relating to safe operation of the equipment.  
(ATTENTION)

#### INSTRUCTIONS FOR SAFE USE



1. No installation of this equipment should take place until this leaflet has been studied and understood.
2. Handling, transportation and installation of this equipment should only be undertaken with the proper use of lifting gear.

#### TEMPERATURE



Where under normal operating conditions, the limit of 68°C (restricted zone) for normal touch, or 80°C (unrestricted zone) for unintentional touch, may be experienced, steps shall be taken to minimise contact or warn operators/users that normal operating conditions will be exceeded.

#### NOISE LEVELS



Maximum sound pressure level less than 70dB(A) @ 1 metre

#### STORAGE

1. Store in a dry place.
2. Protect against dirt, damage and frost.
3. If units are to be stored for long periods then the shaft should be rotated by hand every three months.
4. When handling the single-phase circulator, do not use the capacitor housing for lifting.

#### GENERAL

##### 1.1 Applications

For faster circulation of water in collective central heating, air-conditioning, hot water, boiler return, and hot-water primary-loop exchanger or medical or sanitary water heater circuits.

##### 1.2 Specifications

###### Secondary Hot Water Systems

Minimum suction head (m.w.g) versus operating temperature. °C

Type	82°	95°	110°
MF22-02, MF22-06, MF22-08	1.5M	3.0M	10M

- (a) Max. service pressure: 10 bar.
- (b) Water temperature: 60°C loop.  
Temperature 110°C at circulator.
- (c) Ambient temperature up to +40°C.
- (d) Water-glycol mixture: up to 50% (a).

###### Heating Systems

Minimum suction head (m.w.g.) versus operating temperature. °C

Type	82°	95°	100°
MF22-05, MF22-06	1.5M	3.0M	10M

- (a) Max. service pressure: 10 bar.
- (b) Water temperature: -10 to +110°C.
- (c) Ambient temperature: up to +40°C.
- (d) Water -glycol mixture up to 50% (a).

Minimum suction head (m.w.g) versus operating temperature. °C

Type	82°	95°	110°
MF32-07	3.0M	6.0M	13M
MF32-08, MFT32-05, MFT32-08	2.0M	3.0M	10M

- (a) Max. service pressure: 10 bar.
- (b) Water temperature: -20 to + 110°C.
- (c) Ambient temperature: up to + 40°C.
- (d) Water-glycol mixture: up to 50% (a).

Minimum suction head (m.w.g.) versus operating temperature. °C

Type	70°	90°	110°	130°C
MF32-10, MF52-11, MFT52-11	8.0M	12M	19M	32M
MF42-07, MFT42-07 MF62-09, MFT62-09	5.0M	9.0M	16M	29M
MF42-10, MFT42-10	9.0M	13M	20M	33M
MF52-04, MFT52-04, MF62-07, MFT62-07	3.0M	7.0M	14M	27M
MF52-08, MFT52-08, MF82-07, MFT82-07	7.0M	11M	18M	31M
MF82-12, MFT82-12	10M	14M	21M	34M
MF62-14, MFT62-14, MF82-15, MFT82-15, MF82-20, MFT82-20	12M	16M	23M	36M

- (a) Max. service pressure: 10 bar.
- (b) Water temperature: -20 to + 130°C.
- (c) Ambient temperature: up to +50°C.
- (d) Water -glycol mixture: up to 50% (a).
- (e) Corrosion proofing substances:  
Follow manufacturers directions. □

Correct the hydraulic performance accordingly.

Note: For higher altitudes, add 0.60m for each 500m.  
10.2m/w/g. = 1bar.

## PRODUCTS AND ACCESSORIES

### 1.1 The Pump

Flanged pump casing (except MFX22-02, MFX22-06, MFX32-08, MF22-05, MF22-06, MF32-07, MF32-08, MF32-10, MFT32-05, MFT32-08 which are threaded).

Pressure ports in flanges.

MF, MFX: single pump model.

MFT: two-pump model with non return valve on discharge to allow switching between the pumps.

Motor with wet rotor and built-in thermal overload protection. Self lubricating bushes.

SINGLE PHASE: 230V, MF MFX and MFT models.

THREE PHASE: Three speeds by plug-in selector specific to three phase supply voltage, 230V or 400V.

### 1.2 Accessories

The following are available for an extra charge:

Motor protection circuit-breaker.

Blanking cover (MFT pumps).

Pressure gauge kit.

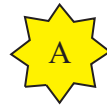
Weld-on round counter-flanges.

Unions.

Anti-vibration sleeves etc.

## INSTALLATION

- (a) Make sure that the circulator is accessible.
- (b) Install directly on a horizontal or vertical pipe.
- (c) The motor shaft axis must always be horizontal.
- (d) Note the direction of flow indicated by the arrows on the flanges or casing.
- (e) Install isolating valves beyond the ports to allow removal of the circulator and other work on it.



**Do not insulate the motor casing. If the pump casing is insulated, make sure that the condensates evacuation holes in the motor flange are not blocked.**

If the double pump (MFT) is installed on a horizontal pipe, with the motor shaft axis horizontal, it will be necessary to switch operation between the pumps from time to time to avoid the formation of an air pocket at the high point of the casing. A bleed device should be connected to the port (1/8" dia.) provided for the purpose.

The terminal box must not be placed in the 6-o' clock position on a chilled water circuit.

**Comment:** The three bosses on the casing are to allow wall mounting; this supports the pump which is heavy from the pipework and avoids crushing the anti-vibration sleeves.

### Electrical Connection



The electrical connection must be made by a licensed electrician and comply with applicable local standards.

- (a) Provide a general switch. (Two for the double circulator).
- (b) Three phase circulators must be connected to a motor protection safety switch.
- (c) Make sure that the supply voltage is right from the motor and provide 10Amp line protection.
- (d) The connection to the terminal box is via a cable gland, which may be on either the right or left side.
- (e) Use a three or four-conductor cable (two or three phases and earth) to connect line power to the terminals.
- (f) Three phase: L1, L2, L3 + Earth. □
- (g) Single Phase: L, N + Earth.
- (h) Terminals 10 and 15 (NC dry contact, 250V, 1 amp) for remoting of a fault reporting signal to a centralized location.



**The power cable must not touch the pipe or the pump; make sure that it is away from any moisture.**

- (i) The single phase circulators are self protected by impedance, and need no external protection. They must be connected to the network via a switch having an opening distance, on each pole of at least 3mm. The power outlet must have an earthing contact. The three phase circulator is delivered set for 400V operation. The voltage must be changed with the pump OFF.

### Choice of Voltage, 3 Phase Motor

- (a) Three phase, 400V sliding ring down.
- (b) Three phase, 230V sliding ring up.

There is no sliding ring on the selector of the single phase motor.

### Choice of Speed

The pump operating speed is coupled to the motor supply voltage.

- Have the speed selected for the mains voltage appear in the window on the back of the terminal box.
- Alternate methods of speed selection on certain pumps are manual selection switch or terminal strip.



**Any error in the voltage damages the motors.**

- On the double models operating in parallel, the motors must both turn at the same speed. Make sure that the same number is showing on the backs of the terminal boxes of both motors.



**To operate on three phase, 230V (240V) power, in 3 speed, cut the protection pin before installing the selector.**

**Note:** MF82-15, MF82-20, MFT82-15, MFT82-20.

The voltage and speed are selected directly as indicated on the top of the selector in the terminal box.

### STARTING UP

#### Filling, Venting



**NEVER OPERATE THE CIRCULATOR WITHOUT IT BEING FILLED WITH WATER.**

- Open the valves on both sides of the circulator and fill installation completely.
- Bleed the circuit at the high point.
- Where a screw plug exists in the motor end cap unscrew the plug a few turns, close it when water runs out and when there are no more air bubbles. Circulators without this end plug are drained automatically.

#### Adjustments

##### Check direction of rotation

This is done using the diodes on the back of the terminal box (inside it on the MF82-15, MF82-20, MFT82-15, MFT82-20).

The direction indicated by the arrow on the diode should match the direction marked on the data plate. If the motor turns the wrong way, reverse two phase wires on the motor terminal block.

- Power up the motor to start the circulator.
- The pump flow rate is adjusted by changing the motor speed using the selector. (see choice of speed).



**Risk of being burnt. In operation, the motor may be hotter than 100°C.**

### SERVICING

The circulator needs no special servicing in operation.

The motor bushes are self-lubricating. If the installation is partially or completely drained for a prolonged shutdown, drain the circulator completely to avoid jamming problems.



**If the motor is removed and re-installed, take care not to damage the casing O ring; if necessary, replace it with a new O ring.**

**Note:** With a double system, make provision for periodic changeovers (Y1200 or similar control box).

### FAULT FINDING



#### Possible Causes and Remedies

**Switch the circulator OFF before doing any work on it. If operating trouble persists contact the nearest Holden Brooke Pullen customer service unit.**

#### The pump fails to start when powered up.

- Check the fuses.
- Check the mains voltage.
- The motor is jammed.
- If the motor is set to an intermediate or slow speed, set the selector to maximum speed.
- If the motor still fails to start when set to maximum speed, disconnect the motor from the pump casing and un-jam the motor by turning the impeller by hand.
- Pumps having plug access in motor can be freed using a flat bladed screwdriver.

#### Motor stops in normal operation

- Check the fuses(rating).
- The thermal relay has tripped. Check its setting against the value given on the data plate.
- Check the current consumption of each phase.
- The motor is jammed by a foreign body (see above). The thermal overload has tripped out (terminals 10-15).
- Check the water temperature.
- Check the power supply.

#### The pump is noisy

- The pump is cavitating because the suction head is too low; increase the pressure in the network.
- Check that the motor is turning in the right direction.
- Check the operating point and speed setting, and if necessary correct the latter.
- Check the bleeding of the installation.

**NOTE:- The use of spare parts not supplied by Armstrong will invalidate guarantee. The units must also be installed and maintained in line with our Operating and Maintenance Manual during the warranty period. Failure to adhere to any of the above will invalidate all guarantees and product responsibility of Armstrong.**

**Under no circumstances should the pumps be used for flushing the system. Such a procedure will invalidate Armstrong guarantee.**

**See page 4 for typical sectional arrangement and methods of mounting Starkan MF pumps.**

