Gefico Enterprise

MHF-350

REHARDENING FILTER

Installation, Operation and Maintenance Manual

PRELIMINARY INFORMATION:

MANUAL EDITION DATE	:	26/01/04
EQUIPMENT NAME	:	REHARDENING FILTER
MODEL	:	MHF-350
MANUFACTURER	:	GEFICO ENTERPRISE,S.L.
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CHAPTER I.- DESCRIPTION

The Fresh Water Maker (desalinator) does not produce drinking water but only distillate with the following characteristics:

*PH	.....	about 6
*Salinity	.....	from 0,5 to 4 ppm expressed as NaCl.
*Presence of gases	.....	O_2 and CO_2

This water, without mineral salts, may be considered as not potable. Also, the distilled water is corrosive to iron, producing quick corrosions on all distribution pipes of this water.

In fact, the carbon dioxide gas that comes from the seawater acid-carbonate decomposition goes off with the distilled vapor and solves into the condensate, putting the **PH** of this water to a value of approx. **6**.

Finally, the lack of calcium considerably reduces the rising power, thus obliging to important water consumption in the personnel and clothes washing.

In order to neutralize the carbon dioxide acid, the water to be treated goes through the rehardening filter which is filling with Alcalite (a porous product of neutralite type). The water filtered through this product permits to neutralize CO_2, according to the reaction:

$$2(H_2CO_3) + MgCa(CO_3H)_2 \text{ ---------- } Mg(CO_3H)_2 + Ca(CO_3H)_2$$

The aggressive carbonic acid contained in the distillate reacts on filtering with activated neutralite to calcium and magnesium bicarbonate. The water is only delivered with substances that are accepted in accordance with the "Regulation about the Addition of External Substances on Preparing Drinking Water" and in accordance with DIN 2000 and DIN 2001.

The rehardening of distillate from a fresh water maker with neutralite increases by approx. 1ºdH/10gr carbonic acid bound off. So, the consumption of rehardening material amounts to approx. 50-70 g/t distillate. Furthermore, the hardness of the neutralized water will be lower than 8ºdH.

As neutralite filter rehardening material acts sensitively contrary to iron and manganese compounds, it is arranged in layers with hydro-anthracite (activate carbon) to maintain its deacidizing function. At same time activate carbon is used to improve the taste eliminating odors of the drinking water.

The sulphate concentration will be lower than 150 p.p.m.

The Potable Water Maker "MHF-350" has a capacity of 8 m3/day with a maximum pressure of 6 bar(g).

The unit vessel is entirely built in AISI 316L Stainless Steel, (only legs for foundation are made in carbon steel) and it is supplied with a complete charge of neutralite and activate carbon.

The filter is provided with top and middle covers for refilling, inspection glass, control valve, drain valve, vent valve, safety valve, back-flush system, insulation valves and all internal connections, ready for installation on board (see enclosed drawings).

The unit is supplied with a pressure gauge, to advice when a back flushing is necessary.

CHAPTER II.- TECHNICAL DATAS

Type	.....	MHF-350
Max. Output	.....……..	8 m3/day
Diameter	……..……..	350 m.m.
Height	……..……	1020.m.
Connections	.....…….....……....	3/4" BSP
Work pressure	.....……..	600 KPa(abs)
Test pressure	.....……..	900 KPa(abs)
Empty weight	…….....……..	45 kgs
Operation weight	.....……..	105 kgs

CHAPTER III.- INSTALLATION

The potable water maker is to be installed between the fresh water maker outlet and the potable water storage tank.

Free space must be left around the unit to be refilling.

The following connections must be done:

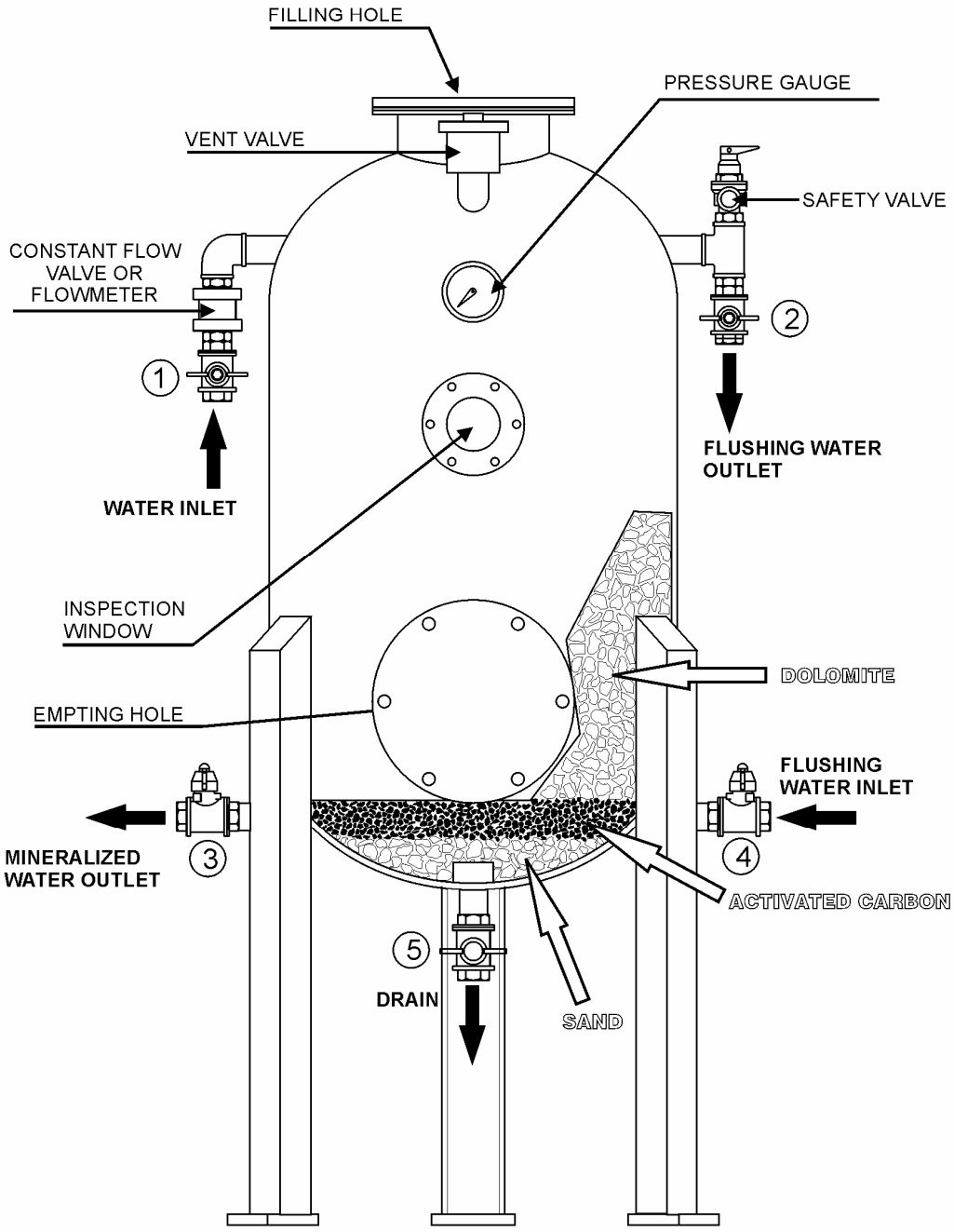
1.- Valve nº1: Distillate water inlet

2.- Valve nº2: Back flushing outlet to bilge

3.- Valve nº3: Mineralized water outlet

4.- Valve nº4: Back flushing inlet water

5.- Valve nº5: Drain to bilge



REV	DATE	DESCRIPTION	BY	CHK	PROJ ENG	ENG MNGR

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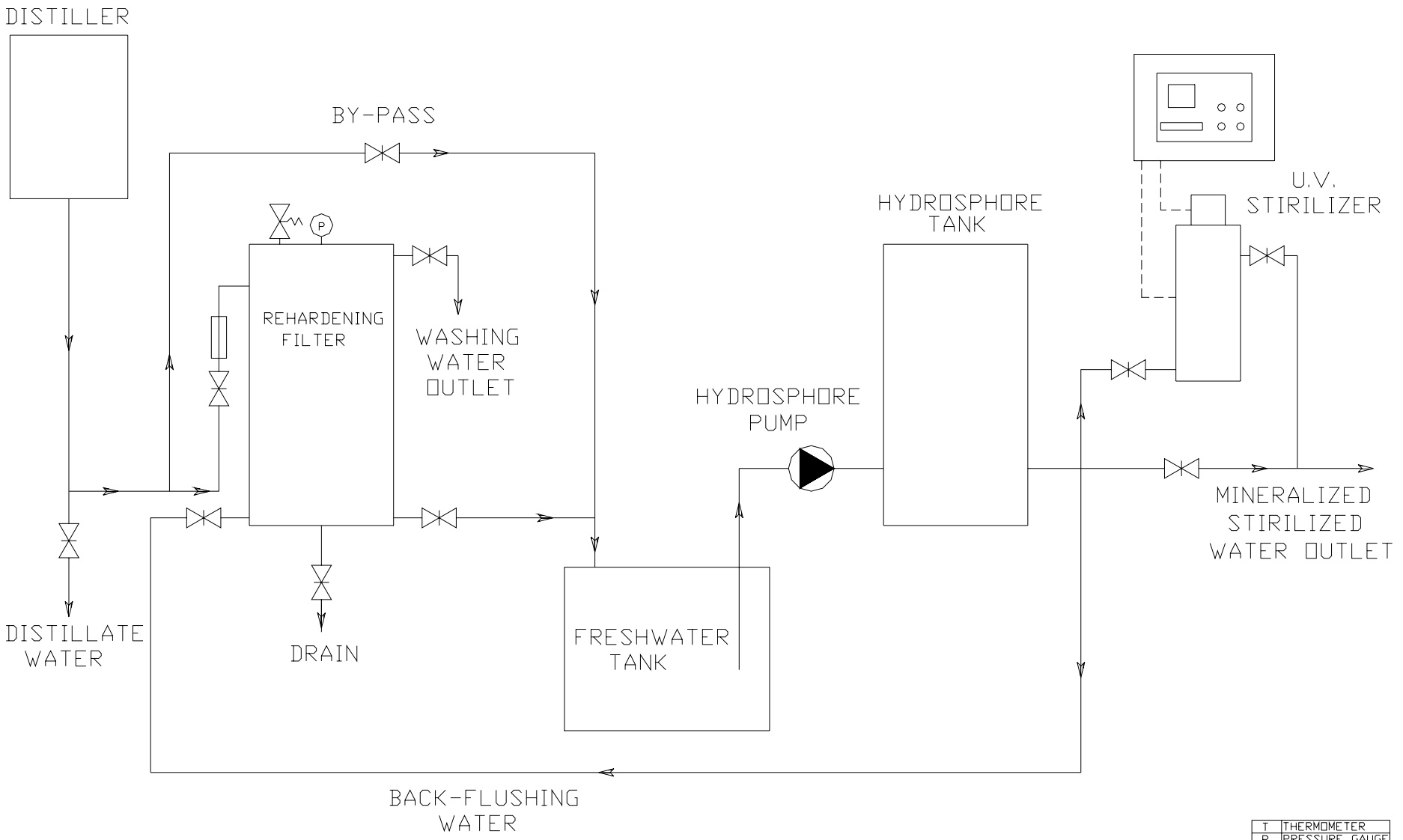
GEFICO DESIGN STANDARD

MHF OPERATION DIAGRAM

DES: A.F.L.	SCALE:	JOB NO.:	DATE:
DR: J. H. M.	DRAWING NO: 05.GE.01.031		
APP: A. LINAR			
APP:			



T	THERMOMETER
P	PRESSURE GAUGE
V	VACUUM GAUGE
F	FLOW METER

GENERAL NOTES

REV.	DATE	DESCRIPTION	BY	CHK	PROJ ENG.	ENG MNGR.

NOTICE

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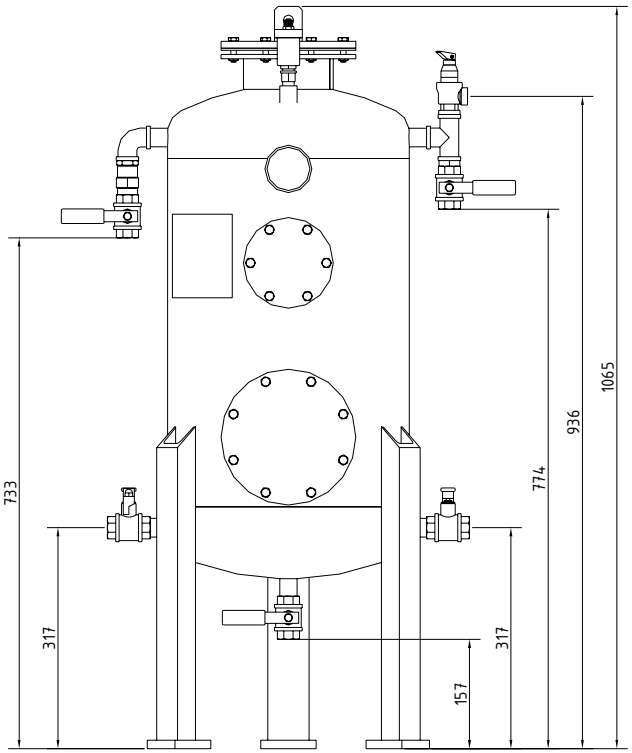
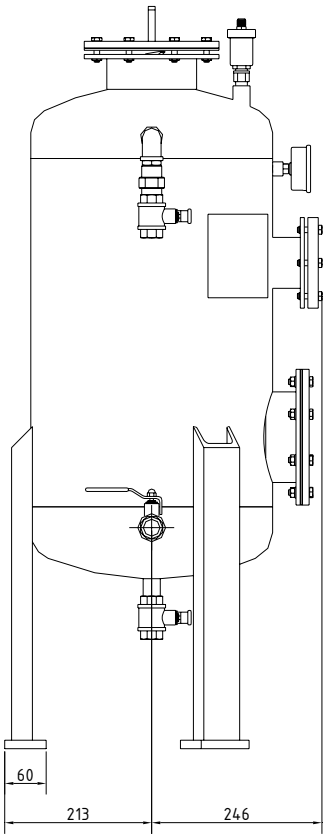
C/GUTEMBERG. LA CORUNA
SPAIN

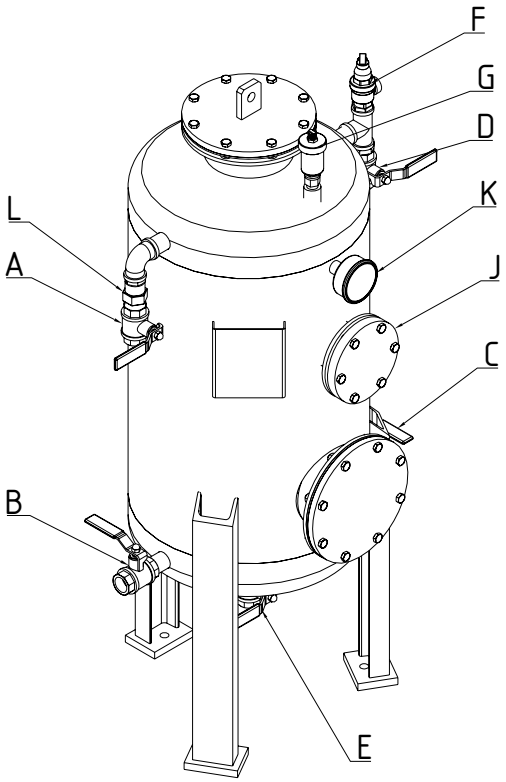
GEFICO DESIGN STANDARD

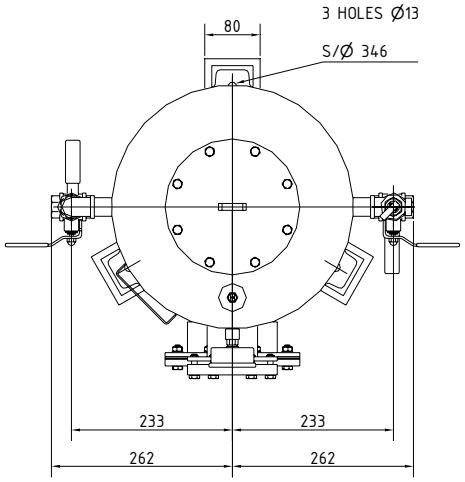
REHARDENING FILTER
MHF
INSTALLATION DIAGRAM II

DES: A.FERNANDEZ	SCALE	REV:	DATE
DR: A.F.L.	DRAWING NO. 05.GE.01.002		
CHECK: A.LINARES			
APP: A.FERNANDEZ			









ITEM	DESCRIPCION	DESCRIPTION	
A	VALVULA ENTRADA	INLET VALVE	3/4"BSP
B	SALIDA AGUA	MINERALIZED WATER OUTLET	3/4"BSP
C	ENTRADA CONTRALAVADO	BACK FLUSH INLET	3/4"BSP
D	SALIDA CONTRALAVADO	BACK FLUSH OUTLET	3/4"BSP
E	VACIADO	DRAIN	3/4"BSP
F	VALVULA SEGURIDAD	RELIEF VALVE	1/2"(6 BAR)
G	VALVULA PURGA	AIR VENT VALVE	3/8"
H	TAPA LLENADO	FILLING COVER	
J	MRILLA INSPECCION	INSPECTION WINDOW	
K	MANOMETRO	PRESSURE GAUGE	1/4"(0-10 BAR)
L	VALVULA CONTROL FLUJO	CONSTANT FLOW VALVE	

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	Fecha	Nombre
Creado	03/10/2005	Agustín Fernández
Revisado	01/03/2007	AFL
Norma		A.FERNANDEZ

Estado	Cambios	Fecha	Nombre

MINERALIZADOR

MHF-350

05.350.01.003

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CHAPTER IV.- OPERATION

The rehardening filter MHF-350 is supplied completely filled with its charge of minerals and activate carbon.

The distillate water, which comes from the fresh water maker outlet, enters into the rehardening filter through valve nº1. This valve permits to regulate the maximum flow (350 l/h), that the filter can treat.

Inside the filter, there is a distributor which distributes the water inside the casing, and avoids that neutralite can go out during back-flushing operation.

The water flows from top to bottom, passing through the neutralite and activate carbon layers, and goes out through valve nº3.

After starting up or refilling, the filtered water should run into the bilge until it is clear. Only the tanks should be filled up then.

Once a week, the filter should be back-flushed, or any time when pressure drop is too big for the fresh water maker pump.

FILTER IN SERVICE: VALVES Nº1 AND Nº3 ARE OPENED
VALVES Nº2, Nº4 AND Nº5 ARE CLOSED

BACK-FLUSHING: VALVES Nº1, Nº3 AND Nº5 ARE CLOSED
VALVES Nº2 AND Nº4 ARE OPENED

CHAPTER V.- MAINTENANCE

5.1.- REFILLING

In order to attain as much as possible a constant rehardening of the distillate, it is necessary to refill the filter only when the filter rehardening material has been consumed down to the sight glass. Then rehardening material is refilled up to the upper welded seam as effected at initial refilling through the top cover.

5.2.- NEW FILLING

If the taste of the water becomes imperfect the whole filling has to be renewed then. The exchange of the total filling would be most suitable to a point of time on which a refilling had to be effected anyhow.

Remove all internal neutralite and activate carbon from the cleaning hole, and clean the inside of the filter. Fill up by the top cover as initial filling.

ACTIVATE CARBON:	2 KG.
NEUTRALITE:	40 KG.

CHAPTER VI.- SPARE PARTS LIST

LISTA DE REPUESTOS / SPARE PARTS LIST

FILTRO MINERALIZADOR “MHF” / REHARDENING FILTER “MHF”

TIPO: MHF 350 / TYPE: MHF 350

ITEM	DESCRIPTION	DESCRIPTION	REF. Nº
A	VALVULA ESFERA DE 3/4”	BALL VALVE G 3/4”	MHF-03-01B
B	VALVULA ESFERA DE 3/4”	BALL VALVE G 3/4”	MHF-03-01B
C	VALVULA ESFERA DE 3/4”	BALL VALVE G 3/4”	MHF-03-01B
D	VALVULA ESFERA DE 3/4”	BALL VALVE G 3/4”	MHF-03-01B
E	VALVULA ESFERA DE 3/4”	BALL VALVE G 3/4”	MHF-03-01B
F	VALVULA SEGURIDAD DE 1/2”	SAFETY VALVE G 1/2”	MHF-03-02
G	VALVULA DE PURGA	AUTOMATIC VENT VALVE	MHF-03-03
H	JUNTA TAPA DE LLENADO	FILLING COVER GASKET	MHF-03-04
I	JUNTA TAPA DE LIMPIEZA	CLEANING COVER GASKET	MHF-03-05
J	JUNTA TORICA MIRILLA	INSPECTION WINDOW O’RING	MHF-03-06
K	MANOMETRO	PRESSURE GAUGE	MHF-03-07
L	VÁLVULA CONTROL CAUDAL	FLOW CONTROL VALVE	MHF-03-08
—	NEUTRALITE (CARGA COMPLETA)	NEUTRALITE (COMPLETE REFILLING)	MHF-03-09
—	CARBON ACTIVADO	ACTIVATE CARBON (COMPLETE REF.)	MHF-03-10
M	CRISTAL MIRILLA	INSPECCION WINDOW GLASS	MHF-03-11
N	TAPA LLENADO	FILLING COVER	MHF-03-12
O	TAPA LIMPIEZA	CLEANING COVER	MHF-03-13
P	CARCASA	VESSEL	MHF-03-14B
•	KIT DE JUNTAS	GASKETS KIT	MHF-03-15

(•) KIT DE JUNTAS FORMADO POR H, I, J. / GASKET KIT CONTAIN H, I, J.