

Instruction Manual

Tetra Plex M, Basic Frame

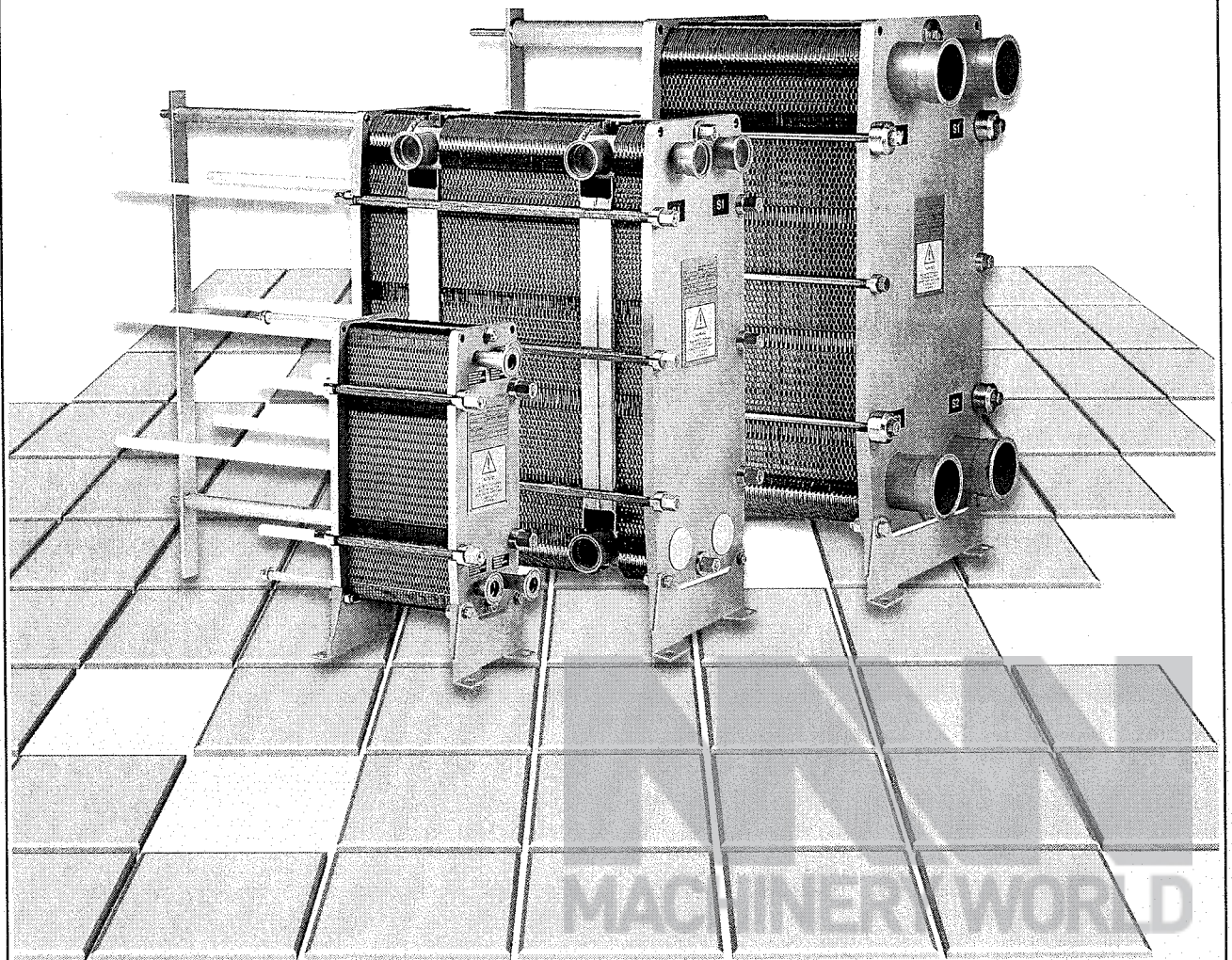
Plate Heat Exchanger

Type

MS3-SBL

Manufacturing No.

30103-22974



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GIVING YOU THE WHOLE PACKAGE WORLDWIDE

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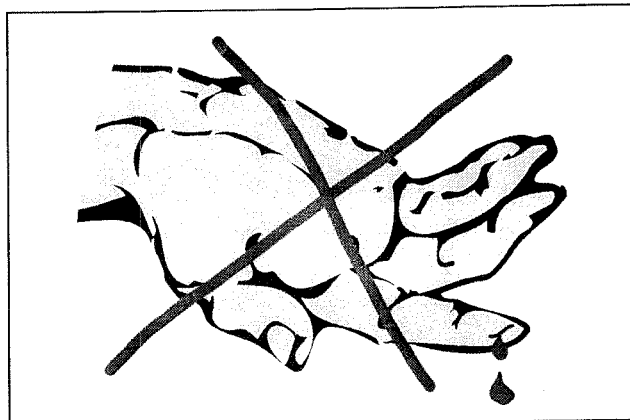
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1. Safety precautions

To avoid injuries and damages, follow the instructions in this manual. Also comply with applicable local safety regulations.

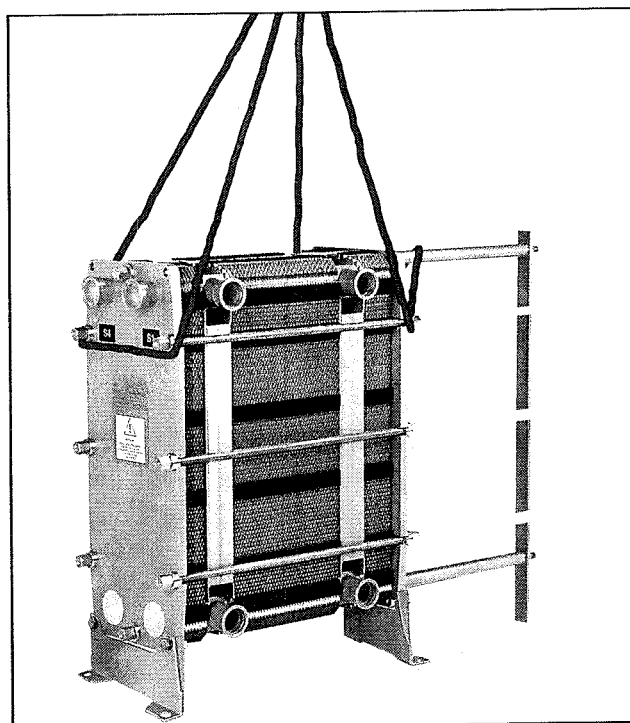
Protective gloves

To avoid hand injuries from sharp edges, protective gloves should always be worn when handling plates and protective sheets.



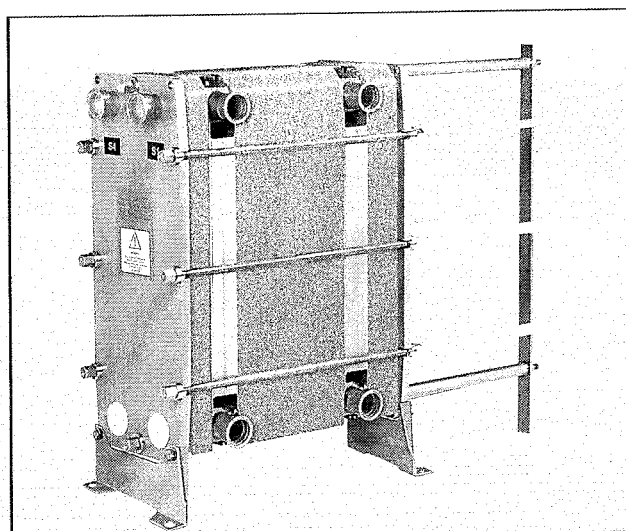
Lifting

Never lift the heat exchanger by the connections or the studs around them. Straps placed around tightening bolts and carrying bar should be used.



Protective sheets

To prevent from injury or damage in case of leakage and spouting liquid or steam, when necessary we can supply protective sheets for all plate heat exchangers.



2. General information

2.1 Application

This plate heat exchanger is used for heating or cooling food or other products with low to medium viscosity. The delivered plate heat exchanger is dimensioned for the specific application, set out in the Data Print, and must not be used in any other way without consulting the supplier.

2.2 Data plate

On the Data Plate, which is fixed to the frame plate, the type of unit, manufacturing number and manufacturing year can be found. The on the plate given working pressure and temperature are only according to the pressure vessel code.

2.3 Unit specific information

Information about this specific unit, identified through the manufacturing number which can be found on the Data Plate as well as on the unit specific information, is provided separately. This information contains the Data Print, a Plate Marking explanation and Parts List.

In all correspondence with the supplier, please refer to the manufacturing number, for true identification of the apparatus.

2.3.1 Plate marking

The plates are identified by one or more markings punched into the plate.

2.3.2 Data Print

The Data Print, which is located in the inside pocket of this manual, gives specific details about the plate pack and should be closely studied.

The first page identifies:

- The manufacturing number
- The type of heat exchanger
- The customer
- Our agent through whom the heat exchanger was purchased
- The supplier
- Measurements and plate installation

The second page specifies:

- The media section by section
- Location of the inlet and outlet connections
- Choice of material in connections, plates and gaskets
- The area of the heat transfer surface
- The plate grouping

On the following page - or pages - is a listing of the plate package, specifying for each plate in sequence from the frame plate to the pressure plate:

- The spare part ordering number
- The corners where holes have been punched
- The flow direction along the plate

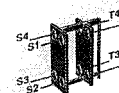
Attached to the Data Print is a design drawing of the plate heat exchanger.

It is important to use the Data Print in all correspondence with the supplier, in order to get a quick and correct answer. If the heat exchanger is rebuilt it is important to notify the supplier so that the Data Prints in our archives can be kept up to date.

2.3.3 Parts List

All parts of the plate heat exchanger are identified by a number. Whenever contacting the supplier about a part, be sure to state its identification number, which is found in Parts List.

Manufactured by	Alfa Laval Thermal, Lund, Sweden
Type	M10-B Base
Serial No.	30103-17488
Year	2000
Calculation dwg.	1628477-2
Volume	25.0 litre
Design press.(g)	6 bar
Design temp.	110 °C



30103-17488 Pg. 1		page no. 1	
Manufacturing No.	30103-17488	Date	2000-12-01
Plate heat exchanger type	2500-113	Quantity	1
Customer		Ref.	
Order No.		Ref.	
Project		Ref.	
Serial		Ref.	
Design		Ref.	
Supplier	ALFA LAVAL THERMAL LTD	Ref.	
Ref. No.	30103-17488	Ref. No.	30103-17488

30103-17488 Pg. 1		page no. 1	
Media	Water	Section no. 1 / A	Section no. 1 / A
Flow rate	8500 m³/h	Flow rate	8500 m³/h
Temp. program	40 to 110 °C	Temp. program	40 to 110 °C
Pressure drop	40 kPa	Pressure drop	40 kPa
Liquid volume	2.5 l	Liquid volume	2.5 l
Location of connections	1.1	Location of connections	1.1
Inlet	1.1	Inlet	1.1
Outlet	1.1	Outlet	1.1
Material in connections	Al-Si 316	Material in connections	Al-Si 316
Plates	2500-113	Plates	2500-113
Heat transfer surface	1.1	Heat transfer surface	1.1
Plate grouping	1.1	Plate grouping	1.1

30103-17488 Pg. 1		page no. 1	
Media	Water	Section no. 2 / A	Section no. 2 / A
Flow rate	8500 m³/h	Flow rate	8500 m³/h
Temp. program	40 to 110 °C	Temp. program	40 to 110 °C
Pressure drop	40 kPa	Pressure drop	40 kPa
Liquid volume	2.5 l	Liquid volume	2.5 l
Location of connections	1.1	Location of connections	1.1
Inlet	1.1	Inlet	1.1
Outlet	1.1	Outlet	1.1
Material in connections	Al-Si 316	Material in connections	Al-Si 316
Plates	2500-113	Plates	2500-113
Heat transfer surface	1.1	Heat transfer surface	1.1
Plate grouping	1.1	Plate grouping	1.1

30103-17488 Pg. 1		page no. 1	
Media	Water	Section no. 3 / A	Section no. 3 / A
Flow rate	8500 m³/h	Flow rate	8500 m³/h
Temp. program	40 to 110 °C	Temp. program	40 to 110 °C
Pressure drop	40 kPa	Pressure drop	40 kPa
Liquid volume	2.5 l	Liquid volume	2.5 l
Location of connections	1.1	Location of connections	1.1
Inlet	1.1	Inlet	1.1
Outlet	1.1	Outlet	1.1
Material in connections	Al-Si 316	Material in connections	Al-Si 316
Plates	2500-113	Plates	2500-113
Heat transfer surface	1.1	Heat transfer surface	1.1
Plate grouping	1.1	Plate grouping	1.1

30103-17488 Pg. 1		page no. 1	
Media	Water	Section no. 4 / A	Section no. 4 / A
Flow rate	8500 m³/h	Flow rate	8500 m³/h
Temp. program	40 to 110 °C	Temp. program	40 to 110 °C
Pressure drop	40 kPa	Pressure drop	40 kPa
Liquid volume	2.5 l	Liquid volume	2.5 l
Location of connections	1.1	Location of connections	1.1
Inlet	1.1	Inlet	1.1
Outlet	1.1	Outlet	1.1
Material in connections	Al-Si 316	Material in connections	Al-Si 316
Plates	2500-113	Plates	2500-113
Heat transfer surface	1.1	Heat transfer surface	1.1
Plate grouping	1.1	Plate grouping	1.1

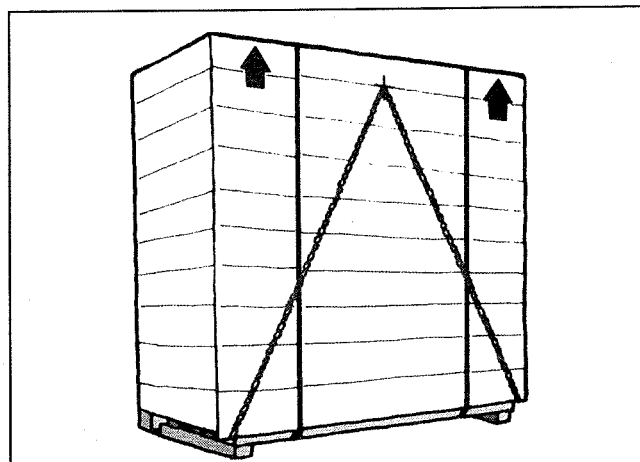
3. Installation

3.1 Lifting

When lifting the unopened packing case, please observe the markings on the case indicating where to place the lifting hooks.

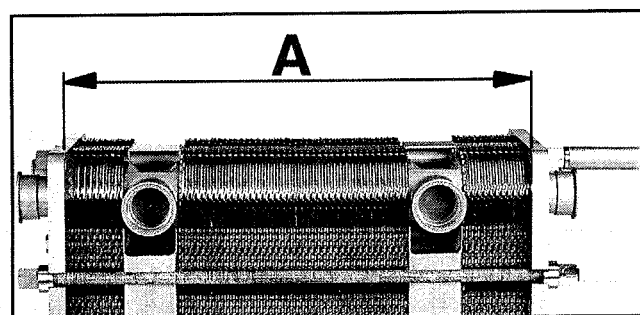
The centre of gravity of the loads is important and is usually marked on the topside of the case; the actual centre of gravity is located on a vertical line directly below this mark. If you are to lift the heat exchanger itself, straps should be used, and they should be placed around tightening bolts and carrying bar (see page 3).

Note: Never lift by the connections or the studs around them!



3.2 Tightening

Check that dimension A is in accordance with the drawing.

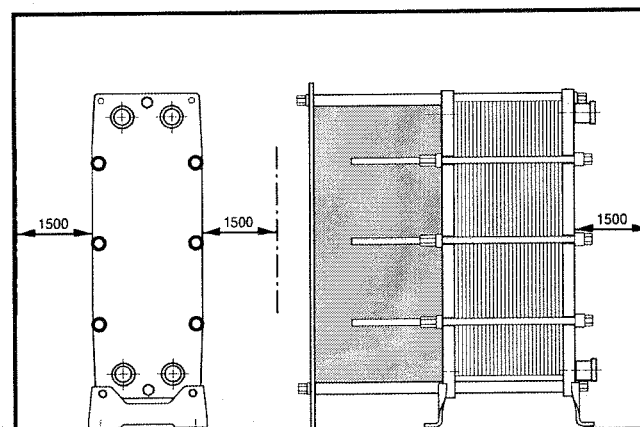


3.3 Piping

Fit the pipes so that tension is not transferred to the heat exchanger.

Pipes connected to the pressure plate and to the connection plates must allow a variation of $\pm 1\%$ of the distance from the connection to the frame plate according to the drawing.

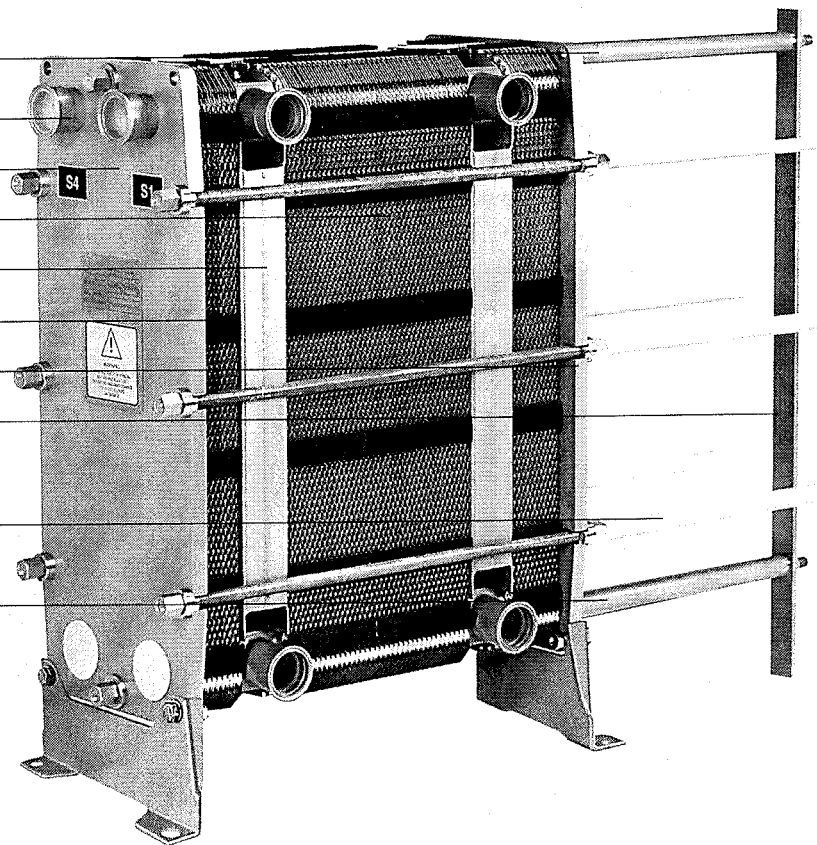
The pressure plate must be moved when the heat exchanger is opened. Therefore no fixed pipes should be fitted inside the shaded area. Use, for example, a short bend directed sideways.



4. The main components

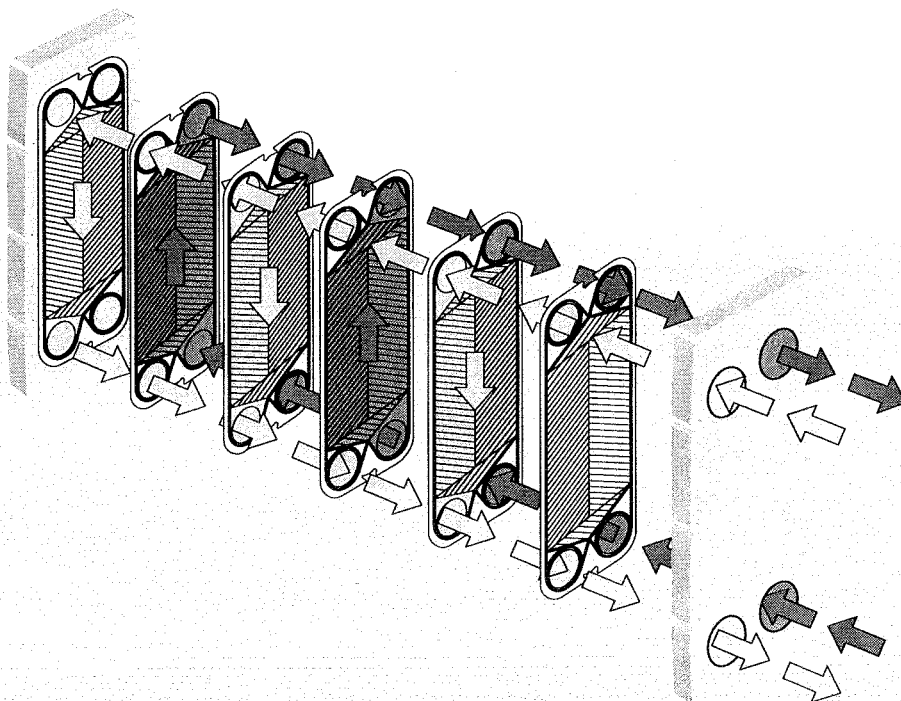
4.1 Main components

1. Carrying bar
2. Connections
3. Frame plate
4. Channel plates
5. Connection plate
6. Gaskets
7. Pressure plate
8. Support column
9. Tightening bolt
10. Guiding bar



4.2 How it works

Working principle and connections of a heat exchanger with counter current and parallel flow.



5. Operation

5.1 Start up and running conditions

Pumps must be started against closed valves and valves operated as smoothly as possible.

Avoid situations where pumps temporarily run empty on the suction side.

In automated installations, program pump starts and stops and actuation of valves, so that the amplitude and frequency of pressure variation is as low as possible. Use efficient dampers at the inlet and outlet of homogenizer connected to the heat exchanger.

Venting of liquid circuits must be considered. Pumps must not draw air into the heat exchanger. When the velocity is low, e.g. for viscous products, venting possibilities at the uppermost points of the circuit may be necessary. It should be possible to vent a tubular holder.

5.1.1 Checking the cleaning result

A new heat exchanger should be opened and the plate surfaces carefully inspected already after the first test run.

5.1.2 Chlorine as a growth inhibitor

Chlorine, commonly used as growth inhibitor in cooling water systems, reduces the corrosion resistance of stainless steels (including SMO).

Chlorine weakens the protection layer of these steels making them more susceptible to corrosion attacks than they otherwise should be. It is a matter of time of exposure and concentration.

In every case where chlorination of non-titanium equipment cannot be avoided, your local representative must be consulted.

Note!

Titanium is not affected by chlorine.

5.2 Cleaning

Immediately after a production cycle, the product side is normally cleaned with lye and / or acid. Sterilisation is performed immediately before starting the next production cycle.

WARNING!

Caustic soda and nitric acid can cause serious injuries to skin and mucous membranes.

Handle with great care! always use protective goggles and protect your hands with rubber.

5.2.1 Cleaning flow rate

The cleaning flow rate should always be at least the same as the production flow rate. Increased flow rate may be required in some cases as e.g. milk sterilisation and processing of viscous liquids or liquids containing particles.

5.2.2 Cleaning agents

1 % by weight NaOH at max. 80 °C. Dissolve 1 kg of caustic soda in 100 litres of water or mix 2.2 litres of 33 % NaOH solution in 100 litres of water.

0.5 % by weight HNO₃ at max. 70 °C. Mix 0.7 litres of 53 % (36Be) nitric acid in 100 litres of water.

Detergents containing wetting and complex-forming agents beside the caustic soda or nitric acid may also be used. The maximal NaOH and HNO₃ concentrations by weight should be respected.

Detergents must be dosed gradually in order to avoid excessive concentration locally and temporarily.

Solid deposits can be removed by opening the heat exchanger and cleaning it with a soft brush and 10% nitric acid.

5.2.3 Checking the cleaning result

A new heat exchanger should be opened and the plate surfaces carefully inspected after the first test run.

If the unit is clean the interval can then be extended according to practical experience. Once a month, usually is regarded as a good practice.

5.2.4 Cleaning of deposits from cooling medium or heating medium

Solid deposits can be removed by opening the heat exchanger and cleaning it with a soft brush and 10% nitric acid.

Note!

Rinse well.

5.2.5 Examples of cleaning programs

Products rich in protein			Products poor in protein			
Coolers		Pasteurisers and other heaters	High content of insoluble components, e.g. nectar and tomato juice		Low content of insoluble components, e.g. beer and wine	
Daily	Weekly	Daily	Daily	Weekly	Daily**	Weekly
Rinsing 5 min Lye 20 min Rinsing 10 min Stop Sterilisation 10 min	Rinsing 5 min Acid 15 min Rinsing 5 min Lye 20 min Rinsing 10 min Stop Sterilisation 10 min	Rinsing 5 min Acid 15 min Rinsing 5 min Lye 20 min Rinsing 5 min* Acid 15 min* Rinsing 10 min Stop	Rinsing 10 min Lye 30 min Rinsing 10 min Stop Sterilisation 10 min	Rinsing 10 min Lye 30 min Rinsing 5 min* Acid 15 min* Rinsing 10 min Stop Sterilisation 10 min	Rinsing 5 min Lye 15 min Rinsing 10 min Stop Sterilisation 10 min	Rinsing 5 min Lye 15 min Rinsing 5 min* Acid 15 min* Rinsing 10 min Stop Sterilisation 10 min

* The need for an additional acid cycle in order to remove chalk deposits depends on the product. In many cases it is possible to carry out cleaning at considerably longer intervals. Sometimes it is possible to eliminate acid cleaning altogether.

** In some cases, where the risk for growth of microorganisms is slight, it is possible to eliminate daily cleaning and replace it by: Rinsing 20 min. - stop - sterilisation 20 min.

5.3 Sterilisation

5.3.1 By heat

Circulate water of 90 °C until all parts of the system have been kept at the required temperature for at least ten minutes. To get all parts, and especially the heating section, at final temperature it is normally necessary to change between forward and return flow.

5.3.2 Chemically

Before introducing the hypochlorite solution, make sure that the equipment is clean and free from deposits and that no acid residues are left.

Dose gradually 100 cm³ of hypochlorite solution, containing max. 150 g/l active chlorine to 100 l of circulation water at a max. temperature of 20 °C.

Treat for five minutes, up to maximum 15 minutes.

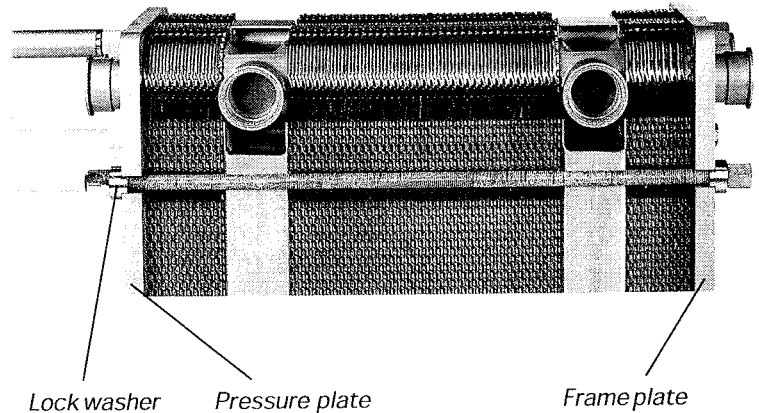
Rinse well after sterilisation.

6. Maintenance and Service

6.1 Opening and closing

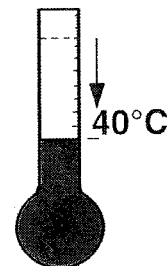
The bolts have one lock washer and one guide washer each. The lock washer is placed under the nut and the guide washer under the bolt head. They are operated from frame plate side with either pneumatic or manual spanner.

(If needed washers can be placed vice versa, but can then only be opened with a manual spanner from pressure plate end).



Before proceeding further:

1. Switch off pumps and steam
2. Close valves and isolate the heat exchanger from the rest of the system
3. Wait until the unit is cooled down (below 40 °C)
4. Drain the heat exchanger
5. Dismantle pipes
6. Remove protecting sheets (use gloves)

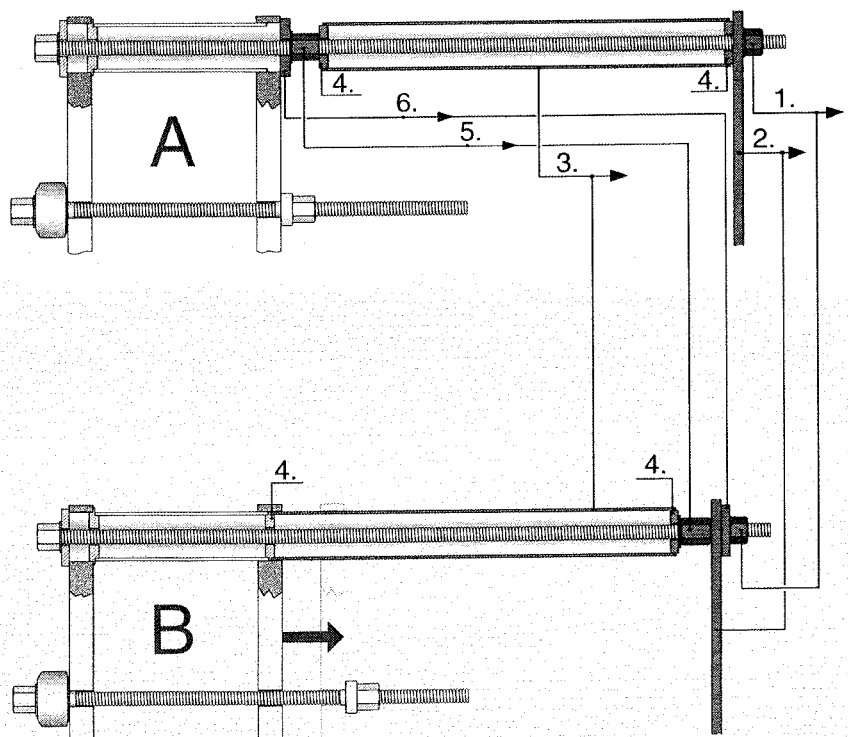


6.1.1 Opening

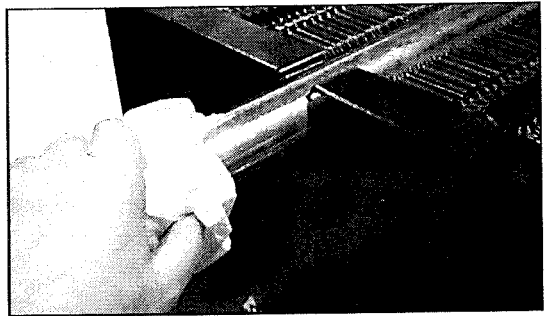
Carrying and Steering bar are identical in design. Step 1 - 8 below should be carried out on both bars in each step.

For the M3-BASE unit, ignore step 1 - 10.

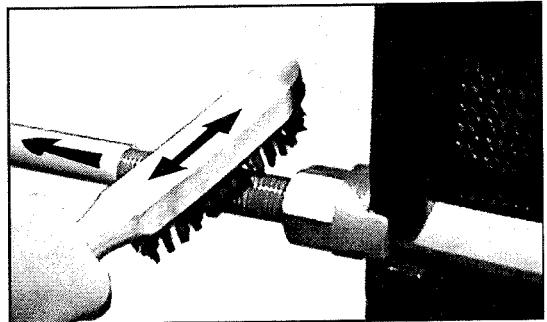
1. Remove the Nut (A:1).
2. Remove the Supporting Column (A:2).
3. Remove the Steering Washers (A:4) and the outer Carrying bar tube (A:3).
4. Brush the treads clean on the Tightening bolts in the Carrying and Steering bar.
Lubricate with grease, for example Gleitmo 800 or similar.
5. Remove the Tightening bolt nut (A:5).
6. Remove the Pressure washer (A:6).
7. Place the Steering washers (B:4) and outer Carrying bar tube (B:3) as shown in figure B. Make sure the Carrying bar tubes line up correctly.
8. Assemble the Pressure washer (B:6) and the Tightening bolt nut (B:5) and tighten enough to make the Carrying and Steering bar rigid.
9. Replace the Supporting Column (B:2) in the position that makes it reach the floor and tighten the Nut (B:1).
10. Remove the foot on the pressure plate.



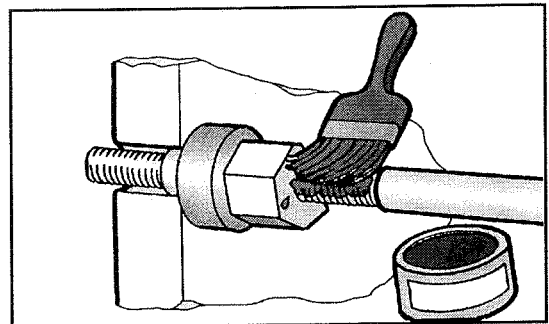
11. Inspect the sliding surfaces of the carrying bar and wipe clean.



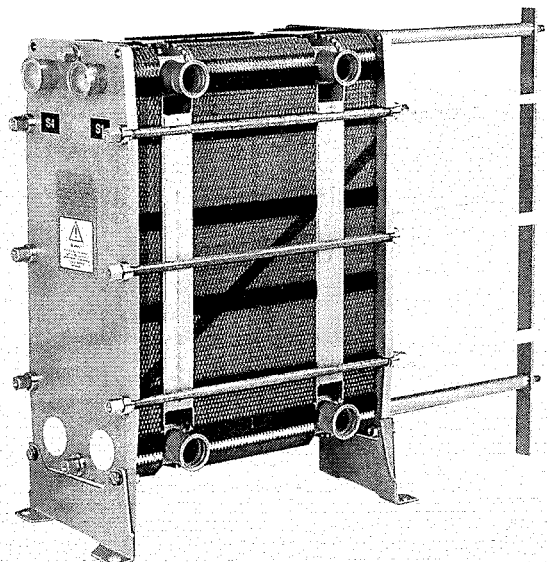
12. Pull back the covers on the tightening bolts and brush the threads clean with a steel wire brush.



13. Lubricate the threads with a thin layer of grease, e.g. Gleitmo 800 or equivalent.



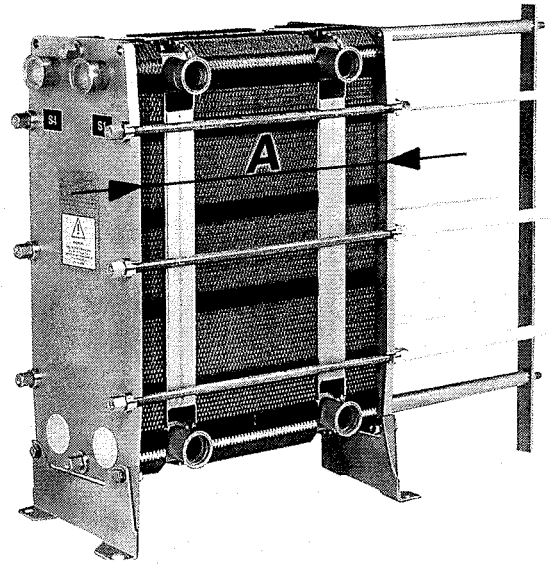
14. Mark the plate assembly on the outside by a diagonal line, or number the plates in sequence.



15. Measure and note down the dimension A.

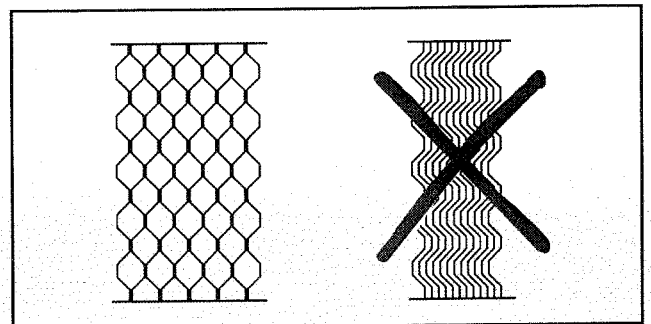
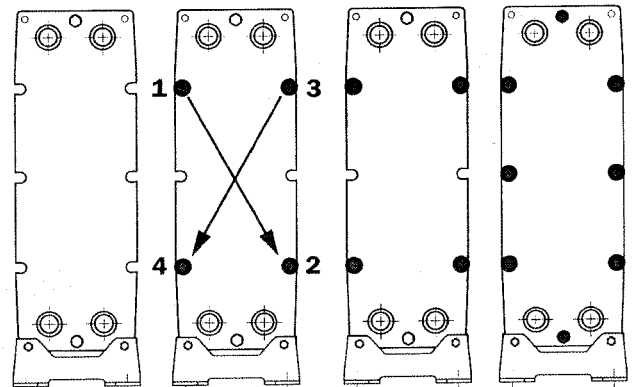
Skewing of the pressure plate during opening must not exceed 5 mm (2 turns per bolt) across the width and 10 mm (5 turns per bolt) vertically.

Order	Bolt no.	To dimension
1	1-2-3-4	1.05 A
2	1-2 or 3-4	Opening

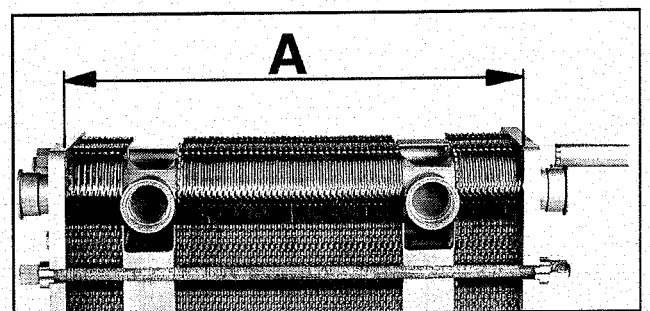


6.1.2 Closing

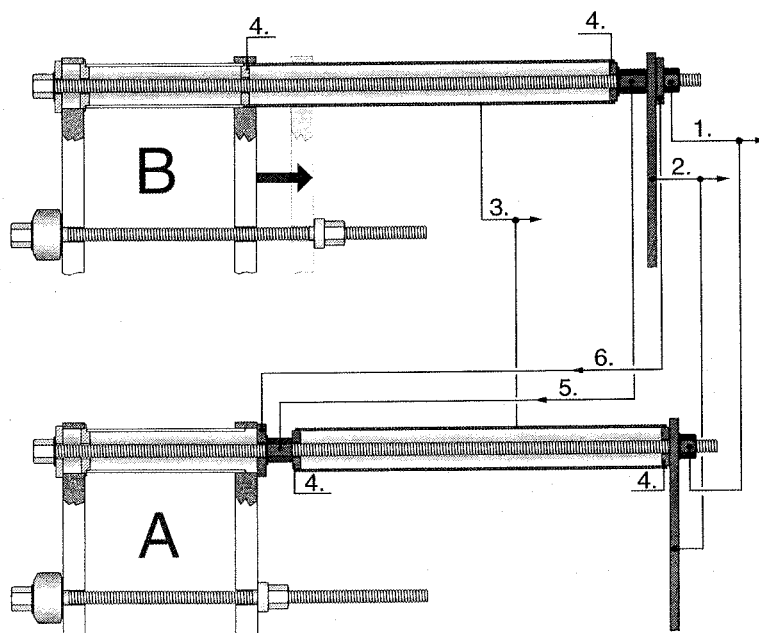
1. If a pneumatic tool (or similar) is used the torque must not exceed 200 Nm and the speed 10 rpm. Tighten the plate pack to the dimension A independent of used torque.
2. Check that all gaskets are clean and correctly positioned in the grooves. Even slight product residue or foreign particles may cause leakage. If a PHE is opened without previously having been efficiently cleaned by circulation, it is necessary to brush the plates manually and to rinse them with a water-hose.
3. Push the plate pack together manually and *place two diagonally opposite bolts in position (1-2 or 3-4)*.
4. If the plate pack has been marked on the outside check this.
5. If the plates are correctly assembled, the edges form a "honeycomb" pattern.
6. Tighten the bolts evenly. Skewing of the pressure plate during closing must not exceed 5 mm (2 turns per bolt) across the width and 10 mm (4 turns per bolt) vertically. Tighten according to the enclosed table and points 7 to 11 (next page) until measure A is reached.



Order	Bolt no.	To dimension
1	1-2 or 3-4	1.10 A
2	1-2-3-4	See point 7
3	All	1.0 A



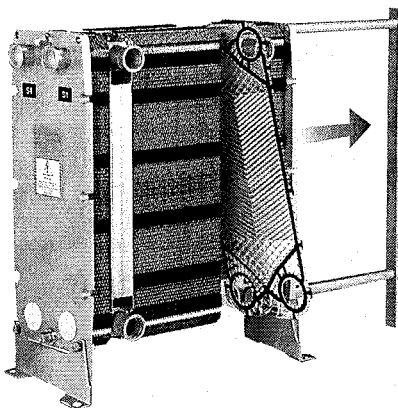
7. When the inner edge of the pressure plate has passed the slot in the carrying bar, the top and bottom bolts must be used for further tightening (see points 8-10)
8. Assemble the foot on the pressure plate and remove the nut (B:1), pressure washer (B:6), supporting column (B:2) and tightening bolt nut (B:5).
9. Remove steering washers (B:4) and outer carrying bar tube (B:3).
10. Assemble the pressure washer (A:6) and the tightening bolt nut (A:5).
11. Add the remaining two bolts and tighten all 8 bolts evenly until measure A is reached.
12. Position the steering washers (A:4) and outer carrying bar tube (A:3). Make sure that the tube lines up correctly on the Steering washers as shown in figure A.
13. Put the supporting column (A:2) back in place and tighten the Nut (A:1).
14. Connect pipes.
15. If the heat exchanger does not seal when the measure A has been reached, it can be tightened further to A-0.5 %.



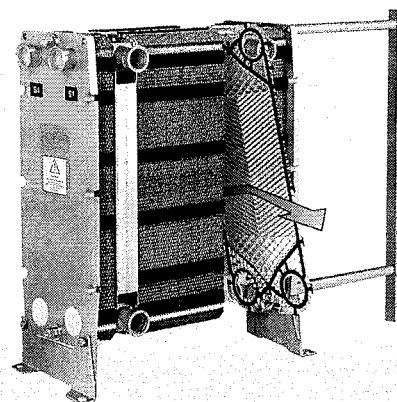
6.2 Removal and insertion of plates

6.2.1 Removal of plates

1. Push the pressure plate against the support column.

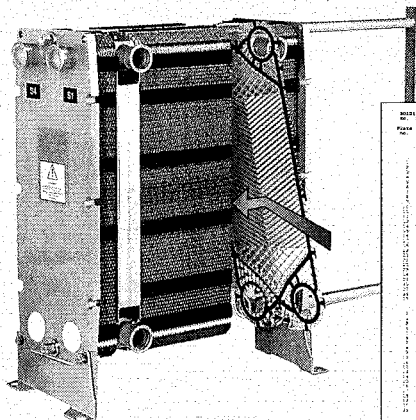


2. Remove the plates.



6.2.2 Insertion of plates

Hang the plates according to instructions on the Data Print. Read the plate table in the Data Print from the top down.



HIRE DATES

DATE PLACE

PERSONNEL NUMBER OF THE GRADE

TIME ADJUSTMENT

(IN MONTHS)

	1	2	3	4	5
1	11/1/57	James	100	100	100
2	11/1/57	James	100	100	100
3	11/1/57	James	100	100	100
4	11/1/57	James	100	100	100
5	11/1/57	James	100	100	100
6	11/1/57	James	100	100	100
7	11/1/57	James	100	100	100
8	11/1/57	James	100	100	100
9	11/1/57	James	100	100	100
10	11/1/57	James	100	100	100
11	11/1/57	James	100	100	100
12	11/1/57	James	100	100	100
13	11/1/57	James	100	100	100
14	11/1/57	James	100	100	100
15	11/1/57	James	100	100	100
16	11/1/57	James	100	100	100
17	11/1/57	James	100	100	100
18	11/1/57	James	100	100	100
19	11/1/57	James	100	100	100
20	11/1/57	James	100	100	100
21	11/1/57	James	100	100	100
22	11/1/57	James	100	100	100
23	11/1/57	James	100	100	100
24	11/1/57	James	100	100	100
25	11/1/57	James	100	100	100
26	11/1/57	James	100	100	100
27	11/1/57	James	100	100	100
28	11/1/57	James	100	100	100
29	11/1/57	James	100	100	100
30	11/1/57	James	100	100	100
31	11/1/57	James	100	100	100
32	11/1/57	James	100	100	100
33	11/1/57	James	100	100	100
34	11/1/57	James	100	100	100
35	11/1/57	James	100	100	100
36	11/1/57	James	100	100	100
37	11/1/57	James	100	100	100
38	11/1/57	James	100	100	100
39	11/1/57	James	100	100	100
40	11/1/57	James	100	100	100
41	11/1/57	James	100	100	100
42	11/1/57	James	100	100	100
43	11/1/57	James	100	100	100
44	11/1/57	James	100	100	100
45	11/1/57	James	100	100	100
46	11/1/57	James	100	100	100
47	11/1/57	James	100	100	100
48	11/1/57	James	100	100	100
49	11/1/57	James	100	100	100
50	11/1/57	James	100	100	100
51	11/1/57	James	100	100	100
52	11/1/57	James	100	100	100
53	11/1/57	James	100	100	100
54	11/1/57	James	100	100	100
55	11/1/57	James	100	100	100
56	11/1/57	James	100	100	100
57	11/1/57	James	100	100	100
58	11/1/57	James	100	100	100
59	11/1/57	James	100	100	100
60	11/1/57	James	100	100	100
61	11/1/57	James	100	100	100
62	11/1/57	James	100	100	100
63	11/1/57	James	100	100	100
64	11/1/57	James	100	100	100
65	11/1/57	James	100	100	100
66	11/1/57	James	100	100	100
67	11/1/57	James	100	100	100
68	11/1/57	James	100	100	100
69	11/1/57	James	100	100	100
70	11/1/57	James	100	100	100
71	11/1/57	James	100	100	100
72	11/1/57	James	100	100	100
73	11/1/57	James	100	100	100
74	11/1/57	James	100	100	100
75	11/1/57	James	100	100	100
76	11/1/57	James	100	100	100
77	11/1/57	James	100	100	100
78	11/1/57	James	100	100	100
79	11/1/57	James	100	100	100
80	11/1/57	James	100	100	100
81	11/1/57	James	100	100	100
82	11/1/57	James	100	100	100
83	11/1/57	James	100	100	100
84	11/1/57	James	100	100	100
85	11/1/57	James	100	100	100
86	11/1/57	James	100	100	100
87	11/1/57	James	100	100	100
88	11/1/57	James	100	100	100
89	11/1/57	James	100	100	100
90	11/1/57	James	100	100	100
91	11/1/57	James	100	100	100
92	11/1/57	James	100	100	100
93	11/1/57	James	100	100	100
94	11/1/57	James	100	100	100
95	11/1/57	James	100	100	100
96	11/1/57	James	100	100	100
97	11/1/57	James	100	100	100
98	11/1/57	James	100	100	100
99	11/1/57	James	100	100	100
100	11/1/57	James	100	100	100

6.3 Regasketing

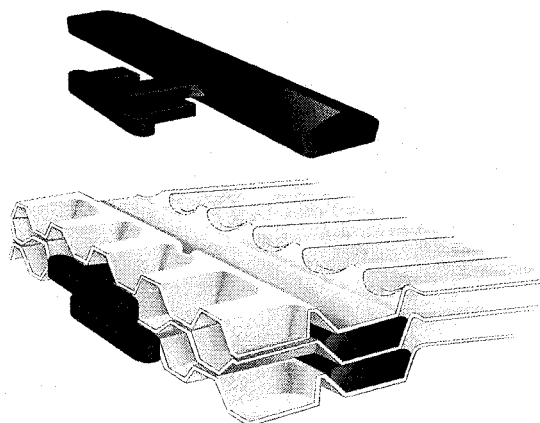
6.3.1 The Clip-On gasket

The Clip-on gasket is attached to the plate by two gasket prongs which slip under the edge of the plate to hold the gasket securely in alignment in the gasket groove.

The prongs are situated at regular intervals around the periphery of the plate.

It is possible to change gasket without removing the plate from the frame.

When the plate heat exchanger is then assembled and tightened, the gasket provides a tight seal around the plate.



NOTE!

Before closing the apparatus:

Check that all the gasket prongs are in correct position.

6.4 Dismantling

6.4.1 Plates

The plates can easily be taken down (and remounted) simply by tilting in two perpendicular directions.

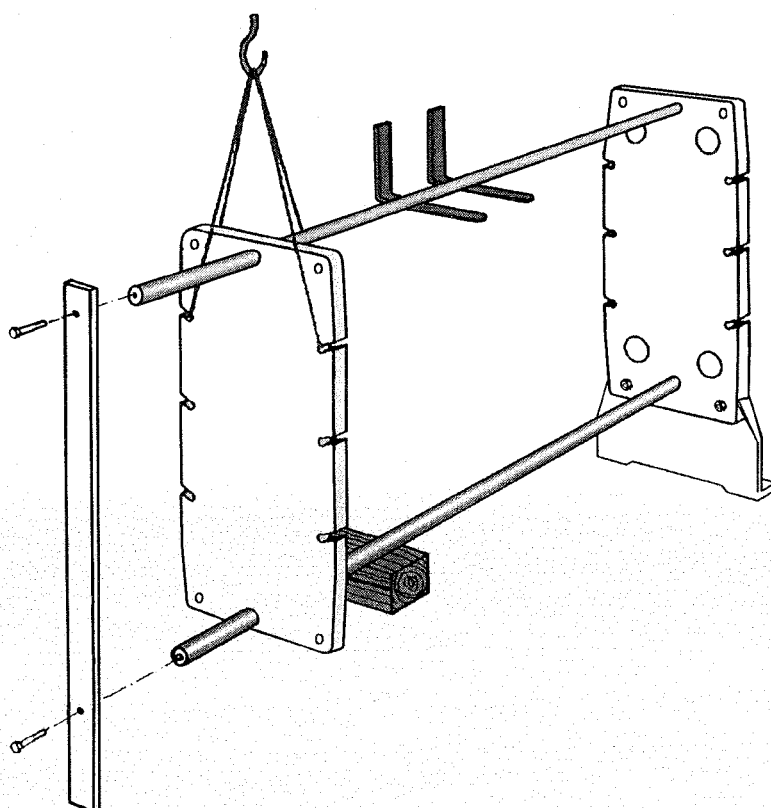
6.4.2 Connection plates

The corner pieces are spot welded or fixed with screws accessible via covers on one side of the connection plate.

6.4.3 Dismounting pressure plate

Dismounting procedure:

1. Push the pressure plate against the support column.
2. A fork-lift truck holds the carrying bar in the horizontal position.
3. Attach the rope to the pressure plate.
4. Place a support under the guide bar.
5. Loosen the support column.



6.5 Maintenance

6.5.1 Sheet material

Even stainless steel can corrode. Chlorine ions are hazardous.

Avoid cooling brines containing chlorine salts as NaCl and, most harmful, CaCl_2 .

Inspect the plates regularly, say once a month, for possible corrosion attacks, especially on a new installation and after changing the running conditions.

6.5.2 Gasket rubber

On opening the PHE, check that all gaskets are clean, in good condition and correctly positioned in the grooves of plates and connections.

The store room for spare gaskets should be cool and dark. Gaskets must not be stored hanging or twisted or subject to great load.

6.5.3 Stainless steel surface

The stainless steel surface on frame, pressure plate and connection plates is glass blasted.

Clean with cloth wetted by paraffin oil. Do not degrease the surface!

6.5.4 Lubrication

Lubricate the bolt threads with an EP (extreme pressure) grease, for example Gleitmo 800 or equivalent.

Grease the suspension wheels on pressure and connection plates.

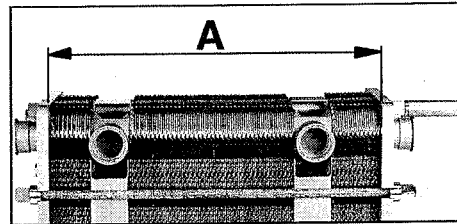
6.6 Fault-finding

6.6.1 Performance of the PHE with regard to heat transfer and/or pressure drop is abnormal

Check the platage. A consequence of wrongly located plates can be that some channels are by-passed, creating dead area. Stagnation will follow, making circulation cleaning impossible and creating immediate risk of corrosion and/or product contamination.

6.6.2 Leakage to the outside

Check A-measure.



If the leakage continues, mark the leaking plates, open and replace the gaskets in question.

6.6.3 Liquids mixing, inside leakage

Apply water pressure on one side of all the sections in the unit. Fill the other side with water and then open all connections on that side. If a plate is perforated, water will pour out of one side of the corresponding open connections.

The plates of the faulty section are then examined by means of current crevice-detection liquids. A large plate section may be divided and the pressure test repeated in order to reduce the number of plates on which the crevice-detector has to be applied.

When corresponding with the supplier regarding defect on plates, please specify:

- Defect heat exchanger manufacturing number
- Plate identification number
- Position of plate in the heat exchanger (note on plate specification or platage diagram)
- Liquid(s) in contact with damaged surface
- Other relevant observations

6.7 Spare parts

6.7.1 Parts List

In the Parts List, which is included in the Spare Parts & Plate Arrangement folder, you can find the Spare Parts Ordering Number for all parts in your plate heat exchanger.

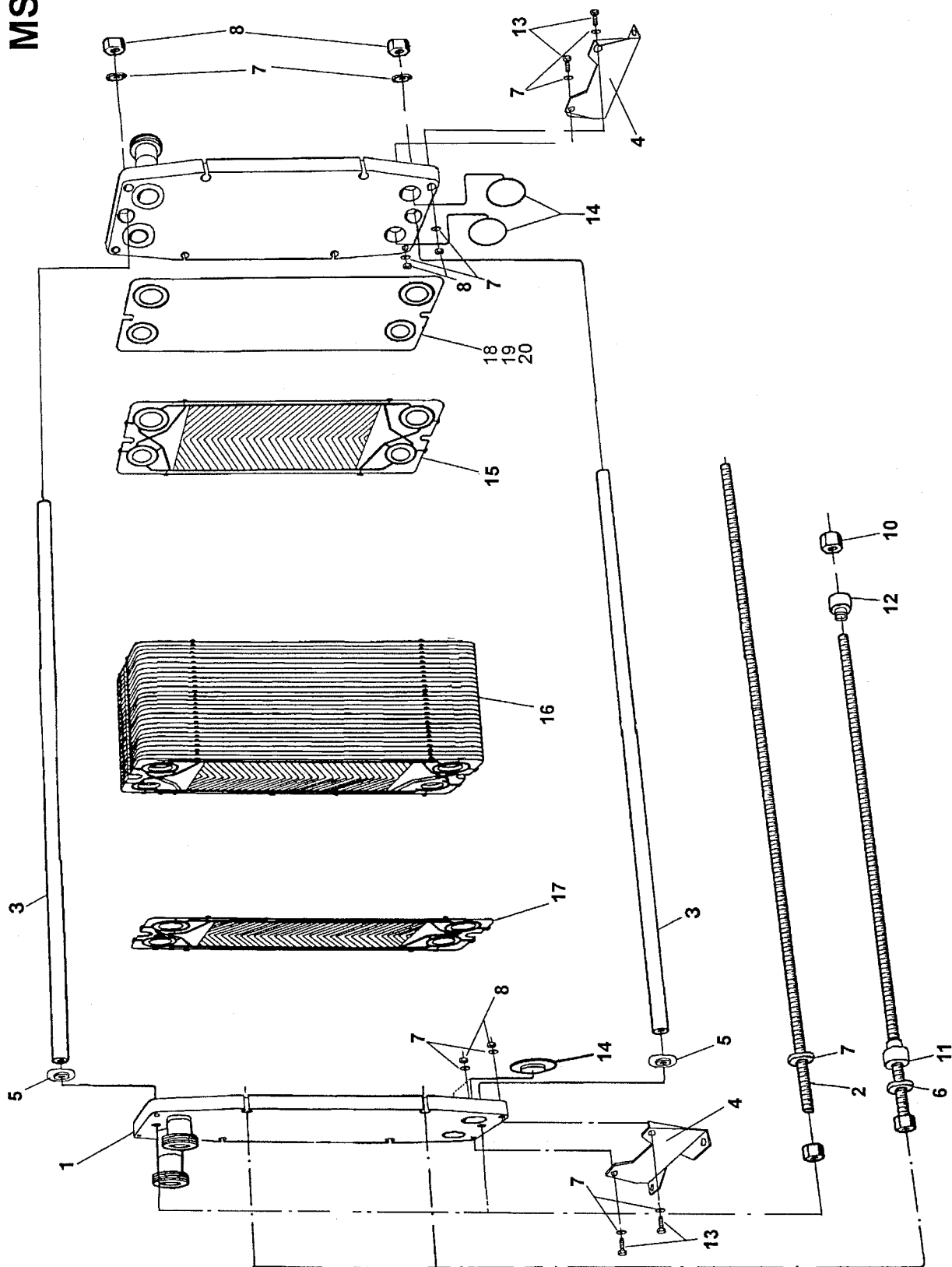
Charles Wait
(process plant) Ltd

FYLDE ROAD - SOUTHPORT
MERSEYSIDE PR9 9XP
ENGLAND
TEL: +44 (0)1704 211273
FAX: +44 (0)1704 225875

PARTS LISTS

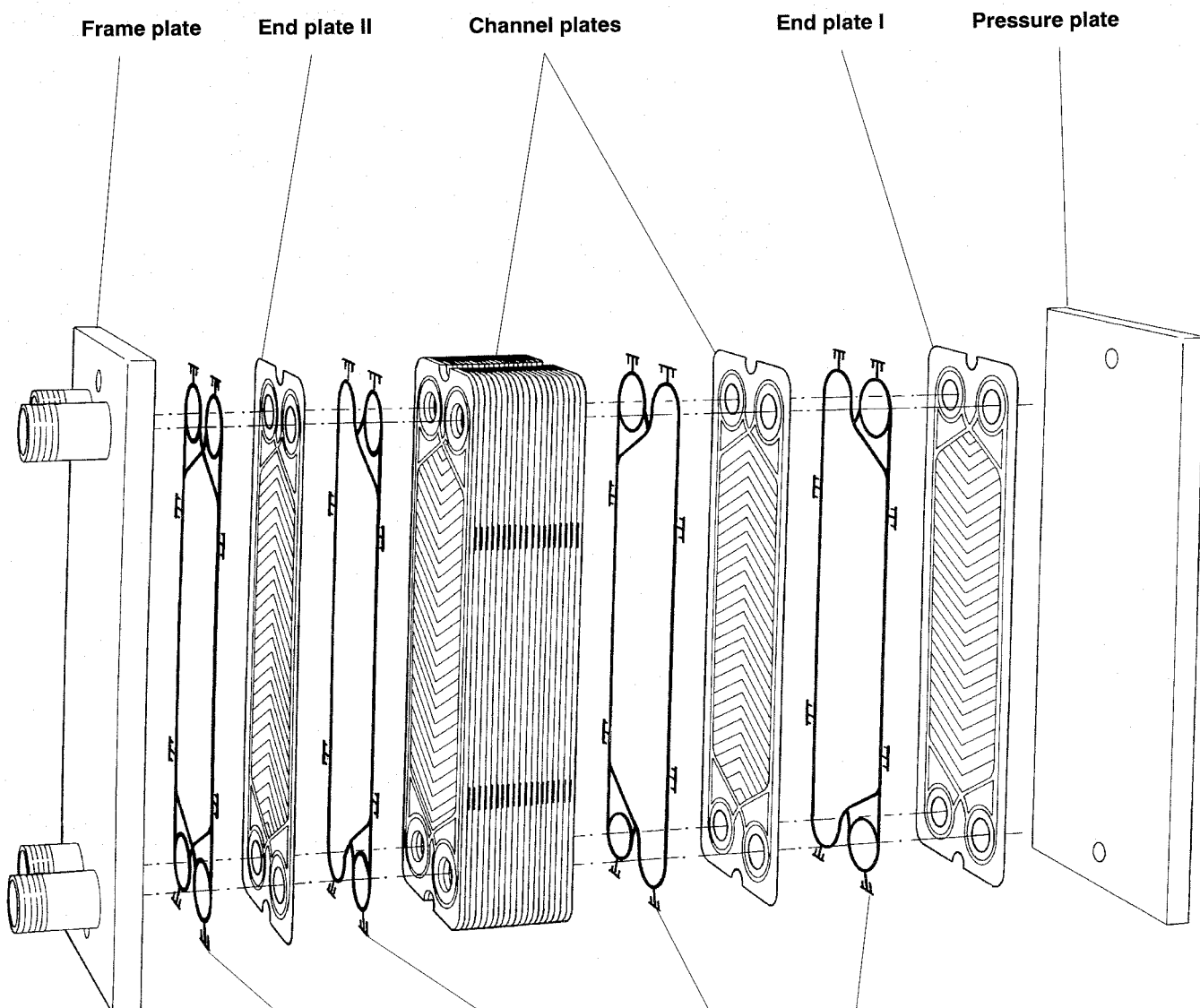
MS3 - SBL

MS3-SBL





MS3-SBL

Pos	Part Number	Name	Comments	
1	1622133-01	Frame / Pressure plate		
2	Carrying bar bolt	Length mm	Max. no. of plates	
			M3	
			0.5 mm	0.6 mm
	1624422-01	220	31	30
	1624422-02	320	62	60
	1624422-03	490	100	97
3	Carrying bar	Length mm		
	1623467-01	140		
	1623467-02	260		
	1623467-03	410		
4	1627507-01	Foot		
5	1623469-01	Washer	OD=22 mm	
6	223101-37	Washer	BRB 17x30, A4	
7	223101-35	Washer	BRB 13x24, A4	
8	221803-22	Nut	M12, A4	
9	Tightening bolt	Length mm	Max. no. of plates	
			M3	
			0.5 mm	0.6 mm
	1624445-01	210	31	30
	1624445-02	330	62	60
	1624445-03	480	100	97
10	32324-2024-6	Nut		
11	1624424-01	Guide washer		
12	1624421-01	Lock washer		
13	221046-06	Screw		
14	1626345-01	Blind washer		
15	End plate I			
16	Cannel plates			
17	End plate II			
18	1622293-01	Distance plate 0-hole		
	1622293-02	Distance plate 1-hole		
	1622293-03	Distance plate 2-hole (1,2)		
	1622293-04	Distance plate 2-hole (1,3)		
	1622293-05	Distance plate 2-hole (1,4)		
	1622293-06	Distance plate 3-hole		
	1622293-07	Distance plate 4-hole		
19	32263-0984-6	Connection gasket NBR		
	32263-0982-8	Connection gasket EPDM		
20	1626510-01	Support ring		



Qualities	Gasket type	End plate gasket II (2 Channel plate gaskets)	Channel plate gasket End plate gasket I	Colour marking
		Part numbers		
EPDM (IND)	Clip-On	32263-0954-3	32263-0954-3	1 Grey
NBR (Nitrile)	Clip-On	32263-0954-6	32263-0954-6	

GASKETS FOR M3		Qualities				
		NBR (Nitrile)		EPDMF (FDA)	FPMB (Viton B with PbO)	
Colour marking				2 Grey	2 Purple	
FG/FM-frame		Code 32263				
Connection gasket for pressure plate						
flat		-0984-6		-0982-8	-0982-4	
ribbed		-0979-6		-0977-8		

PCI-2-M3/2
Edition 2 9809

Ed. 1

Manufacturing no.	30103-22974	Date	010409 HAO
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Plate Heat Exchanger type	MS3-SBL	Quantity	1
Drawing no.	32200-8001		

Customer	Ref.
Charles Wait Process Plan	

Agent	Ref.
TETRA PAK LTD GB	2109820 650443
Storbritanien	

Supplier	Ref.
Alfa-Laval Thermal	T313275
	TO nr.313275

Plates with parallel flow.

The plate pack is tightened to 76 mm

Always observe plate from its gasket side. A ten figure part number plus one letter are stamped on the upper part of the plate.

The plates are assembled, counting from the frame plate to the pressure plate, in sequence stated below with the gasket side facing the frame plate.

For information about installation, running, cleaning etc. see the instruction book.

Measurements (see drawing)	mm	: Net weight
		: 30 kg
A =	76	:
LT=	210	: Liquid volume
		: 2 l
		:
C =	250	: Design pressure
		: 6.0 BAR

Connection standard
SMS

Remarks

Test pressure : 8,0 BAR
Design temp : 110 C

40.0% Cream : S3->T3
Ice water : S2=>T2

Bolts : M16
PROTECTION SHEET

Media	->40.0% Cream	=>Ice water
Flow rate	150.0 kg/h	500.0 kg/h
Temp. program	55.0 to 13.4 C	2.0 to 12.0 C
Pressure drop	1.184 mwg	1.093 mwg

Liquid volume	1,1 l	1,1 l
---------------	-------	-------

Location of connections

inlet	S3	S2
outlet	T3	T2

Material in connections

Plates material	AISI 316
-----------------	----------

thickness	0.50 mm
-----------	---------

Gasket material	NBR	CLIP-ON
-----------------	-----	---------

Heat transfer surface	0,74 m2
-----------------------	---------

Plate grouping	4*3 L

	4*3 L

Media	->Attemperated water	=>CIP
Flow rate	1500 kg/h	1000 kg/h
Temp. program	75.0 to 72.0 C	70.0 to 72.0 C
Pressure drop	5.910 mwg	2.858 mwg

Liquid volume	0,0 l	0,0 l
---------------	-------	-------

Location of connections

inlet	S3	S2
outlet	T3	T2

Material in connections

Plates material	AISI 316
thickness	0.50 mm

Gasket material	NBR	CLIP-ON
-----------------	-----	---------

Heat transfer surface	0,00 m2
-----------------------	---------

Plate grouping	4*3 L

	4*3 L

Plate no.	Plate code no.	Punched corner of the plate				Flow direction on the gasket side of the plate
		upper left	lower left	lower right	upper right	
S						
		1	2	3	4	
			=>=	-<-		
1	373017 4484B		0	0		
2	372917 4403A	0	0	0---	>--0	Up
3	372917 4403B	0==<==	0	0	0	Up
4	372917 4403A	0	0	0	0	Up
5	372917 4403B	0	0	0	0	Up
6	372917 4403A	0	0	0---	>--0	Up
7	372917 4411B	0==<==			0	Up
8	372917 4403A	0	0	0--<---	0	Down
9	372917 4403B	0==>==	0	0	0	Down
10	372917 4403A	0	0	0	0	Down
11	372917 4403B	0	0	0	0	Down
12	372917 4403A	0	0	0--<---	0	Down
13	372917 4404B	====>==	0	0		Down
14	372917 4403A	0	0	0---	>--0	Up
15	372917 4403B	0==<==	0	0	0	Up
16	372917 4403A	0	0	0	0	Up
17	372917 4403B	0	0	0	0	Up
18	372917 4403A	0	0	0---	>--0	Up
19	372917 4411B	0==<==			0	Up
20	372917 4403A	0	0	0--<---	0	Down
21	372917 4403B	0==>==	0	0	0	Down
22	372917 4403A	0	0	0	0	Down
23	372917 4403B	0	0	0	0	Down
24	372917 4403A	0	0	0--<---	0	Down
25	373017 4404B	====>==	0	0		Down
T						
		1	2	3	4	
			<==	-->		

DATE : 010409

30103-22974

Ed. 1

Plate-req. for manuf.order: 313275

Orderno. : T313275-01

M3

AISI 316

0.50 NBR

CLIP-ON

PLATE NUMBER	QUANTITY
--------------	----------

372917 4403	20
-------------	----

372917 4404	1
-------------	---

372917 4411	2
-------------	---

373017 4404	1
-------------	---

373017 4484	1
-------------	---

TOTAL (CHANNELPL.+ENDPL.)	25
---------------------------	----

MEASUREMENTS

Manufacturing no.

30103-22974

Date

010409

HAO

Plate Heat Exchanger type MS3-SBL
 Drawing no. 32200-8001

Quantity 1

MC - orderno.
 2109820 650443

Orderno.
 T313275
 TO nr.313275

A-MEAS.TOTAL 76 mm
 A+FREE SPACE 98 mm
 C - MEASURE 250 mm
 CONN.STD SMS

TOTAL WEIGHT 30 KG
 TOTAL VOLUME 2,2 L

SECT. NO.	PLATE AREA m2	PER SECTION VOLUME IN LTR.		A-MEASURE (mm)
		SIDE 1 /	SIDE 2	
1	0,74	1,1 /	1,1	76

CARRYING BARS

CARR.BAR L. 220 mm EST. MIN.LENGTH 198 mm
 EXTENDIBLE BY : PLATE QUANT. / FREE HANGING
 6 PCS / 22 mm

TIGHTENING BOLTS

TIGHT.BOLT L. 210 mm EST. MIN.LENGTH 188 mm
 TIGHT.BOLT DIM. M16
 EXTENDIBLE BY : PLATE QUANT. / FREE HANGING
 6 PCS / 22 mm

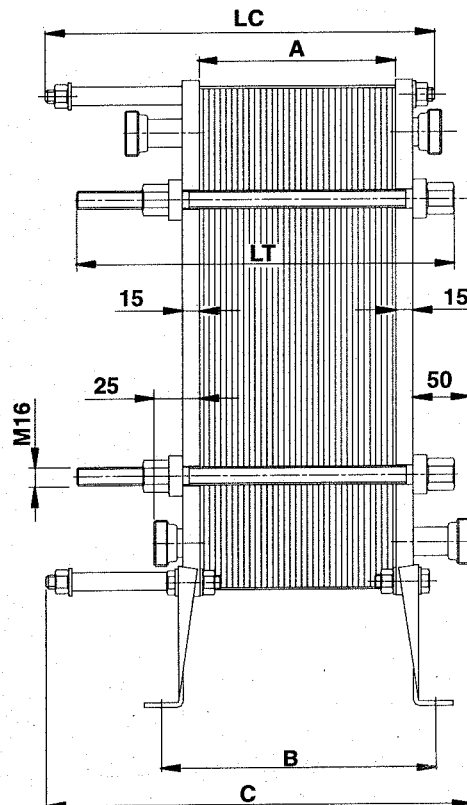
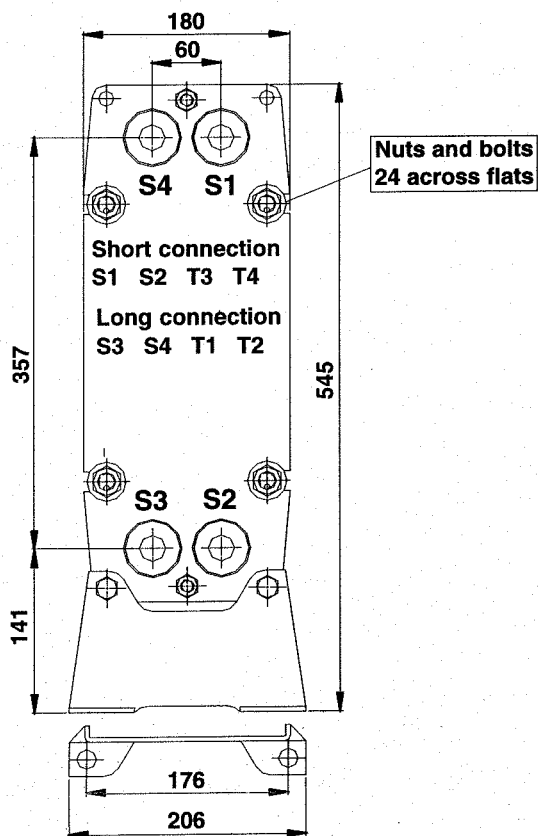
CENTRE OF GRAVITY	EMPTY	FILLED (mm)	
HORIZONTAL	63	60	(from the outside of the frame plate)
VERTICAL	320	320	(from the underside foot or frame)

FOUNDATION LOAD	OPENED	OPERATING (N)
SUPP. COLUMN SIDE	157	78
FRAME SIDE	216	235

DIMENSION DRAWING

PHE-TYPE MS3-SBL

No. 32200-8001	
Date	0003
Edition	1
Dept.	TPI-SU



Required free space around the unit is 1.0 meter
at sides and frame head end.

SYMBOLS USED IN THE TABLES AND FORMULAS BELOW

N = No. of plates

X = Thickness of plate material

STANDARD LENGTHS (SEE FIG. ABOVE)

Tight. bolts LT M16	Max no. of plates	Main dimensions		
	X= 0.5	LC	B	C
210	31	220	A + 68	250
330	62	340	A + 68	370
480	100	490	A + 68	510

FRAME WEIGHTS (IN KG)

Frame: $22 + 0.008 \cdot LC$

Channel plates: $WP \cdot N$ For WP see Data Sheet

PLATE PACKAGE LENGTHS

$A = N \cdot (2.4 + X)$

CONNECTION TYPE

Connection of stainless steel $\varnothing 25$ mm

STANDARD	SMS	DIN	IDF	RJT	CLAMP
----------	-----	-----	-----	-----	-------

CONNECTION LOCATIONS

