

Installation and Maintenance Manual

Forbes Marshall Cast Strainer

FMSTR34, FMSTR54, FMSTR54#600

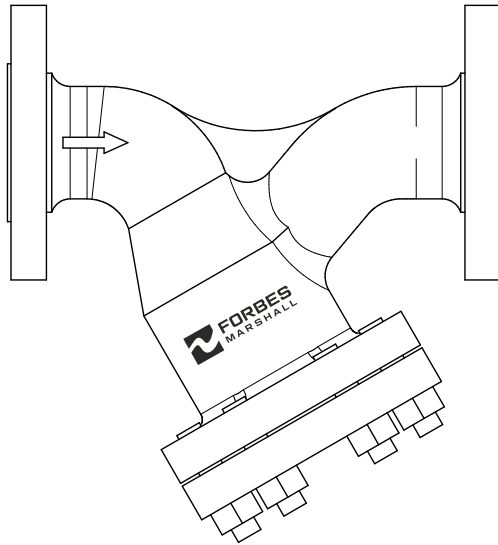


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PLEASE NOTE - Throughout this manual this cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked. This symbol denotes CAUTION, WARNING or DANGER.



1. Preface:

This manual is intended for anyone using, commissioning, servicing, or disposing the below mentioned products safely and efficiently.

Forbes Marshall Cast Strainer [FMSTR34] Size: DN 40 (1 ½"), DN 50 (2"), DN 65 (2 ½"), DN 80 (3"), DN 100 (4"), DN 125 (5"), DN 150 (6"), DN 200 (8").

Forbes Marshall Cast Strainer [FMSTR54/FMSTR54#600] Size: DN40 (1 ½"), DN50 (2"), DN 65 (2 ½"), DN80 (3"), DN100 (4"), DN125 (5"), DN150 (6"), DN200 (8"), DN250 (10"), DN300 (12").

PLEASE NOTE:

Throughout this manual the following cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked.

2. Important Safety Notes:



Read this section carefully before installing/operating/maintaining the product. The precautions listed in this manual are provided for personnel and equipment safety. Furthermore, Forbes Marshall accepts no responsibility for accidents or damage occurring as a result of failure to observe these precautions. Note that the product is designed to perform for non-contaminated fluids only. A contamination in the form of chemical, foreign particle etc. can lead to problem with product performance and life of the product.

If these products in compliance with the operating instructions are, properly installed, commissioned, maintained and installed by qualified personnel (refer Section 2.7) the safety operations of these products can be guaranteed. General instructions for proper use of tools and safety of equipments, pipeline and plant construction must also be complied with.

2.1 Intended use:

Check if the product is suitable for intended use/ application by referring to the installation and maintenance instructions, name plates and technical information sheets.

- i) The product is suitable for use as defined in the technical information sheet. In case the need arises to use the product on any other fluid please contact Forbes Marshall for assistance.
- ii) Check for the suitability in conformance to the limiting conditions specified in technical information sheet of the product.
- iii) The correct installation and direction of fluid flow has to be determined.
- iv) Forbes Marshall products are not intended to resist external stresses, hence necessary precautions to be taken to minimize the same.

2.2 Accessibility and Lighting:

Safe accessibility and working conditions are to be ensured prior to working on the product.

2.3 Hazardous environment and media:

The product has to be protected from hazardous environment and check to ensure that no hazardous liquids or gases pass through the product.

2.4 Depressurizing of systems and normalizing of temperature:

Ensure isolation and safety venting of any pressure to the atmospheric pressure. Even if the pressure gauge indicates zero, do not make an assumption that the system has been depressurized. To avoid danger of burns allow temperature to normalize after isolation.

2.5 Tools and consumables:

Ensure you have appropriate tools and / or consumables available before starting the work. Use of original Forbes Marshall replacement parts is recommended.

2.6 Protective clothing:

Consider for the requirement of any protective clothing for you/ or others in the vicinity for protection against hazards of temperature (high or low), chemicals, radiation, dangers to eyes and face, noise and falling objects.

2.7 Permits to work:

All work to be carried out under supervision of a competent person. Training should be imparted to operating personnel on correct usage of product as per Installation and Maintenance instruction. "Permit to work" to be complied with (wherever applicable), in case of absence of this system a responsible person should have complete information and knowledge on what work is going on and where required, arrange to have an assistant with his primary goal and responsibility being safety. "Warning Notices" should be posted wherever necessary.

2.8 Handling:

There is a risk of injury if heavy products are handled manually. Analyze the risk and use appropriate handling method by taking into consideration the task, individual, the working environment and the load.

2.9 Freezing:

Provision should be made to protect systems which are not self-draining, against frost damage (in environment where they may be exposed to temperatures below freezing point) to be made.

2.10 Freezing:

It is necessary to dispose this product only in accordance with local regulations at the authorized, qualified collecting point specified for equipment's and its parts—Please refer the part details mentioned in the material table of this manual. Please follow all waste disposal guidelines (Management & Handling) as published by local governing authorities in India & abroad

2.11 Returning products:

Customers and Stockist are reminded that, when returning products to Forbes Marshall they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

2.12 Product Disposal

It is necessary to dispose this product only in accordance with local regulations at the authorized, qualified collecting point specified for equipment's and its parts—Please refer the part details mentioned in the material table of this manual. Please follow all waste disposal guidelines (Management & Handling) as published by local governing authorities in India & abroad

3. Brief Product Information:

3.1 Description:

Forbes Marshall Cast Strainers, FMSTR34, FMSTR54/FMSTR54#600 are available in cast iron / cast steel with SS screen having 0.8mm dia perforation as standard up to DN 125 .

3.2 Sizes and End Connections:

CI : DN 40, 50, 65, 80, 100, 125, 150 and 200

CS : DN 40, 50, 65, 80, 100, 125, 150, 200, 250 and 300

Note :

1. Also available with IBR certificate on request

3.6 Limiting Conditions:

A) For CI Strainer - FMSTR34

PMO	Maximum operating pressure for saturated steam service	EN 1092 PN16	13 bar g
		BS10 Table F	13 bar g
		ANSI 125	10 bar g
		ANSI 150	10 bar g
TMO	Maximum operating temperature	220°C	
	Minimum operating temperature	0°C	
Designed for a maximum cold hydraulic test pressure of 26 bar g			

B) For CS Strainer - FMSTR54

Flange Type	Max Working Pressure Kg/cm ² g	Temperature Deg C
BS 10 Table F	10.5	425
BS 10 Table H	17.6	425
BS 10 Table J	24.6	425
BS 10 Table K	31.6	425
BS 10 Table R	42	425
Class 150	13	220
Class 300	28	425
Class 600	58	425
PN 10	7	425
PN 16	11.5	425
PN 25	20	425
PN 40	30	425

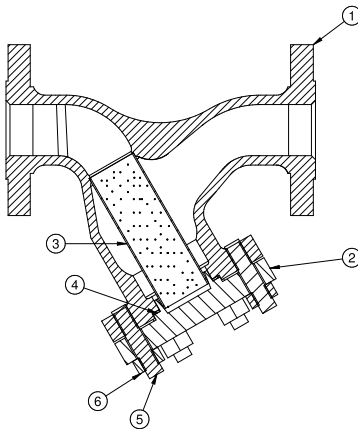
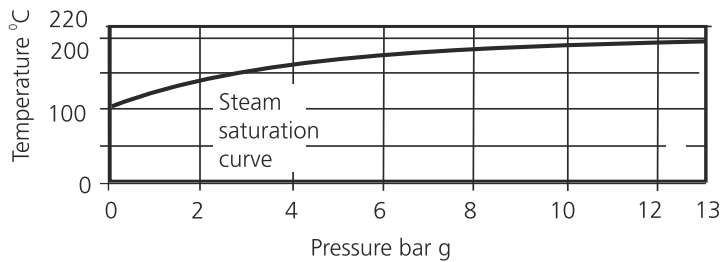


Figure 1: Forbes Marshall Cast Strainer

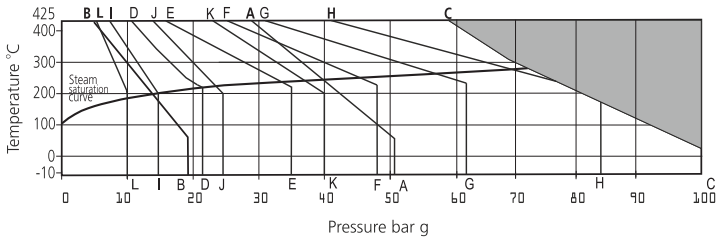
Material:

Sr no	Part	Material	Standard
1	Body	Cast Iron	IS 210 FG 260
		Cast Steel	ASTM A 216 Gr WCB
2	Cap	Cast Iron	IS 210 FG 260
		Cast Steel	SA-516 Gr.70
3	Screen	Stainless Steel	ASTM A 240 Gr. 304
4	Gasket	SS exfoliated graphite	-
5	Stud	Carbon Steel	ASTM A 193 Gr. B7
6	Nut	Carbon Steel	ASTM A 194 Gr. 2H

3.5 Operating Range :
A) For CI Strainer - FMSTR34:



B) For CS Strainer - FMSTR54



 This product must not be used in this region.

A-A Flanged ANSI 300

B-B Flanged ANSI 150

C-C Flanged ANSI 600

D-D BS10 Table F

E-E BS10 Table H

F-F BS10 Table J

G-G BS10 Table K

H-H BS10 Table R

I-I PN16

J-J PN25

K-K PN40

L-L PN10

3.6 Product Dimension and Drawing:

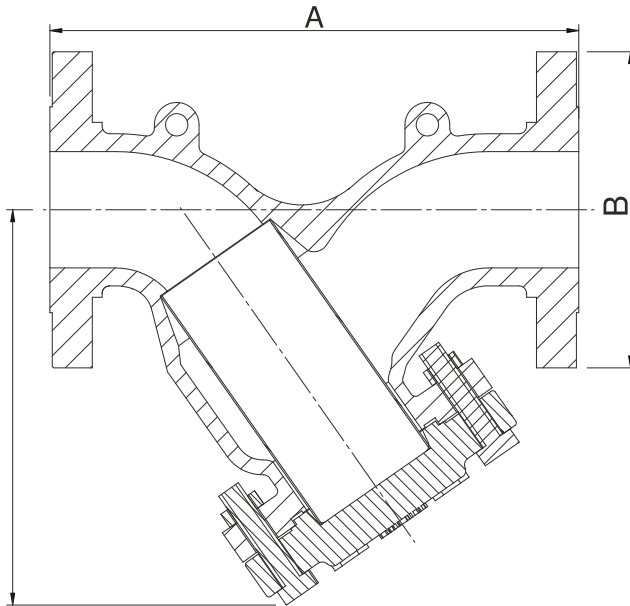


Figure 2: Dimensional drawing of FMSTR34 / FMSTR54

A) CI Strainer - FMSTR34

Dimensions and Weight (approx) in mm and kg

DIM→ SIZE↓	A	B					Weight Kg
		BS TABLE	ANSI	DIN			
DN		F	150	PN10	PN16	C	
40	230	140	127	150	150	159	8
50	242	165	152	165	165	179	10
65	292	185	178	185	185	229	12
80	298	203	190	200	200	225	18
100	348	229	229	220	220	267	30
125	400	279.5	254	250	250	316	40
150	484	305	279	285	285	367	90
200	604	368	343	340	340	470	118

B) C.S Strainer - FMSTR54

Dimensions and Weight (approx) in mm and kg

DIM→								B								Weight
SIZE↓	A	BS TABLE						ANSI			DIN				C	(Kg)
DN		F	H	J	K	R	150	300	600	PN10	PN16	PN25	PN40			
40	235	....	140	....	152	152	127	155	155	150	150	150	150	187	9
50	254	....	165	....	165	....	152	165	165	165	165	165	165	203	15
65	292	184	184	184	184	184	177.8	190.5	190.5	185	185	185	185	229	19	
80	330	203	203	203	203	203	190	210	210	200	200	200	200	245	23	
100	381	....	....	....	241	....	229	254	273	220	220	235	235	299	33
125	400	279	279	279	279	279	254	279	330	250	250	270	270	316	70	
150	540	....	304.8	304.8	304.8	304.8	279.4	317.4	355.6	285	285	300	300	370	96
200	668	....	368.3	368.3	368.3	368.3	343	381	419.1	340	340	360	375	470	160
250	813	....	....	....	431.8	....	406.4	444.5	508	395	405	425	450	650	200
300	894	....	489	489	489	508	482.6	520.7	558	445	485	485	515	800	350

4. Product Working Principle:

Forbes Marshall Cast Strainer is used to remove dirt, debris and other foreign particles from the fluid, it restricts the particle size which are larger than specified sieve size (mesh or perforation). Pressure drop across the strainer will increase as dirt and debris will block the opening of the sieve. As pressure drop increases above certain specified limit the strainer sieve needs to be cleaned.

5. Installation Guidelines : [Refer Figure 3 and 4]



Note: Before implementing any installations observe the 'Important Safety notes' in section 2. Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation.

1. Check the direction marked on the strainer and the direction of fluid flow.
2. Remove protective covers from connections.
3. Strainer can be fitted on steam /gases and liquid systems in either horizontal pipework or vertical pipework when the flow and strainer pocket pointing downward. In a horizontal pipeline on steam / gas system the strainer pocket should be in the horizontal plane as this reduces the possibility of water hammer because of condensate steam gets accumulated in screen when strainer pocket pointed downward. On liquid systems the strainer pocket should point downwards.
4. Suitable isolation valves must be installed to allow for safe maintenance.

Note: Never install strainer in vertical pipework with flow from bottom to top it can lead to re-entrainment of filtered dirt or foreign particles back into the incoming flow.

5. Strainer can be lagged (insulated) if required.

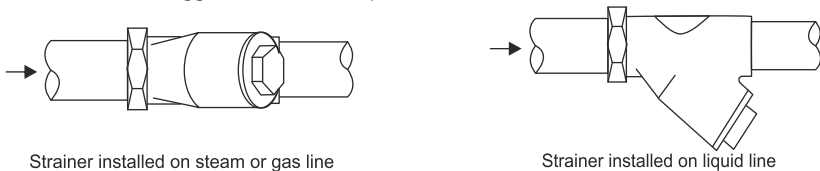


Figure 3 : Strainer installation on horizontal pipework

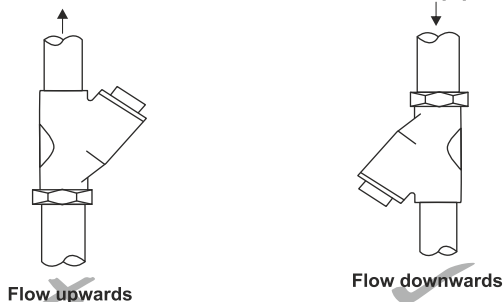


Figure 4 : Strainer installation on vertical pipework

Start-up and Commissioning:


6.1. Flushing of lines:

As part of pre-installation all fluid handling equipment particularly piping should be thoroughly cleaned of scale and the internal debris which accumulates during construction. This is accomplished by blowing or flushing with air, steam, water and other suitable

6. medium.
Follow this step to carry out flushing of lines.
Note: For a detailed procedure on flushing of lines please visit Forbes Marshall website.
- 6.2. Commissioning:**
After installation or maintenance ensure that the system is fully functioning by confirming fluid is passing through it.

Maintenance Guidelines:

- Note:** Before undertaking any maintenance of the product it must be isolated from both supply line and return line and ensure pressure is normalized to atmosphere. The product should then be allowed to cool. When re-assembling ensure that all joint faces are clean.
- Note:** The strainer cap gasket contains a thin stainless steel support ring which may cause physical injury if not handled and disposed of carefully.

- 7.1. Routine and preventive maintenance:**
7.  Please refer to the maintenance schedule mentioned in the table below to undertake routine maintenance of the Strainer.
- 7.2. Recommended tightening torques:**

Sr. No.	PARAMETERS TO BE CHECKED	FREQUENCY FOR CHECKING VARIOUS PARAMETERS					
		Daily	Weekly	Monthly	Quarterly	Half Yearly	Annually
1.	Clean of the screen					Y	

Table 1: Recommended tightening torques for strainer [FMSTR34]



Size	Part		Torque Range
DN 40	Nut (6)	10 A/F	170-185 Nm
DN 50		10 A/F	190-210 Nm
DN 65		19 A/F	25-35 Nm
DN 80		13 A/F	25-35 Nm
DN 100		19 A/F	55-65 Nm
DN 125		19 A/F	55-65 Nm
DN 150		19 A/F	80-100 Nm
DN 200		30 A/F	80-100 Nm

Table 2: Recommended tightening torques for strainer [FMSTR54]

Size	Part		Torque Range
DN 40	Nut (6)	10 A/F	170-185 Nm
DN 50		10 A/F	190-210 Nm
DN 65		19 A/F	25-35 Nm
DN 80		19 A/F	25-35 Nm
DN 100		24 A/F	55-65 Nm
DN 125		19 A/F	55-65 Nm
DN 150		19 A/F	80-100 Nm
DN 200		30 A/F	80-100 Nm
DN 250		50 A/F	100-120 Nm
DN 300		55 A/F	100-120 Nm

7.3. Procedure to clean or replace strainer screen: [Refer figure 1]

1. Unscrew nuts (6) and remove the strainer cap (2)
2. Remove the muck and clean screen (3) thoroughly fit screen carefully and fit cap (2) with new gasket (4).
3. Apply a thin coating of jointing paste.
4. Tighten nuts (6) uniformly open up isolation valve. Check for gasket (4) leak if any then tighten the nuts (6) of strainer cap (2) if required.

Troubleshooting:

If the expected performance is unachievable after installation of the Forbes Marshall Cast Strainer, check the following points for appropriate corrective measures.

Note: Never attempt to modify the product. When replacing old part with new part, use the spare parts listed in section 9.

Available Spares: [Refer figure 5 and 6]

Warranty Period:

As per ordering information and agreements in the contract.

8.

Failure Mode	Possible Cause	Remedy
No flow through strainer.	Strainer screen is clogged with rust or debris.	Flush inline drip leg or pipeline and clean the screen. If screen is rusted, replace with new screen.
Increased pressure drop across the strainer.	Screen is blocking up.	Clean or replace the screen.
Fluid leakage from strainer pocket.	Gasket deterioration or damage.	Replace with new gasket and tighten the nut of the Strainer cap to the recommended torque.

9.

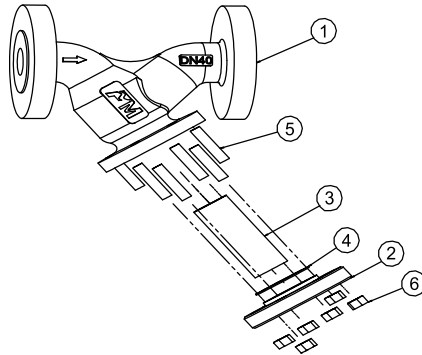


Figure 5 : Exploded view of Forbes Marshall Cast Strainer [FMSTR34]

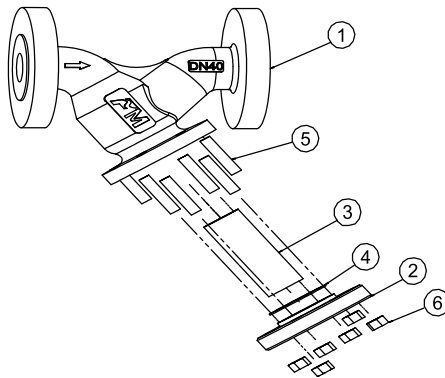


Figure 6 : Exploded view of Forbes Marshall Cast Strainer [FMSTR54]

Spares	Part No.	Spare Code
Screen & Gasket kit for DN 40 FMSTR34 [Pack of 3]	3,4	SPARE-040FMSTR34-SGKIT
Screen & Gasket kit for DN 50 FMSTR34 [Pack of 3]	3,4	SPARE-050FMSTR34-SGKIT
Screen & Gasket kit for DN 65 FMSTR34 [Pack of 1]	3,4	SPARE-065FMSTR34-SGKIT
Screen & Gasket kit for DN 80 FMSTR34 [Pack of 1]	3,4	SPARE-080FMSTR34-SGKIT
Screen & Gasket kit for DN 100 FMSTR34 [Pack of 1]	3,4	SPARE-100FMSTR34-SGKIT
Screen & Gasket kit for DN 125 FMSTR34 [Pack of 1]	3,4	SPARE-125FMSTR34-SGKIT
Screen & Gasket kit for DN 150 FMSTR34 [Pack of 1]	3,4	SPARE-150FMSTR34-SGKIT
Screen & Gasket kit for DN 200 FMSTR34 [Pack of 1]	3,4	SPARE-200FMSTR34-SGKIT
Screen & Gasket kit for DN 40 FMSTR54 [Pack of 3]	3,4	SPARE-040FMSTR54-SGKIT
Screen & Gasket kit for DN 50 FMSTR54 [Pack of 3]	3,4	SPARE-050FMSTR54-SGKIT
Screen & Gasket kit for DN 65 FMSTR54 [Pack of 3]	3,4	SPARE-065FMSTR54-SGKIT
Screen & Gasket kit for DN 80 FMSTR54 [Pack of 1]	3,4	SPARE-080FMSTR54-SGKIT
Screen & Gasket kit for DN 100 FMSTR54 [Pack of 1]	3,4	SPARE-100FMSTR54-SGKIT
Screen & Gasket kit for DN 125 FMSTR54 [Pack of 1]	3,4	SPARE-125FMSTR54-SGKIT
Screen & Gasket kit for DN 150 FMSTR54 [Pack of 5]	3,4	SPARE-150FMSTR54-SGKIT
Screen & Gasket kit for DN 200 FMSTR54 [Pack of 5]	3,4	SPARE-200FMSTR54-SGKIT
Screen & Gasket kit for DN 250 FMSTR54 [Pack of 5]	3,4	SPARE-250FMSTR54-SGKIT
Screen & Gasket kit for DN 300 FMSTR54 [Pack of 5]	3,4	SPARE-300FMSTR54-SGKIT
Gasket kit for DN 40 FMSTR34 [PACK OF 5]	4	SPARE-040FMSTR34-GKIT
Gasket kit for DN 50 FMSTR34 [PACK OF 5]	4	SPARE-050FMSTR34-GKIT
Gasket kit for DN 65 FMSTR34 [PACK OF 5]	4	SPARE-065FMSTR34-GKIT
Gasket kit for DN 80 FMSTR34 [PACK OF 5]	4	SPARE-080FMSTR34-GKIT
Gasket kit for DN 100 FMSTR34 [PACK OF 5]	4	SPARE-100FMSTR34-GKIT
Gasket kit for DN 125 FMSTR34 [PACK OF 5]	4	SPARE-125FMSTR34-GKIT
Gasket kit for DN 150 FMSTR34 [PACK OF 5]	4	SPARE-150FMSTR34-GKIT
Gasket kit for DN 200 FMSTR34 [PACK OF 5]	4	SPARE-200FMSTR34-GKIT

Spares	Part No.	Spare Code
Gasket kit for DN 40 FMSTR54 [PACK OF 5]	4	SPARE-040FMSTR54-GKIT
Gasket kit for DN 50 FMSTR54 [PACK OF 5]	4	SPARE-050FMSTR54-GKIT
Gasket kit for DN 65 FMSTR54 [PACK OF 5]	4	SPARE-065FMSTR54-GKIT
Gasket kit for DN 80 FMSTR54 [PACK OF 5]	4	SPARE-080FMSTR54-GKIT
Gasket kit for DN 100 FMSTR54 [PACK OF 5]	4	SPARE-100FMSTR54-GKIT
Gasket kit for DN 125 FMSTR54 [PACK OF 5]	4	SPARE-125FMSTR54-GKIT
Gasket kit for DN 150 FMSTR54 [PACK OF 5]	4	SPARE-150FMSTR54-GKIT
Gasket kit for DN 200 FMSTR54 [PACK OF 5]	4	SPARE-200FMSTR54-GKIT
Gasket kit for DN 250 FMSTR54 [PACK OF 5]	4	SPARE-250FMSTR54-GKIT
Gasket kit for DN 300 FMSTR54 [PACK OF 5]	4	SPARE-300FMSTR54-GKIT

How to Order:

Example- 1 No. DN 40 Forbes Marshall Cast Strainer, FMSTR34 strainer flanged to table F, IBR

10 How to Order Spares:

Always order spares by using the description given in the column headed "Available Spares" in user manual



www.forbesmarshall.com

Forbes Marshall Arca

Codel International

Krohne Marshall

Forbes Vyncke

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