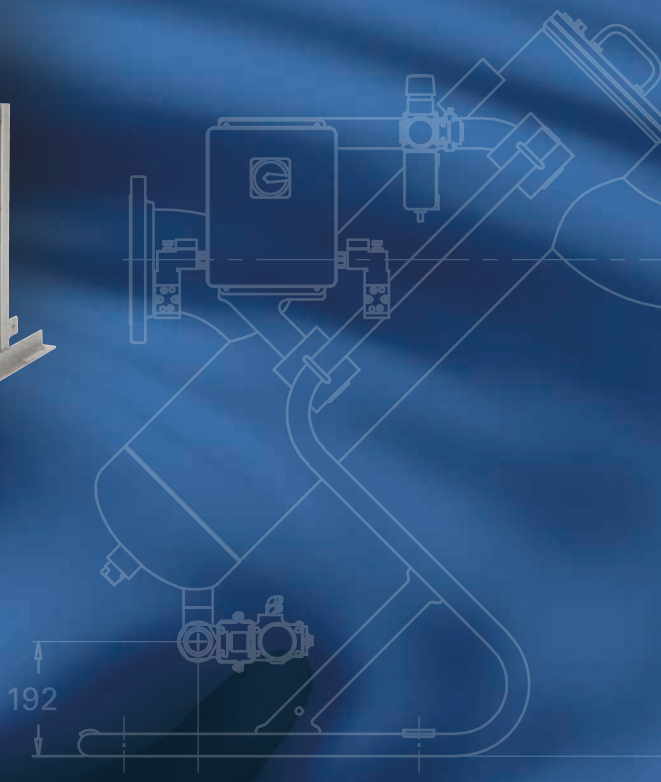
Permanent Media Systems

Technical Support Guide



DCF, MCF, MCS Mechanically Cleaned Filters and Strainers

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Eaton Filtration Solutions

Eaton's Filtration business is a global leader in manufacturing filtration products that include automatic self-cleaning and fabricated pipeline strainers, mechanically cleaned filters and strainers, bag and cartridge filtration systems, and gas/liquid separators for industrial customers worldwide. Eaton has manufacturing sites as well as research and development centers in the United States, Belgium, Germany and China. Sales and service centers are located in North America, Europe and Asia.

Eaton supplies high-quality systems, parts, and services to markets that include automotive, food and beverage, ethanol and biofuels, oil and gas, pharmaceutical, power generation, pulp and paper, chemical, paints and coatings, electronics, iron and steel manufacturing, and municipal and industrial water. Eaton is well positioned in key markets and is expanding its global footprint with initiatives in the Americas, EMEA, and Asia Pacific.

Eaton's Filtration business has led the way with technology that meets the growing and rigorous demands of vital industrial sectors. Utilizing a variety of filtration technologies, Eaton has consistently implemented the best solutions available while continually striving to make a difference for customers and the environment.

Eaton Filtration Services

- State-of-the-art water testing lab facility
- Long-term or short-term equipment rental
- Field service–inspections, start-up, maintenance, repair, and replacement
- Field trials
- Extensive network of manufacturer representatives and distributors worldwide
- Worldwide technical support in international markets
- Team of product specialists dedicated to providing application engineering

Eaton Technologies

- Customized and modular solutions provide a full range of retention capabilities and construction materials in manual and automated designs
- ISO 9001:2015 quality management
- Standard ASME "U", "UM" Code, and CRN Stamp
- "N" stamp available
- EPA compliant solutions
- Properly sized components to meet any specified flow rate and retention requirement
- NSF approved coatings
- Ultra low discharge strainer technology that offers reduced purge volumes

Eaton Sustainability Commitment

Eaton is unwavering in our commitment to being sustainable by design—in the way we operate, through the design of our products, and through the energy and climate saving benefits our products deliver. Eaton issues a Sustainability Report as part of its Annual Report, available on www.eaton.com.

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Eaton Mechanically Cleaned Filter and Strainer Applications

Chemicals
The presence of automatic filters and strainers means a cleaner product, protection of equipment and simple separation of solids from liquids. By installing a filter system, noticeable improvements in chemical operations and guaranteed longer running life of equipment are possible.

Industrial and municipal water
Eaton automatic filters and strainers remove debris from lakes, streams and wells that can damage or clog equipment. They also remove leaves, insects, feathers, etc. from cooling tower water where the system is open to the atmosphere. For desalinization equipment, they take out unwanted matter from the water before it is treated for salt removal. Spent waste- water often passes through a basket strainer to take out material that should not go into a sewer or a waterway.

Cosmetics
Ointments, lotions and similar products, which may contain clumps of undispersed or undissolved matter, are pumped through a filter system. In the manufacture of lipstick, for instance, unwanted lumps can ruin the product.

Petroleum
Pipeline filters clean unwanted material from petroleum products ranging from crude oil to gasoline. Fuel oil can contain gums, tars or other dirt that can plug the nozzles of an oil burner. Every industrial oil burner is equipped with a filters system to screen these out. Similarly, refineries use strainers in oil handling operations to keep debris away from pumps and meters.

Pulp and paper
Smooth paper finishes require coatings be free of pigment clumps. Automatic filters in the coating lines catch and retain the lumps. They also clean traces of pulp or paper from white water effluent before it is discharged.

Process equipment
By installing a filter system ahead of expensive process equipment, the filters protect against damage from scale, dirt or by-products, preventing costly shutdowns. Heat exchangers, condensers and pumps use strainers on their intake sides. Pipeline strainers keep flow meters and spray nozzles from clogging.

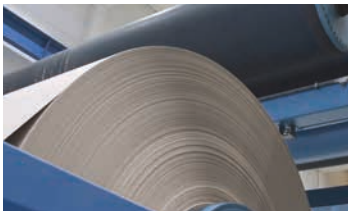
Paint, ink and latex
Undissolved lumps of resin, skins or clumps of pigment can ruin costly coating products. They are hard to detect, yet easy to avoid when using Eaton filters.

Commercial buildings, hospitals and schools
Cooling towers and boilers use pipeline strainers to protect them from damage due to scaling.

Food industry
Filter systems remove bits of pulp, skins or other unwanted matter from fruit juices. They remove lumps from chocolate syrup and wax from honey. The baking industry strains bone and gristle from molten lard with basket strainers and uses them to remove bits of dough, seeds, etc. From discharge water.







Straining water allows it to be recycled and used for other purposes.

Power generation
The electric power industry uses automatic strainers to clean water for cooling and to protect equipment. They also strain transformer oil to avoid clogging of the circulating lines.

More information
For specific, detailed application information, consult Eaton.

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Permanent Media Systems

Mechanically Cleaned Filters and Strainers

Technical Support Guide

Content and Product Overview

Mechanically Cleaned Technology - Filters and Strainers

- **Introduction, features and benefits**
- **How it works**
- **Product overview:**
  - DCF-400, 800, 1600
  - DCF-2000
  - DCF-3000
  - MCF-824 Series
  - MCS-500
  - MCS-1500
- **Cleanable media and systems options**

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Mechanically Cleaned Filters and Strainers

DCF, MCF, MCS

Unbeatable reliability with measurable ROI

Permanent Media with Disc Cleaning Technology

- Elimination of or reduction in disposable filter elements to reduce operator intervention, inventory costs and landfill waste
- Reduction in product loss, more thorough contaminant purge
- Reduction or elimination of operator intervention for safer operation
- Virtually maintenance-free, negligible downtime
- Compact design, lower capital cost to fit most installations
- Choice of pneumatic, motor drive or magnetic actuation
- Stainless steel screens from 15 micron slots to 1/4" perforations to handle a wide range of filtration needs
- Short payback time and increased ROI

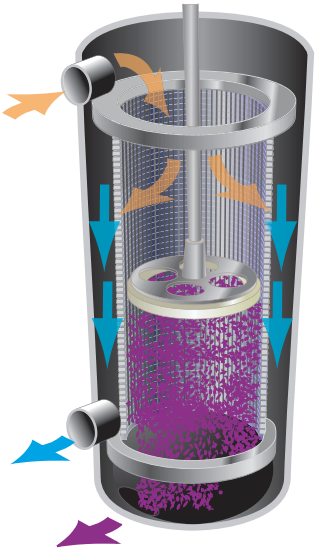
Eaton's unique spring-loaded cleaning disc (shown here in an MCS-500) ensures precise contact with the filtration screen to thoroughly and uniformly clean the media.

Typical Applications

- Paper coatings • PCC/GCC slurries • Phenolic resins
- Detergents • Petroleum-based greases • Ethanol processing
- Hot fry oils • CIP fluids (sodium hydroxide) • Starch
- Lime slurries • Adhesives • Curtain coaters • Nutraceuticals
- Machining coolants • Paint • Ink • Chocolate • Edible oils
- Tallow

Collect, concentrate, expel

Eaton's mechanically cleaned filters are based on a simple concept: A cylindrical stainless steel housing contains a filter screen; unfiltered liquids enter the inlet; solids are deposited on the interior surface of the filtration screen; and filtered fluid exits at the outlet.



Choice of actuation method

Pneumatic
The cleaning disc can be actuated by air pressure alone (60 to 80 psi @ 5 cfm). DCF-800 and DCF-1600 models feature single or twin air cylinders. The smaller DCF-400 is equipped with a single cylinder. The DCF-3000 model is only available in twin actuator design.

Pneumatic with magnetic coupling
MCS and MCF series utilize magnets to eliminate the need for cover thru-holes and their associated seals. This cost-effective method reduces maintenance and lengthens operating life.

Motorized
The DCF-2000 Series uses a motor to drive the cleaning disc through higher viscosity fluids and other challenging conditions.

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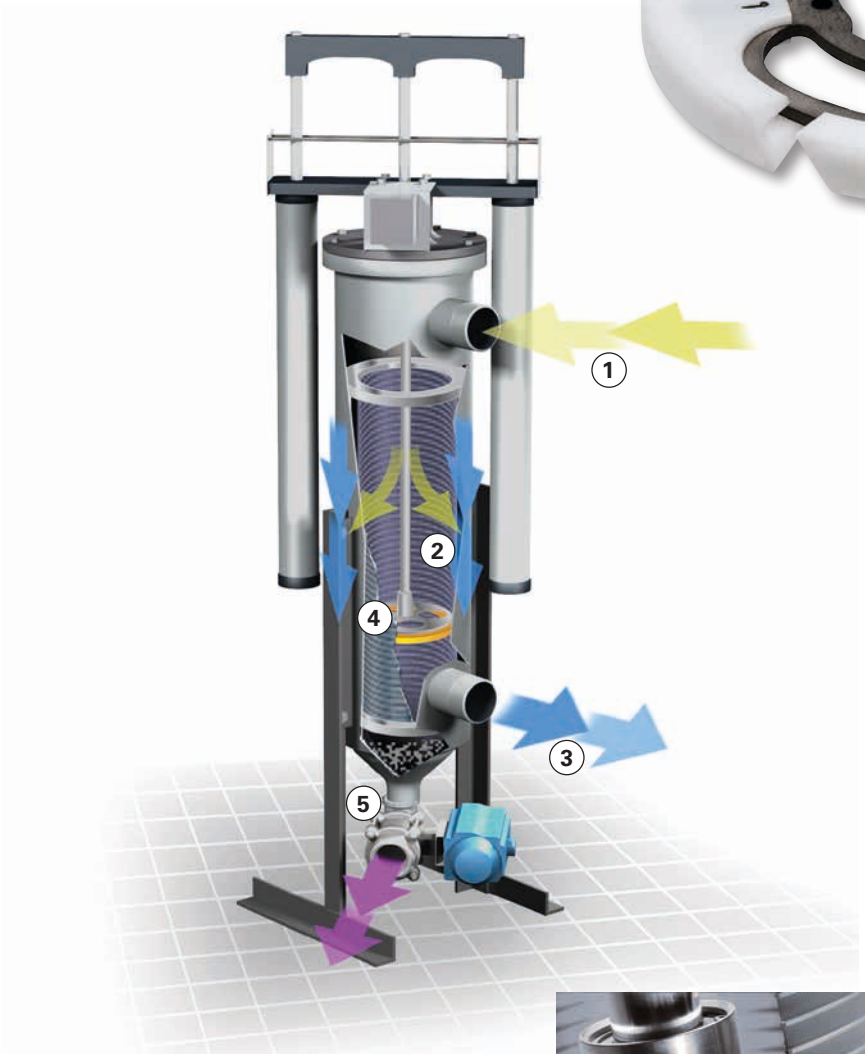
Disc Power

Our unique circular cleaning disc design (MCF 824-Series design shown) ensures intimate contact with the screen to thoroughly and uniformly clean the media.



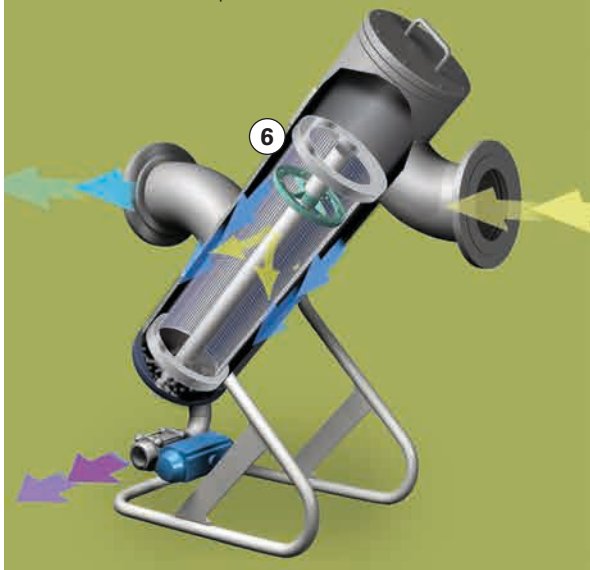
In Eaton's DCF mechanically cleaned filter unit, incoming fluids (1) are channelled from the interior cylinder through a wire screen (2) to the outer cylinder and out the discharge port (3).

A cleaning disc (4) moves up and down inside the cylinder to periodically clear the filter screen. Particles are collected at the bottom of the housing where they can be discharged (5).

How it works

Eaton's mechanically cleaned filters are based on a simple concept: A cylindrical stainless steel housing contains a filter screen; unfiltered liquids enter the inlet; solids are deposited on the interior surface of the filtration screen; and filtered fluid exits at the outlet.

When the media requires cleaning (based on time, differential pressure, or manual selection), a spring loaded cleaning disc travels down and up, wiping the media clean of concentrated solids in both strokes. Once the debris is removed from the slotted screen, the cleaning disc directs the contaminant to the bottom of the housing and out of the flow path. This cleaning process happens while the filter remains in service, thereby maintaining process efficiency and dramatically reducing loss of valuable product.



Eaton MCF and MCS operate in much the same manner as DCF units, but add the advantage of a magnetically coupled disc mechanism (6). This unique design eliminates the need for internal seals and reduces maintenance costs.

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Mechanically Cleaned Filters and Strainers

DCF filter systems

When processing water and water-like liquids where a low initial investment is demanded, this series delivers tremendous benefits.

DCF-400

DCF-800

DCF-1600

DCF-2000

DCF-2000

Designed specifically for the needs of the pulp and paper industry, the DCF-2000 features a rugged motorized cleaning action, which can handle the continuous processing requirements of protecting critical wet-end coating operations.

MCS strainers

Engineered to conserve valuable process water while protecting costly equipment from debris, the MCS features fast-cleaning magnetically coupled actuation. This high flow strainer uses a magnetically coupled cleaning disc, which eliminates the need for cover thru-holes and their associated seals.

MCS-500

MCS-1500

DCF with twin actuation

Designed for the rigors of processing highly viscous, abrasive, sticky, or otherwise hard-to-process liquids, the Twin Actuation is ideal for a broad spectrum of challenging applications.

DCF-1600 with Twin Actuation

DCF-3000

MCF-824

MCF-824 filter system

The MCF features a magnetically coupled cleaning disc, which eliminates the need for lid thru-holes and their associated seals. The MCF was designed specifically for the most challenging process liquids and conditions, and features the fastest cleaning action of the mechanically cleaned family.

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TECHNICAL INFORMATION
Mechanically Cleaned Systems

	Pneumatically driven				Motor driven	Pneumatically driven with magnetic coupling		
	DCF-400	**DCF-800**	**DCF-1600**	**DCF-3000**	**DCF-2000**	**MCF-824**	**MCS-500**	**MCS-1500**
Weight lbs (kg)	Approx. 35 (16)	Approx. 75 (34)	Approx. 215 (97.5)	Approx. 639 (290)	Approx. 564 (256)	Approx. 200 (91)	Approx. 350 (159)	Approx. 775 (352)
Service Height in (mm)	Approx. 62 (1575)	Approx. 69 (1753)	Approx. 102 (2591)	Approx. 136 (3454)	Approx. 80 (2032)	Approx. 64 (1626)	Approx. 66 (1676)	Approx. 102 (2591)
Total Volume gal (l)	Approx. 0.94 (3.5)	Approx. 3.9 (14.8)	Approx. 11 (41.6)	Approx. 49.2 (186.2)	Approx. 11 (41.6)	Approx. 11 (41.6)	Approx. 18.7 (70.8)	Approx. 49.2 (186.2)
Purge Chamber Capacity - gal (l)	0.0313 (0.119)	0.2 (0.74)	1.5 (6)	1.1 (4.1)	1.5 (6)	1.3 (5)	0.56 (2.1)	1.1 (4.1)
Filtration Surface Area - in^2 (cm^2)	112 (722)	264 (1704)	610 (3995)	1508 (9729)	610 (3995)	610 (3995)	610 (3995)	1508 (9729)
Flow Rate Range at 100 µm - gpm (m^3/h)	2–15 (0.45–3.5)	15–60 (3.5–13.5)	60–180 (13.5–40)	to 1100 (to 250)	30–200 (6.8–45.4)	30–180 (6.8–40)	30–180 (6.8–40)	to 1100 (to 250)
Temperatur max. °F (°C)	350 (177)	350 (177)	350 (177)	350 (177)	350 (177)	180 (82)	180 (82)	180 (82)
Pressure max. psi (bar)	300 (21)	150 (10.5)	150 (10.5)	150 (10.5)	150 (10.5)	150 (10.5)	150 (10.5)	150 (10.5)
Housing/wetted parts material*	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	

* Details see technical data sheets of single products

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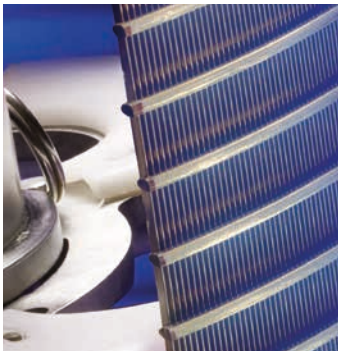
Cleanable Media and System Options

Selection of media retentions and degree of automation is easy with Eaton mechanically cleaned filtration systems. Choose from 15-micron filter elements to ¼" strainers. Manual to semi-automatic to full microprocessor controlled systems can be configured to suit specific operations, and the range of internal and external components help make Eaton systems a logical choice for long-term efficiency and cost control.

A range of control systems can be employed to actuate and monitor mechanically cleaned systems. Microcomputer controls can also be integrated with system-wide operations.

Media Elements

Slotted wedge wire
DCF/MCF/MCS filter screens feature special wedge wire that is honed perfectly circular to guarantee contact with the cleaning disc so the slot openings are smallest at the screen's surface. This design helps prevent particle plugging of the slot openings while assuring total rated solids removal.



Perforated
Perforated screens feature precise and uniform perforation patterns for complete removal of larger solids. These elements are ideal for straining large volumes of viscous fluids. 1/16", 1/8" and ¼" perforations are available.

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Mechanically Cleaned Filter and Strainer Media Options

Media Retentions

Slotted wedge wire

Inch	Micron	Mesh	% Open Area
.0006	15	–	2
.001	25	–	3
.0015	38	400	5
.002	50	325	6
.003	75	200	9
.004	100	150	12
.006	150	100	17
.007	180	80	19
.008	200	70	21
.009	230	60	23
.015	380	40	33
.024	610	30	44
.030	750	20	50
.045	1140	15	60

Perforated

Inch	Micron	Mesh	% Open Area
1/16	1575	12	40
1/8	3175	6	40
1/4	6350	3	57

Additional retentions available. Consult Eaton.

Control System Choices

The control options for mechanically cleaned filters are as broad as the applications they serve. Available controllers include:

PLC controls deliver programmable stand-alone performance. A panel mounted HMI allows for easy parameter changes and system monitoring. Power isolation design reduces electrical shock hazard. PLC controls can also integrate into existing control networks. Eaton, Allen Bradley and Siemens are standard options. Hardware is mounted in a NEMA4 enclosure (stainless steel optional).

Continuous Cleaning Valve (CCV) is the standard configuration where the cleaning disc continuously cycles, driven by shop airflow. Purge is controlled by a manual valve or push-button.

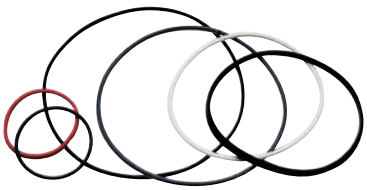
The low cost smart relay option allows for timed clean or timed clean and purge. Parameter changes are made via an integrated display. Hardware is mounted in a NEMA4 enclosure (stainless steel optional). Dual pneumatic timers are also available. As standard, hardware in mounted in a NEMA4 enclosure (stainless steel optional).

Disc and Seal Choices

To meet the widest range of operating conditions and process liquid characteristics, Eaton mechanically cleaned systems are available with a number of lid and element seal elastomers and cleaning discs.

Lid and element seals

Viton® Nordel®



Cleaning discs

UHMWPE | Teflon® or Kynar® (DCF design shown) | Urethane

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North America
44 Apple Street
Tinton Falls, NJ 07724
Toll Free: 800 656-3344
(North America only)
Tel: +1 732 212-4700

Europe/Africa/Middle East
Auf der Heide 2
53947 Nettersheim, Germany
Tel: +49 2486 809-0

Friedensstraße 41
68804 Altlußheim, Germany
Tel: +49 6205 2094-0

An den Nahewiesen 24
55450 Langenlonsheim, Germany
Tel: +49 6704 204-0

Greater China
No. 7, Lane 280,
Linhong Road
Changning District, 200335
Shanghai, P.R. China
Tel.: +86 21 2899-3687

Asia-Pacific
100G Pasir Panjang Road
#07-08 Interlocal Centre
Singapore 118523
Tel.: +65 6825-1620

For more information, please email us at *filtration@eaton.com* **or visit** *www.eaton.com/filtration*

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