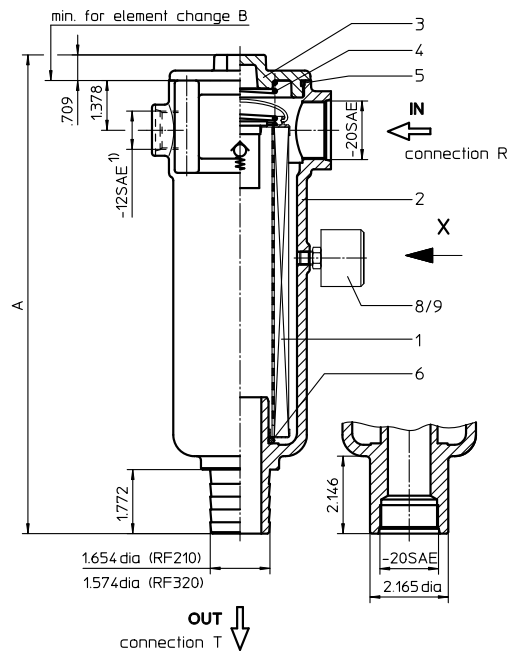
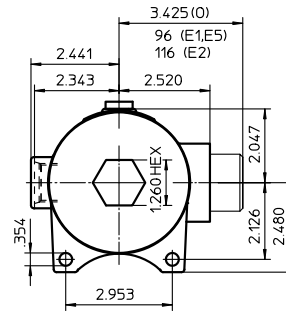
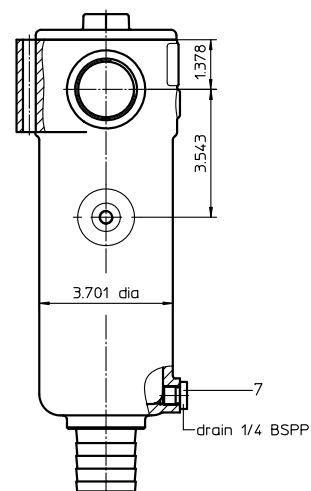


# Series RF 210-320 145 PSI



view X



**Dimensions:**

| Type   | A     | B     | weight   | volume tank |
|--------|-------|-------|----------|-------------|
| RF 210 | 13.26 | 8.07  | 6.0 lbs. | .30 Gal.    |
| RF 320 | 16.61 | 11.41 | 7.7 lbs. | .45 Gal.    |

1) additional connection „IN“ max. -12 SAE, by agreement

Dimensions: inches

Designs and performance values are subject to change.

# Return Line Filter

## Series RF 210-320

### 145 PSI

#### Description:

Return-line filter series RF 210-320 have a working pressure up to 145 PSI. The RF filter is mounted in the return line.

The return pipes at the outlet connection must be less than 39 inches long. The pressure measured at the clogging indicator is the back pressure of the element and the return line hose.

For cleaning the mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For filtration finer than 40 µm, use the disposable elements made of microglass or paper. Filter elements as fine as 5 µm(c) are available; finer filter elements upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

#### 1. Type index:

##### 1.1. Complete filter: (ordering example)

**RF. 210. 10VG. 16. S. P. -. UG. 4. -. O**

|   |   |   |   |   |   |   |   |   |    |    |
|---|---|---|---|---|---|---|---|---|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|----|----|

- 1 | **series:**  
RF = return-line filter
- 2 | **nominal size:** 210, 320
- 3 | **filter-material and filter-fineness:**  
80G, 40G, 25G, 10G stainless steel wire mesh  
25VG, 16VG, 10VG, 6VG, 3VG microglass
- 4 | **filter element collapse rating:**  
16 = Δp 232 PSI
- 5 | **filter element design:**  
E = without by-pass valve  
S = with by-pass valve, Δp 29 PSI
- 6 | **sealing material:**  
P = Nitrile (NBR)  
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)  
- = standard  
VA = stainless steel  
IS06 = for HFC applications, see sheet-no. 31601  
IS07 = for oil/ammonia mixtures (NH<sub>3</sub>), see sheet-no. 31602
- 8 | **connection:**  
UG = thread connection
- 9 | **no. of version:**

|                          |    |          |
|--------------------------|----|----------|
| <b>version</b>           | 3  | 4        |
| <b>connection R type</b> | UG | UG       |
| <b>size</b>              | 6  | 6        |
| <b>connection T type</b> | UG | SA       |
| <b>size</b>              | 6  | 42 or 40 |

**type:** UG = thread  
SA = hose nozzle

**size:** 6 = -20 SAE  
42 = 1.65 dia (RF 210)  
40 = 1.57 dia (RF 320)
- 10 | **filter housing specification:** (see catalog)  
- = standard  
IS06 = for HFC applications, see sheet-no. 31605
- 11 | **clogging indicator:**  
- = without  
O = visual, see sheet-no. 1616  
E1 = pressure switch, see sheet-no. 1616  
E2 = pressure switch, see sheet-no. 1616  
E5 = pressure switch, see sheet-no. 1616

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

##### 1.2. Filter element: (ordering example)

**01E. 210. 10VG. 16. S. P. -. D**

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

- 1 | **series:**  
01E. = filter element according to company standard
- 2 | **nominal size:** 210, 320
- 3 | - 7 | see type index-complete filter
- 8 | **accessories:**  
D = with wire strap

## Technical data:

|                                 |  |
|---------------------------------|--|
| design temperature:             | 14 °F to +212 °F   |
| operating temperature:          | 14 °F to +176 °F   |
| operating medium                | mineral oil, other media on request                      |
| max. operating pressure:        | 145 PSI  |
| opening pressure by-pass valve: | 29 PSI   |
| process connection:             | thread connection  |
| output:                         | hose nozzle or thread connection                         |
| housing material:               | Al-cast, glass fiber reinforced polyamide (filter cover) |
| sealing material:               | Nitrile (NBR) or Viton (FPM), other materials on request |
| installation position:          | vertical   |

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.  
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

## Pressure drop flow curves:

### Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left( \frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left( \frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

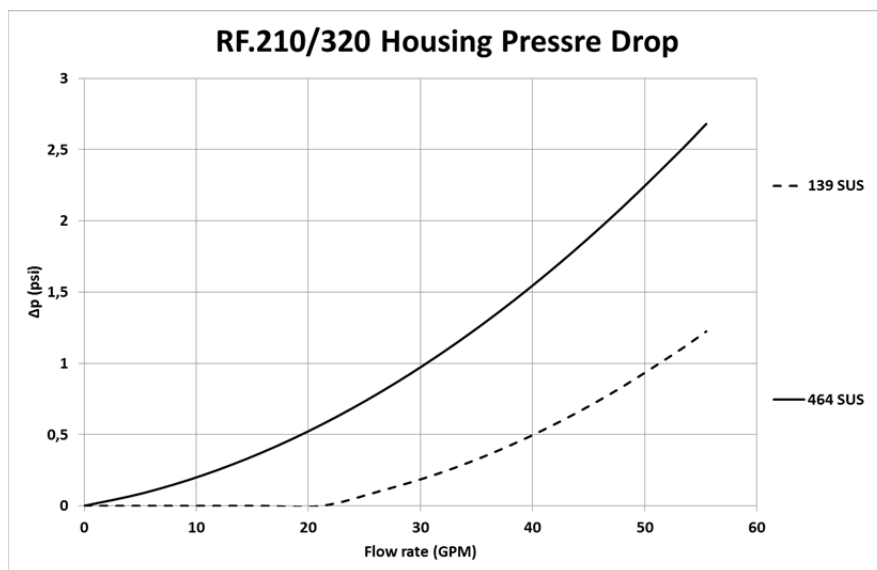
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

| RF  | VG    |       |       |       |       | G      |        |        | P     |
|-----|-------|-------|-------|-------|-------|--------|--------|--------|-------|
|     | 3VG   | 6VG   | 10VG  | 16VG  | 25VG  | 25G    | 40G    | 80G    | 10P   |
| 210 | 1.600 | 1.111 | 0.711 | 0.619 | 0.423 | 0.0588 | 0.0549 | 0.0376 | 0.353 |
| 320 | 1.148 | 0.797 | 0.510 | 0.444 | 0.304 | 0.0337 | 0.0314 | 0.0215 | 0.253 |

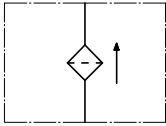
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.

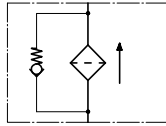


## Symbols:

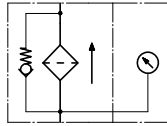
without indicator



with by-pass valve



visual  
O



electric  
contact maker E1



electric  
contact breaker E5



electric  
contact maker/breaker E2



## Spare parts:

| item | qty. | designation                | dimension    |            | article-no.               |
|------|------|----------------------------|--------------|------------|---------------------------|
|      |      |                            | RF 210       | RF 320     |                           |
| 1    | 1    | filter element             | 01E.210...   | 01E.320... |                           |
| 2    | 1    | filter housing             | NG 210       | NG 320     |                           |
| 3    | 1    | screw plug                 | M90 x 2      |            | 301910                    |
| 4    | 1    | spring                     |              |            | 302144                    |
| 5    | 1    | O-ring                     | 82 x 3       |            | 305191 (NBR) 305298 (FPM) |
| 6    | 1    | O-ring                     | 40 x 3       |            | 304389 (NBR) 304391 (FPM) |
| 7    | 1    | screw plug                 | ¼ BSPP       |            | 305003                    |
| 8    | 1    | clogging indicator, visual | O            |            | 301721                    |
| 9    | 1    | pressure switch, electric  | E1, E2 or E5 |            | see sheet-no. 1616        |

## Test methods:

Filter elements are tested according to the following ISO standards:

|           |   |
|-----------|---|
| ISO 2941  | Verification of collapse/burst resistance               |
| ISO 2942  | Verification of fabrication integrity                   |
| ISO 2943  | Verification of material compatibility with fluids      |
| ISO 3723  | Method for end load test                                |
| ISO 3724  | Verification of flow fatigue characteristics            |
| ISO 3968  | Evaluation of pressure drop versus flow characteristics |
| ISO 16889 | Multi-pass method for evaluating filtration performance |

### 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

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.