

**FLC200 Seal Water Control and Monitoring Unit**

**EagleBurgmann®**



**FLC200 Seal Water Control and Monitoring Unit / Supply System**

**General**

**FLC200** seal water control unit has been especially developed to monitor the amount of seal water used in rotating shaft seals in the pulp and paper industries, seal space pressures as well as seal condition. It is possible to tell from one glance the condition of the seal. Rotating shaft sealing is a significant cost factor in process industries. For this reason it is not the same how sealing water flows and how it is monitored. It is fact that unnecessary seal wear results in excess raw and wastewater handling. Through controlling seal water amounts it is possible to decrease costs incurred through reduced water demand and wastewater loads. FLC200 seal water control unit is an invaluable tool for dealing with these unnecessary costs.

Three basic models typical seals (xx = flow range)

Model <b>FLC2xxQ</b> <b>*FCQ</b>	For quench-flush seals
Model <b>FLC2xx</b> <b>*FC</b>	For packings- and single mechanical seals
Model <b>FLC2xxD</b> <b>*FCP</b>	For double acting mechanical seals

In addition Flow control can modify **FLC200** in to variable circumstances, where is a great demand for lasting materials, e.g. erosive fluids. \*FCQ, FC and FCP are Flow Control Fittings

**Technical data**

Flow ranges:	0.5-4, 1-8, 4- 5 and 10-30 LPM or (USGPM)
Max. Pressure:	20 bar / 2 MPa / 290 psi
Max. Temperature:	+85°C (POM-body)
Typical accuracy:	±5-10% (o.F.S.) (+20°C) external clean water
Pressure drop:	0.6 bar 3 l/min and 1.5 bar 8 l/min
Body material type:	POM-C (PE, PVDF, EN 1.4401)
Metal parts:	EN 1.4401/1.4301 (wetted parts)
Flow tube:	Grilamid TR 55 (PSU or glass)
Seals:	NBR (FPM)
Supports:	Stand, Z- or L- brackets



**Model FLC2xxQ / FCQ**



**Model FLC2xx / FC**



**Model FLC2xxD / FCP**

**The operating principle and flow meter reading**

Sealing water is directed into the meter via the bottom hose inlet connector and to the flow adjustment valve (1) and then through to the measuring section. A flow rate is determined by the float (2), which in conjunction with the internally constructed fixed cone (3) forms a precise and stable flow meter. Changes in the cross surfaces of the float and cone form changes in pressure differences, which correspond to the exact amount of flow. The set pressure change values of the float in the measuring section define the position. Sealing water leaves the measuring section via a channel through to the check valve (4) and from there to the seal. Required seal water is lead to the pressure adjustment module located under the flow meter, which adjusts the required back- pressure amounts in the dual action seal.

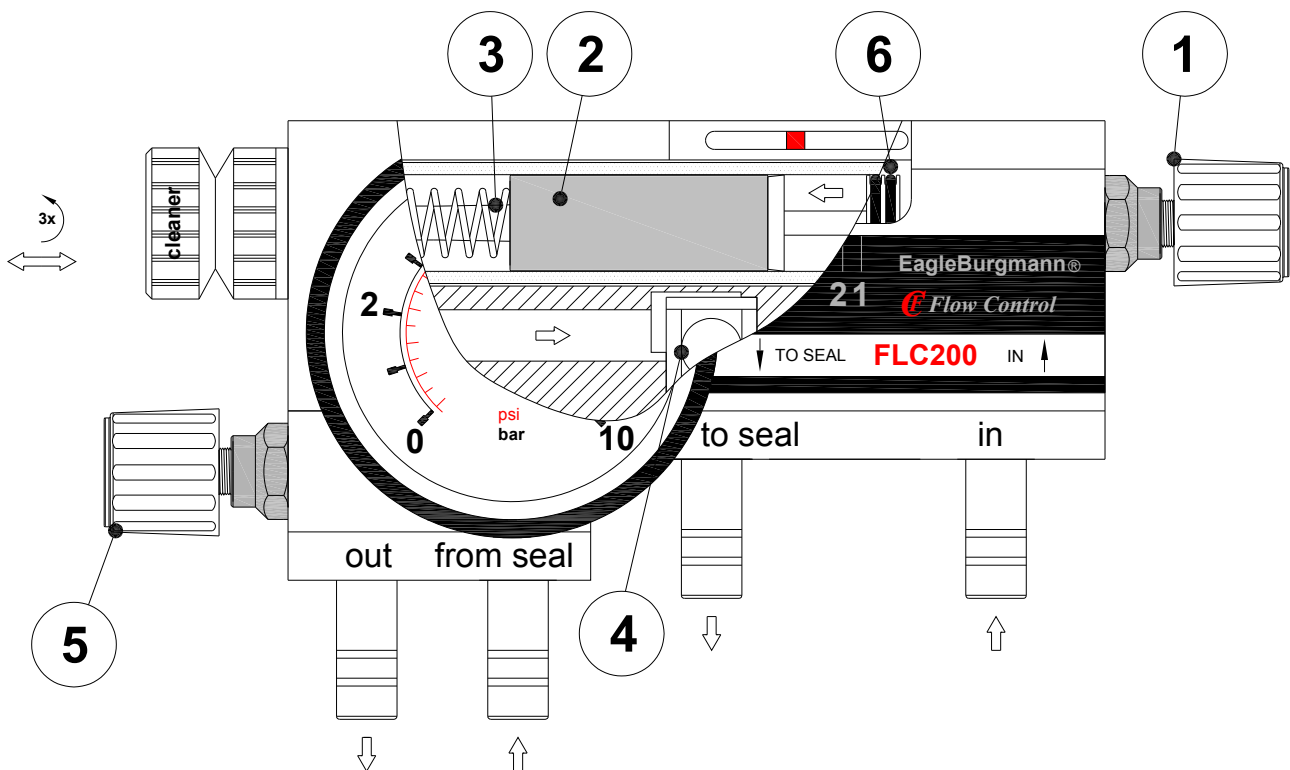
The flow rate is accurately indicated to the scale on the meter body. The actual amount of flow capacity is adjusted by the flow adjustment valve (1), as well as in such circumstances where there is a pressure adjustment module in addition to the regulator valve (5).

**Keeping the seal water control unit clean**

The display on the flow meter must remain clean and this is achieved by using the cleaner provided (6). The flow pipe may be cleaned when seal water is running or not running and this does not affect any changes for current flow or pressure nor any pressure shocks causes.

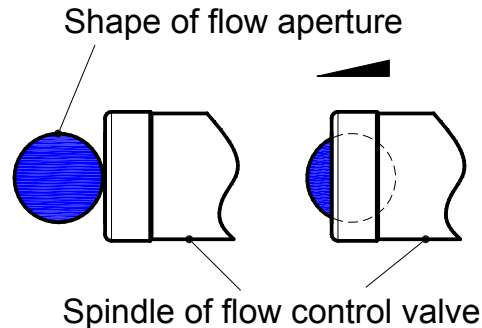
**The blockage free check valve is standard in every flow meter**

An internally constructed and replaceable check valve (4) ensures complete seal operation conformity e.g. against pressure shocks. The check valve is located on the clean water side and it has no springs or moving mechanical parts.



## Anti-Blocked flow adjustment valve

Sealing water contaminants do not block the flow adjustment valve (1 and 5) because the optimal circular segment flow aperture permits the free flow of large particles.



## Seal damage

A normal cause of damage to shaft seals is the dry running of mechanical shaft seals and the depletion of impregnated material in cord packing seals. In such circumstances both seal types suffer from a non-conforming seal water control unit or sometimes it can result in the deficiency completely.

### Packing Seals

Failure to ensure seal water in cord packings results in the burning of the seal, which causes depletion of impregnated material, ultimately resulting in overheating through friction. Such conditions result in cord packings hardening and an early end to their service life.

### Mechanical Seals

Failure to ensure seal water to mechanical shaft seals results in the overheating of moving surfaces, further resulting in surface damage. For this reason seals normally begin to leak and require either replacement or repair. The advantage of cord packing seals is that they can be tightened.

**FLC200** seal water control unit prevents dry running of shaft seal solutions and at the same time cools, if required, the seal area. In addition the unit maintains a manageable amount of flow leakage preventing material wear from blocking the seal area. **FLC200** also assists in optimising the amount of seal water usage. At the same time it reduces wastewater loads and enables seal solutions to operate reliably and with a longer service life. **FLC200** setting values indicator tells pressure and flow changes compared to the start value.



## FLC200 Flow Controller For optimum water management

The most common reason for seal failures is dry running of seal faces of mechanical seals and loss of impregnation of stuffing box packings. For both of these sealing types this is usually caused by an insufficient supply with flush water or barrier water depending on whether it concerns single or double operating mode.

The EagleBurgmann FLC200 has been developed to monitor the amount of seal water (flush, quench and barrier water) used for rotating equipment (e.g. centrifugal pumps) and adjust it to an optimum level. Important parameters such as pressure and flow rate are permanently controlled and possible process malfunctions can be recognised at an early stage. In many pumps (especially older factory sites) the seal water discharge is only limited by the dimension of the water pipeline. Flow rates often are adjusted manually by estimations which usually prove to be too high (up to 15 l/min with stuffing box packings and 8,5 l/min with double mechanical seals). The FLC200 prevents the mechanical seal from dry running and additionally controls and optimises the flow rate and pressure within the seal. This means that the quantity of fresh and waste water are reduced to a minimum level and hence guarantees a failure-free operation of the seal and at the same time minimises the repair and maintenance costs.

### Operational recommendations

Flow ranges: 0.5-4, 1-8, 5-15 and 10-30 l/min  
 $p_{3 \text{ max}}$ : 20 bar / 2 MPa  
 $t_{3 \text{ max}}$ : 85 °C  
 Typical accuracy:  $\pm 5\%$  (average)  
 Pressure drop:  
 0.6 bar 3 l/min and 1.3 bar 8 l/min  
 Body material types:  
 POM (PE, AISI 316 or Teflon®)  
 Metal parts: AISI 316 and AISI 304  
 Flow tube: Grilamid TR 55 (PSU or glass)  
 Seals: FPM (Viton®)  
 Supports: stand, Z- or L-bracket

All technical specifications are based on extensive tests and our many years of experience. The diversity of possible applications means, however, that they can serve only as guide values. We must be notified of the exact conditions of application before we can provide any guarantee for a specific case. Subject to change.

## INFORMATION ED 08031

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### Standard types and order codes

Code	Type	Connection
226 152 299	FLC208-10-00	R3/8" without brackets, stand and/or hoses
310 040 299	FLC208-10-R3/8"-00	R3/8" (with hoses)
310 044 299	FLC208-10-G3/8"-00	G3/8" (with female base plate, no hoses)
310 048 299	FLC208Q-00	R3/8" (no hoses)
310 053 299	FLC208Q-R3/8"-00	R3/8" (with hoses)
310 058 299	FLC208Q-G3/8"-00	G3/8" (with female base plate, no hoses)
310 062 299	FLC208D-10-00	R3/8" (no hoses)
310 067 299	FLC208D-10-R3/8"-00	R3/8" (with hoses)
310 071 299	FLC208D-10-G3/8"-00	G3/8" (with female base plate, no hoses)

### Calculation of potential cost savings

Considered period: 5 years  
 Seal size (shaft): 60 mm  
 20 % of complete new seal  $\approx$  repair costs per year  
 Operating conditions  
 Media: pulp with 6 % stock consistency  
 Media pressure: 3 bar  
 Media temperature: 60 °C  
 Rotational speed: 1,500 min<sup>-1</sup>  
 Mechanical Seal \*) (e.g. Cartex-DN/60-00)  $\approx$  € 2,000.00  
 + repair of seal within 5 years  $\approx$  € 2,000.00

#### Without FLC200:

+ costs for compensation of leakage \*\*)  $\approx$  € 0.45  
 + water consumption (8 l/min) =  $8 \times 60 \times 24 \times 350 \times 5 / 1000 \approx$  € 20,160.00  
 Total (5 years)  $\approx$  € 24,160.45  
 cost per year = € 4,832.09

#### With FLC200:

+ supply system \*) (FLC204D-10-00)  $\approx$  € 380.00  
 + costs for compensation of leakage \*\*)  $\approx$  € 0.45  
 + water consumption (1,5 l/min) =  $1,5 \times 60 \times 24 \times 350 \times 5 / 1000 \approx$  € 3,781.00

Total (5 years)  $\approx$  € 8,161.45  
 cost per year = € 1,632.29  
 appr. 66 % cost savings

\*) investment; \*\*) The leakage of barrier fluid of a double seal  $\approx 20 \text{ ml/h}$  ( $\times 24 \text{ h/d} \times 350 \text{ d/y}$ ) =  $0,168 \text{ m}^3/\text{y}$ ; with corresponding costs for water of appr. 0,50- €/m<sup>3</sup>; this is a value of € 0,09 annually per mechanical seal. In 5 years this adds up to € 0,45.

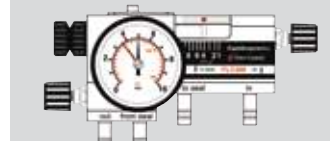
### Base model



FLC208 For packings and single mechanical seals with flushing



FLC208Q For mechanical seals with quench



FLC208D For double mechanical seals

### Customer benefits at a glance

- Economic supply system
- Optimized seal water management
- Reduced cost for fresh and waste water
- Compact and robust design
- High flexibility
- Straightforward handling
- Easy cleaning also during operation
- No clogging due to big diameters
- Save operation also with pressure changes
- Fast detection of seal failures



## FLC200 Flow Controller Für optimales Wasser-Management

Die häufigste Ausfallursache von Dichtungen ist Trockenlauf der Gleitflächen bei Gleitringdichtungen und der Verlust der Imprägnierung bei Stopfbuchspackungen. Bei beiden Dichtungstypen wird dies normalerweise durch eine mangelnde Versorgung mit Spül- oder Sperrwasser verursacht, je nachdem ob es sich um eine einfach- oder doppelwirkende Fahrweise handelt.

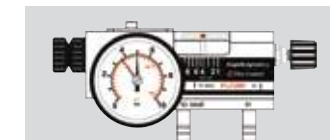
Die Durchflusskontrolleinheit FLC200 wurde entwickelt, um die Menge an Dichtungswasser (Spül-, Quench-, oder Sperrwasser) bei rotierenden Maschinen (z. B. Kreiselpumpen) in einfacher Weise auf einen für den sicheren Betrieb der Dichtung optimalen bzw. minimal notwendigen Wasserverbrauch einzustellen, wichtige Parameter wie Druck und Durchfluss permanent zu überwachen und somit eventuelle Betriebsstörungen frühzeitig erkennen zu können. Bei vielen Pumpen (vor allem bei Altanlagen) wird der Spül- oder Sperrwasserdurchsatz nur durch die Dimension der Zuleitung bzw. durch Erfahrungswerte vorgegeben, welche meist beträchtlich über den vom Hersteller empfohlenen Werten liegen (bis zu 15 l/min bei Stopfbuchspackungen und 8,5 l/min bei Doppel-Gleitringdichtungen).

Mit dem FLC200 wird zum einen Trockenlauf der Gleitringdichtung verhindert. Zusätzlich kontrolliert und optimiert der FLC200 den Durchfluss und den Druck in der Dichtung. Dies bedeutet, dass die Mengen an Frisch- und Abwasser auf ein für den sicheren Betrieb der Dichtung abgestimmtes Minimum reduziert werden können. Somit sichert er eine störungsfreie Funktion des Prozesses und minimiert gleichzeitig die anfallenden Reparatur- und Instandhaltungskosten.

### Einsatzempfehlung

Durchflussrate: 0.5-4, 1-8, 5-15 und 10-30 l/min  
 $p_{3 \text{ max}}$ : 20 bar / 2 MPa  
 $t_{3 \text{ max}}$ : 85 °C  
 Genauigkeit:  $\pm 5\%$  (Durchschnitt)  
 Druckabfall:  
 0.6 bar 3 l/min und 1,3 bar 8 l/min  
 Gehäusematerial:  
 POM (PE, AISI 316 oder Teflon®)  
 Metallteile: AISI 316 und AISI 304  
 Schauglas: Grilamid TR 55 (PSU oder Glas)  
 Dichtungen: FPM (Viton®)  
 Befestigungen: Ständer, Z- oder L-Platte

### Basismodelle



FLC208 für Packungen und Einfach-Gleitringdichtungen mit Spülung



FLC208Q für Gleitringdichtungen mit Quench



FLC208D für Doppel-Gleitringdichtungen

### Vorteile im Überblick

- kostengünstiges Versorgungssystem
- optimiertes Dichtungswassermanagement
- reduzierte Kosten für Frisch- und Abwasser
- kompakte und robuste Bauweise
- flexibles Baukastensystem
- einfache Bedienung
- einfache Reinigung auch während des Betriebes
- keine Verstopfungsgefahr durch große Querschnitte
- sicherer Betrieb auch bei Druckschwankungen
- schnelles Erkennen von Dichtungsschäden

Alle technischen Angaben können aufgrund der Vielfalt der Anwendungsmöglichkeiten nur als Richtwerte angesehen werden. Eine Gewährleistung im Einzelfall ist nur möglich, wenn uns die genauen Einsatzbedingungen bekannt sind und dies in einer gesonderten Vereinbarung bestätigt wurde. Bei besonders kritischen Betriebsbedingungen empfehlen wir eine Beratung durch unsere Fachingenieure. Änderungen vorbehalten.



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### Standardausführungen und Bestellnummern

Code	Typ	Anschluss
226 152 299	FLC208-10-00	R3/8" (ohne Schlauch)
310 040 299	FLC208-10-R3/8"-00	R3/8" (mit Schlauch)
310 044 299	FLC208-10-G3/8"-00	G3/8" (Basisplatte female, ohne Schlauch)
310 048 299	FLC208Q-00	R3/8" (ohne Schlauch)
310 053 299	FLC208Q-R3/8"-00	R3/8" (mit Schlauch)
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310 062 299	FLC208D-10-00	R3/8" (ohne Schlauch)
310 067 299	FLC208D-10-R3/8"-00	R3/8" (mit Schlauch)
310 071 299	FLC208D-10-G3/8"-00	G3/8" (Basisplatte female, ohne Schlauch)

### Berechnung des Kosteneinsparungspotentials

Betrachteter Zeitraum: 5 Jahre  
 Betrachtete Dichtungsgröße (Wellendurchmesser): 60 mm  
 20 % des Dichtungspreises  $\approx$  Reparaturkosten pro Jahr  
 Betriebsbedingungen  
 Medium: Zellstoff mit 6 % Stoffkonzentration  
 Mediumsdruck: 3 bar  
 Mediumstemperatur: 60 °C  
 Drehzahl Pumpe: 1.500 min<sup>-1</sup>  
 Gleitringdichtung \*) (z.B. Cartex-DN/60-00)  $\approx$  € 2.000,00  
 + Reparatur der Dichtung in 5 Jahren  $\approx$  € 2.000,00

#### Ohne FLC200:

+ Wasserkosten für Leckagekompensation \*\*)  $\approx$  € 0,45  
 + Kosten Wasserverbrauch (8 l/min) =  $8 \times 60 \times 24 \times 350 \times 5 / 1000 \approx$  € 20.160,00  
 Summe (5 Jahre)  $\approx$  € 24.160,45  
 Kosten pro Jahr = € 4.832,09

#### Mit FLC200:

+ Versorgungssystem \*) (FLC204D-10-00)  $\approx$  € 380,00  
 + Wasserkosten für Leckagekompensation \*\*)  $\approx$  € 0,45  
 + Kosten Wasserverbrauch (1,5 l/min) =  $1,5 \times 60 \times 24 \times 350 \times 5 / 1000 \approx$  € 3.781,00  
 Summe (5 Jahre)  $\approx$  € 8.161,45  
 Kosten pro Jahr = € 1.632,29  
 ca. 66 % Kosteneinsparung

\*) Anschaffungskosten; \*\*) Der Verlust von Sperrflüssigkeit bei einer Doppeldichtung beträgt  $\approx 20 \text{ ml/h}$  ( $\times 24 \text{ h/d} \times 350 \text{ d/a}$ ) =  $0,168 \text{ m}^3/\text{a}$ ; dies entspricht bei einem Wasserpreis von ca. 0,50- €/m<sup>3</sup> einem Betrag von € 0,09 pro Jahr pro Gleitringdichtung. Dies entspricht in 5 Jahren € 0,45.

## FLC200

### Features

The FLC200 is an economical sealing water management solution for reducing operating costs through minimized rates of fresh water and waste water. The FLC200 series is available in three basic versions:

**FLC200:** for single mechanical seals with flush

**FLC200Q:** for mechanical seals with quench

**FLC200D:** for double mechanical seals

These three basic types are available for five different indicated flow ranges and with numerous system components (e.g. mounting supports, stands, hoses, alarm sensors, etc.) and other material combinations.

Circulation in accordance with API 682 / ISO 21049: Plan 32, Plan 62

### Advantages

- Economical supply system
- Optimized sealing water management
- Reduced costs for fresh water and waste water
- Easy operation and cleaning even during operation
- Compact and robust design
- Safe operation even in case of pressure changes
- Quick detection of seal failures



# FLC200 (2)

## Recommended applications

- Pulp and paper industry

## Functional description

The FLC200 flow control unit is designed to enable easy adjustment of the rate of sealing water (flush, quench or buffer water) on rotary machines to the optimum and lowest level of water consumption necessary for the seal's safe operation. Key parameters such as pressure and flow can be permanently monitored for early detection of any malfunctions. The buffer medium is supplied by an external system.

## Product variants

Designation	FLC208-10-00	FLC208Q-00	FLC208D-10-00
Pressure gauge	x		x
Pressure control valve			x
Flow rate (l/min.)	1 ... 8	1 ... 8	1 ... 8
Allowable pressure	10 bar (145 PSI)		10 bar (145 PSI)
Allowable temperature	85 °C (185 °F)	85 °C (185 °F)	85 °C (185 °F)
Accuracy	±5 %	±5 %	±5 %
Housing material	POM	POM	POM
Metal parts	AISI 316 AISI 304	AISI 316 AISI 304	AISI 316 AISI 304
Sight-glass	Grilamid TR 55	Grilamid TR 55	Grilamid TR 55
Seals	FPM	FPM	FPM
Connections	Hose nozzles for 10 mm hose	Hose nozzles for 10 mm hose	Hose nozzles for 10 mm hose

Other versions with alternative connections, higher pressure and/or higher flow rates on request.