

# CytroPac small power unit

## Type CytroPac

**RE 51055**

Edition: 2017-01



► Component series 1X

### Features

- Integrated frequency converter
- Power 1.5 ... 4.0 kW with identical frame size and interfaces
- Power unit is suitable for S1 operation (continuous operation)
- Early warning signals in case of faults regarding oil level, temperature, return flow filter and frequency converter
- Plug and run (electrical connection via plug-in connection)
- Integrated cooling for motor and frequency converter, optionally also for active oil cooling
- Noise-reduced design
- Integrated oil drain facility
- Integrated return flow filter
- Reduced oil volume due to degassing-optimized tank
- Compact design
- Prestart Control to reduce the collapse of pressure
- Sleep function to reduce the power consumption, e.g. during accumulator charging operation.

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## Ordering code

01	02	03	04	05	06	07	08	09	10	11	12					
<b>CYTROPAC</b>	<b>-</b>	<b>1X</b>	<b>/</b>	<b>20</b>	<b>/</b>	<b>AF</b>		<b>/</b>	<b>2</b>	<b>/</b>	<b>/</b>	<b>/</b>	<b>1</b>	<b>/</b>	<b>7035</b>	<b>*</b>

01	Small power unit	<b>CYTROPAC</b>
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02	Component series 10 ... 19 (10 ... 19: unchanged installation and connection dimensions)	<b>1X</b>
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### Tank size

03	20 liters	<b>20</b>
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### Drive

04	Asynchronous motor with frequency converter	<b>AF</b>
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### Performance class

05	1.5 kW	<b>1.5</b>
	2.2 kW	<b>2.2</b>
	3.0 kW	<b>3.0</b>
	4.0 kW	<b>4.0</b>

### Pump

06	Size 4	<b>AS04</b>
	Size 5	<b>AS05</b>
	Size 8	<b>AS08</b>
	Size 11	<b>AS11</b>
	Size 14	<b>AS14</b>

07	Maximum operating pressure 240 bar	<b>2</b>
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### Sensor technology

08	Basic	<b>B</b>
	Advanced	<b>A</b>
	Premium	<b>P</b>

### Cooling type / maximum cooling power fluid<sup>1)</sup>

09	<b>Without</b>	<b>WA</b>
	700 Watt	<b>WB</b>
	1400 Watt	<b>WC</b>
	2000 Watt	<b>WD</b>

### Filling

10	Return flow filter	<b>1</b>
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### Coloring

11	RAL 7035	<b>7035</b>
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12	Further details in the plain text	<b>*</b>
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<sup>1)</sup> The connection to a cooling water supply for cooling the motor and the frequency converter must always be ensured before the operation.



#### Notice:

The required operating pressure can be pre-set at the factory. Please indicate when ordering. If there is no specification, the operating pressure is set at the factory to 25 bar.

## Selection table

### CytroPac power 1.5 kW

Power in kW	Displacement in cm <sup>3</sup> /r	Sensor technology design	Max. power oil cooling (W)	Material number
1.5	4	Basic	without	R901500001
			700	R901500002
			1400	R901500003
			2000	R901500004
		Advanced	without	R901500005
			700	R901500006
			1400	R901500007
			2000	R901500008
		Premium	without	R901500009
			700	R901500010
			1400	R901500011
			2000	R901500012
	5.5	Basic	without	R901500013
			700	R901500014
			1400	R901500015
			2000	R901500016
		Advanced	without	R901500017
			700	R901500018
			1400	R901500019
			2000	R901500020
		Premium	without	R901500021
			700	R901500022
			1400	R901500023
			2000	R901500024
	8	Basic	without	R901500025
			700	R901500026
			1400	R901500027
			2000	R901500028
		Advanced	without	R901500029
			700	R901500030
			1400	R901500031
			2000	R901500032
		Premium	without	R901500033
			700	R901500034
			1400	R901500035
			2000	R901500036
	11	Basic	without	R901500037
			700	R901500038
			1400	R901500039
			2000	R901500040
		Advanced	without	R901500041
			700	R901500042
			1400	R901500043
			2000	R901500044
		Premium	without	R901500045
			700	R901500046
			1400	R901500047
			2000	R901500048

## Selection table

### CytroPac power 1.5 kW

Power in kW	Displacement in cm <sup>3</sup> /r	Sensor design	Max. power oil cooling (W)	Material number
1.5	14	Basic	without	R901500049
			700	R901500050
			1400	R901500051
			2000	R901500052
		Advanced	without	R901500053
			700	R901500054
			1400	R901500055
			2000	R901500056
		Premium	without	R901500057
			700	R901500058
			1400	R901500059
			2000	R901500060

### CytroPac power 2.2 kW

Power in kW	Displacement in cm <sup>3</sup> /r	Sensor design	Max. power oil cooling (W)	Material number
2.2	4	Basic	without	R901500061
			700	R901500062
			1400	R901500063
			2000	R901500064
		Advanced	without	R901500065
			700	R901500066
			1400	R901500067
			2000	R901500068
		Premium	without	R901500069
			700	R901500070
			1400	R901500071
			2000	R901500072
	5.5	Basic	without	R901500073
			700	R901500074
			1400	R901500075
			2000	R901500076
		Advanced	without	R901500077
			700	R901500078
			1400	R901500079
			2000	R901500080
		Premium	without	R901500081
			700	R901500082
			1400	R901500083
			2000	R901500084
	8	Basic	without	R901500085
			700	R901500086
			1400	R901500087
			2000	R901500088
		Advanced	without	R901500089
			700	R901500090
			1400	R901500091
			2000	R901500092
Premium		without	R901500093	
		700	R901500094	
		1400	R901500095	
		2000	R901500096	

## Selection table

### CytroPac power 2.2 kW

Power in kW	Displacement in cm <sup>3</sup> /r	Sensor design	Max. power oil cooling (W)	Material number
2.2	11	Basic	without	R901500097
			700	R901500098
			1400	R901500099
			2000	R901500100
		Advanced	without	R901500101
			700	R901500102
			1400	R901500103
			2000	R901500104
		Premium	without	R901500105
			700	R901500106
			1400	R901500107
			2000	R901500108
	14	Basic	without	R901500109
			700	R901500110
			1400	R901500111
			2000	R901500112
		Advanced	without	R901500113
			700	R901500114
			1400	R901500115
			2000	R901500116
Premium		without	R901500117	
		700	R901500118	
		1400	R901500119	
		2000	R901500120	

### CytroPac power 3.0 kW

Power in kW	Displacement in cm <sup>3</sup> /r	Sensor design	Max. power oil cooling (W)	Material number
3.0	4	Basic	without	R901500121
			700	R901500122
			1400	R901500123
			2000	R901500124
		Advanced	without	R901500125
			700	R901500126
			1400	R901500127
			2000	R901500128
		Premium	without	R901500129
			700	R901500130
			1400	R901500131
			2000	R901500132
	5.5	Basic	without	R901500133
			700	R901500134
			1400	R901500135
			2000	R901500136
		Advanced	without	R901500137
			700	R901500138
			1400	R901500139
			2000	R901500140
Premium		without	R901500141	
		700	R901500142	
		1400	R901500143	
		2000	R901500144	

**CytroPac power 3.0 kW**

Power in kW	Displacement in cm <sup>3</sup> /r	Sensor design	Max. power oil cooling (W)	Material number
3.0	8	Basic	without	R901500145
			700	R901500146
			1400	R901500147
			2000	R901500148
		Advanced	without	R901500149
			700	R901500150
			1400	R901500151
			2000	R901500152
		Premium	without	R901500153
			700	R901500154
			1400	R901500155
			2000	R901500156
	11	Basic	without	R901500157
			700	R901500158
			1400	R901500159
			2000	R901500160
		Advanced	without	R901500161
			700	R901500162
			1400	R901500163
			2000	R901500164
		Premium	without	R901500165
			700	R901500166
			1400	R901500167
			2000	R901500168
14	Basic	without	R901500169	
		700	R901500170	
		1400	R901500171	
		2000	R901500172	
	Advanced	without	R901500173	
		700	R901500174	
		1400	R901500175	
		2000	R901500176	
	Premium	without	R901500177	
		700	R901500178	
		1400	R901500179	
		2000	R901500180	

**CytroPac power 4.0 kW**

Power in kW	Displacement in cm <sup>3</sup> /r	Sensor design	Max. power oil cooling (W)	Material number
4.0	4	Basic	without	R901500181
			700	R901500182
			1400	R901500183
			2000	R901500184
		Advanced	without	R901500185
			700	R901500186
			1400	R901500187
			2000	R901500188
		Premium	without	R901500189
			700	R901500190
			1400	R901500191
			2000	R901500192

## CytroPac power 4.0 kW

Power in kW	Displacement in cm <sup>3</sup> /r	Sensor design	Max. power oil cooling (W)	Material number
4.0	5.5	Basic	without	R901500193
			700	R901500194
			1400	R901500195
			2000	R901500196
		Advanced	without	R901500197
			700	R901500198
			1400	R901500199
			2000	R901500200
		Premium	without	R901500201
			700	R901500202
			1400	R901500203
			2000	R901500204
	8	Basic	without	R901500205
			700	R901500206
			1400	R901500207
			2000	R901500208
		Advanced	without	R901500209
			700	R901500210
			1400	R901500211
			2000	R901500212
		Premium	without	R901500213
			700	R901500214
			1400	R901500215
			2000	R901500216
	11	Basic	without	R901500217
			700	R901500218
			1400	R901500219
			2000	R901500220
Advanced		without	R901500221	
		700	R901500222	
		1400	R901500223	
		2000	R901500224	
Premium		without	R901500225	
		700	R901500226	
		1400	R901500227	
		2000	R901500228	
14	Basic	without	R901500229	
		700	R901500230	
		1400	R901500231	
		2000	R901500232	
	Advanced	without	R901500233	
		700	R901500234	
		1400	R901500235	
		2000	R901500236	
	Premium	without	R901500237	
		700	R901500238	
		1400	R901500239	
		2000	R901500240	

**Technical data**

(For applications outside these parameters, please consult us!)

<b>general</b>			
Installation position		Vertical	
Line connections	▶ Pressure port	G1/2	
	▶ Return flow	G1/2 (via filter) G1 (2x, direct)	
Place of installation		Industrial building; stationary application	
Ambient temperature range (during operation)	°C	+10 ... +40	
Material	▶ Oil tank	PA66 GF30	
	▶ Hood	PA66 GF30	
	▶ Central plate	GG with corrosion protection	
Weight (depending on configuration level) without oil	kg	60 ... 65	
<b>hydraulic</b>			
Maximum operating pressure	bar	240	
Maximum flow	l/min	See characteristic curves on page 10	
Oscillating volume	l	10	
Tank capacity	l	20	
Maximum return flow via return flow filter	l/min	35	
Temperature range hydraulic fluid	°C	+10 ... +65	
Admissible hydraulic fluids		See table below	
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)		Class 20/18/15 <sup>1)</sup>	
Return flow filter		Type HC10XL-R00-0-M	
	▶ Filter rating	µm	10
	▶ Cold start	°C	< 10 → maximum flow 10 l/min
	▶ Early warning	%	75
	▶ Shut-off	%	100
Filling level monitoring	▶ Early warning	l	10
	▶ Shut-off	l	13
Temperature monitoring	▶ Early warning	°C	55
	▶ Shut-off	°C	65
Pump			
	▶ Minimum flow	l/min	1
	▶ Viscosity range hydraulic fluid	mm <sup>2</sup> /s	12 ... 800 (admissible range, for start at most 2000) 20 ... 100 (recommended range)

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HLP ISO VG 32 HLP ISO VG 46	NBR, FKM	DIN 51524	90220

 **Important information on hydraulic fluids:**

- ▶ For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.  
For the selection of the filters, see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).




**Technical data**

(For applications outside these parameters, please consult us!)

<b>electric</b>			
	▶ Performance class	kW	1.5; 2.2; 3.0; 4.0
	▶ Voltage (according to IEC 60038)	V	380 ... 480 AC (-15% / +10%)
	▶ Frequency	Hz	50/60
Protection class according to DIN EN 60529			IP 54
Maximum pre-fuse protective motor switch (on the customer side)	▶ Power 1.5 kW	max. A	10
	▶ Power 2.2 kW	max. A	16
	▶ Power 3.0 kW	max. A	20
	▶ Power 4.0 kW	max. A	20

<b>Cooling water</b>			
Requirement cooling water supply	▶ Flow	l/min	> 8
	▶ Inlet temperature	°C	15 ... 25
	▶ Ports		G1/2 (2x)
	▶ Maximum glycol share	%	30
	▶ Maximum cooling water pressure	bar	30

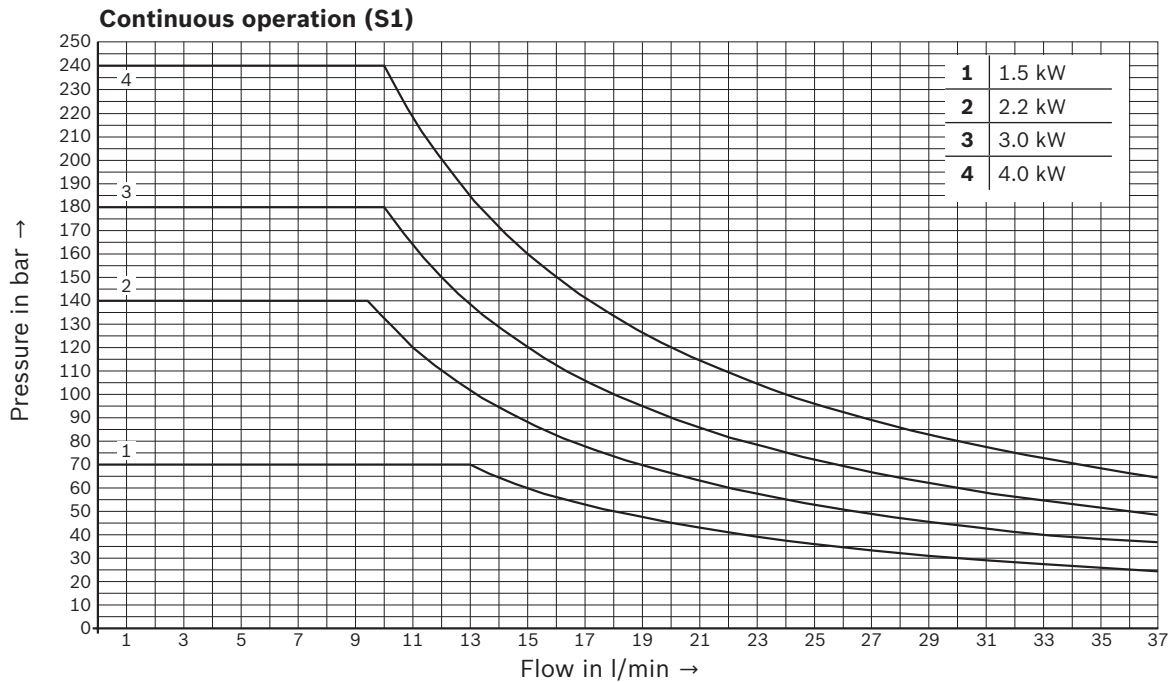
 **Notice:**

The cooling water supply for cooling the motor and the frequency converter must always be activated before the operation. It must be ensured that the cooling water supply temperature does not fall below the dewpoint of the ambient air of the power unit. Different coolant possible after consultation.

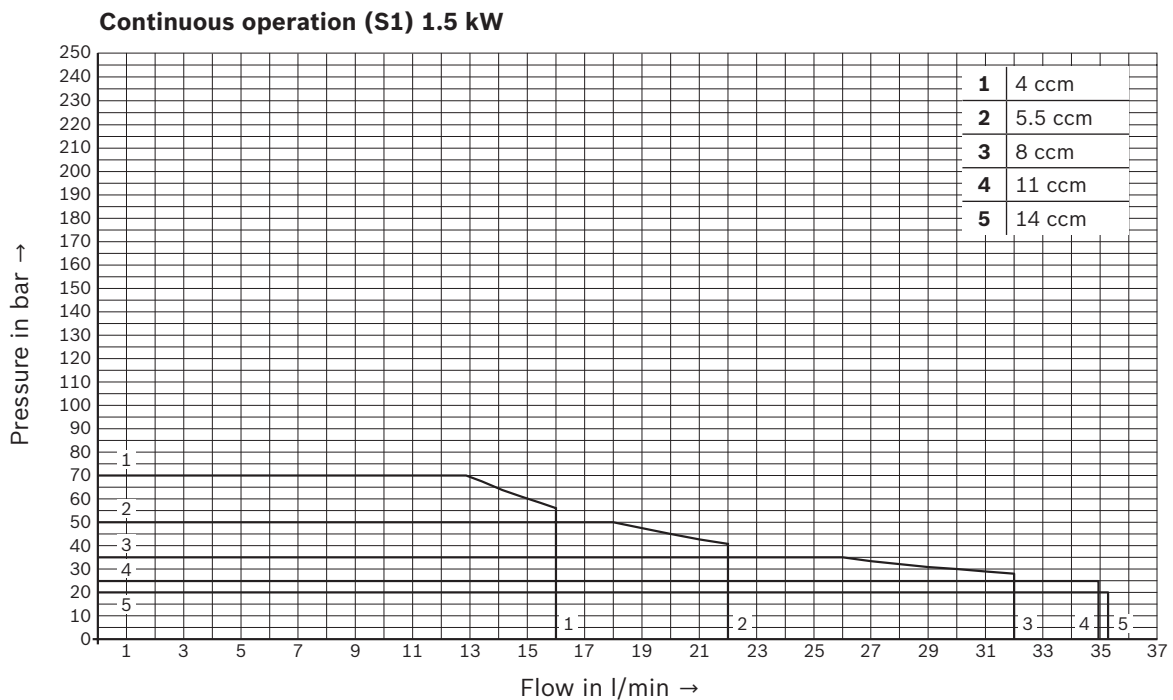
### Characteristic curves

(measured with HLP32,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ ; voltage 380V - 480V)

#### Performance diagram for the project planning of the performance class



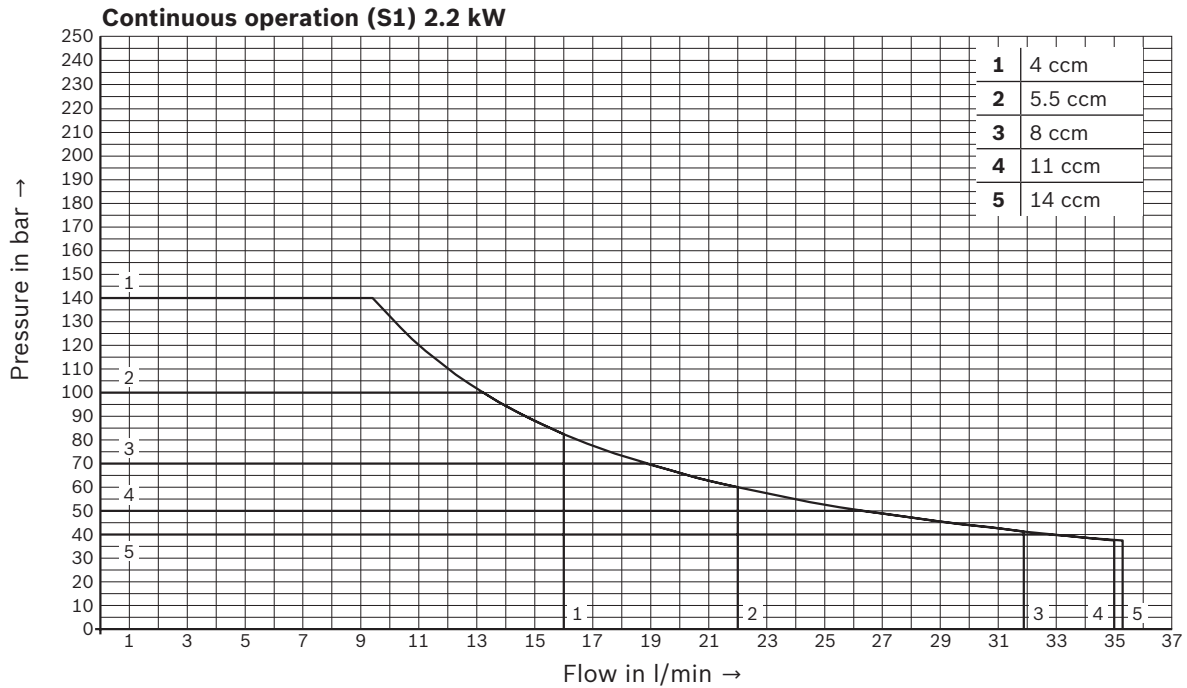
#### Performance diagram for selecting the pump



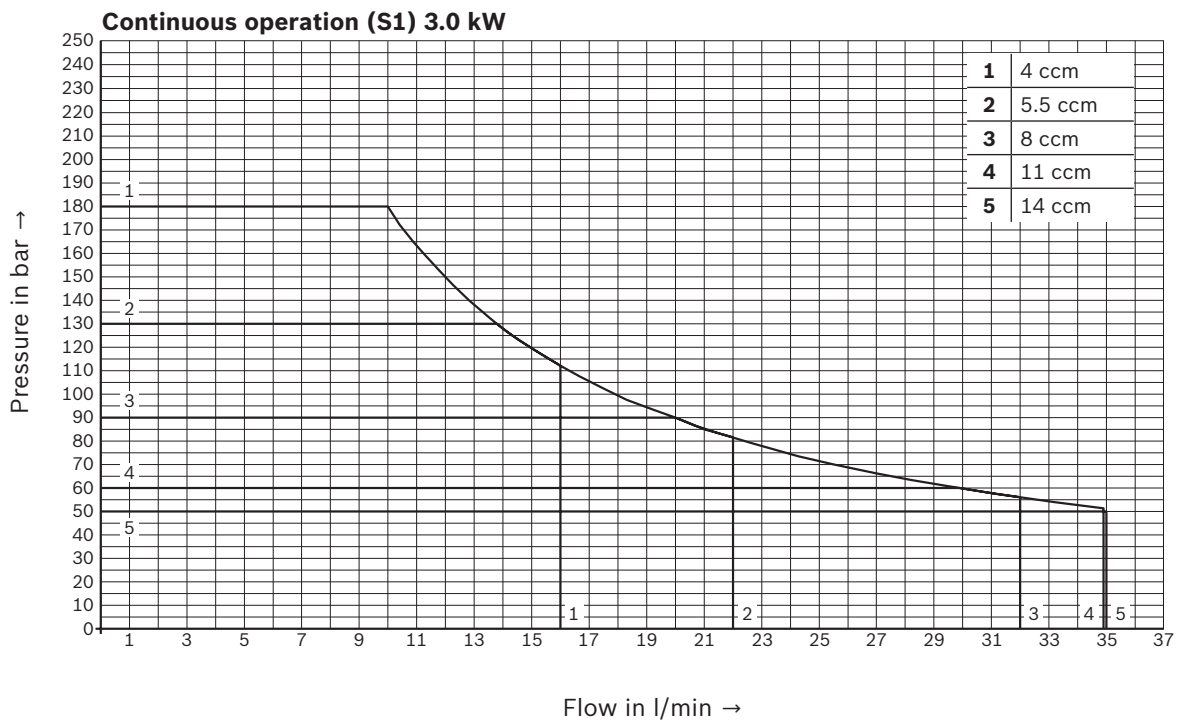
### Characteristic curves

(measured with HLP32,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ ; voltage 380V - 480V)

#### Performance diagram for selecting the pump



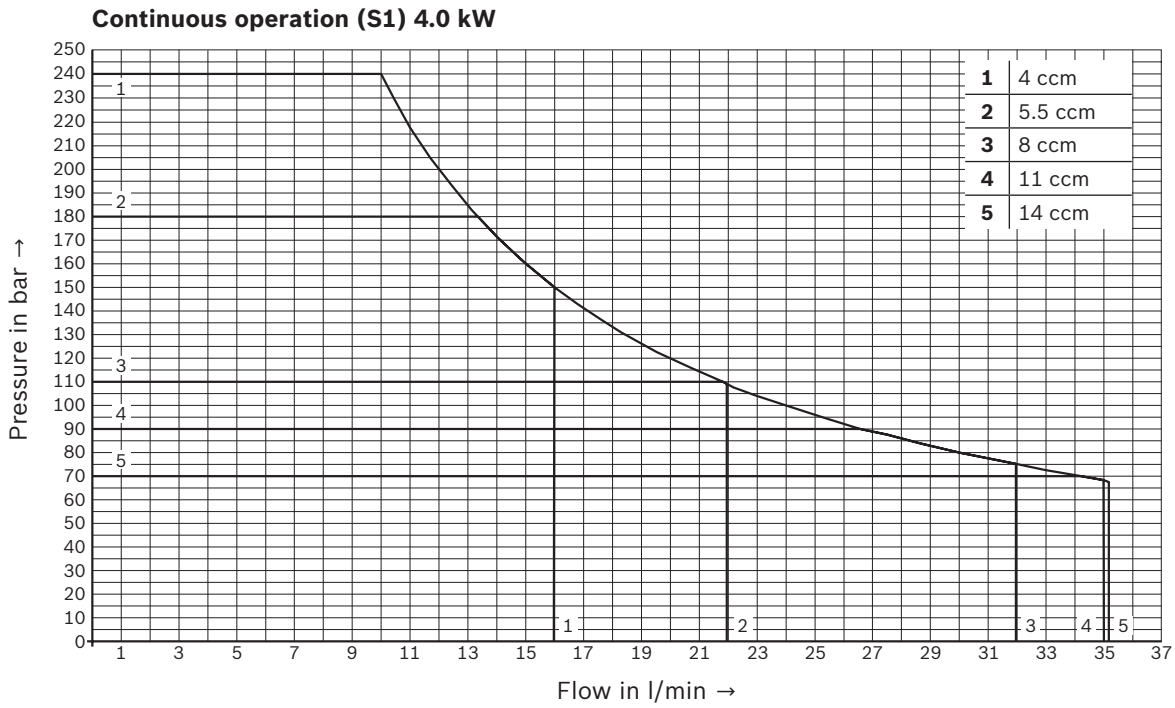
#### Performance diagram for selecting the pump



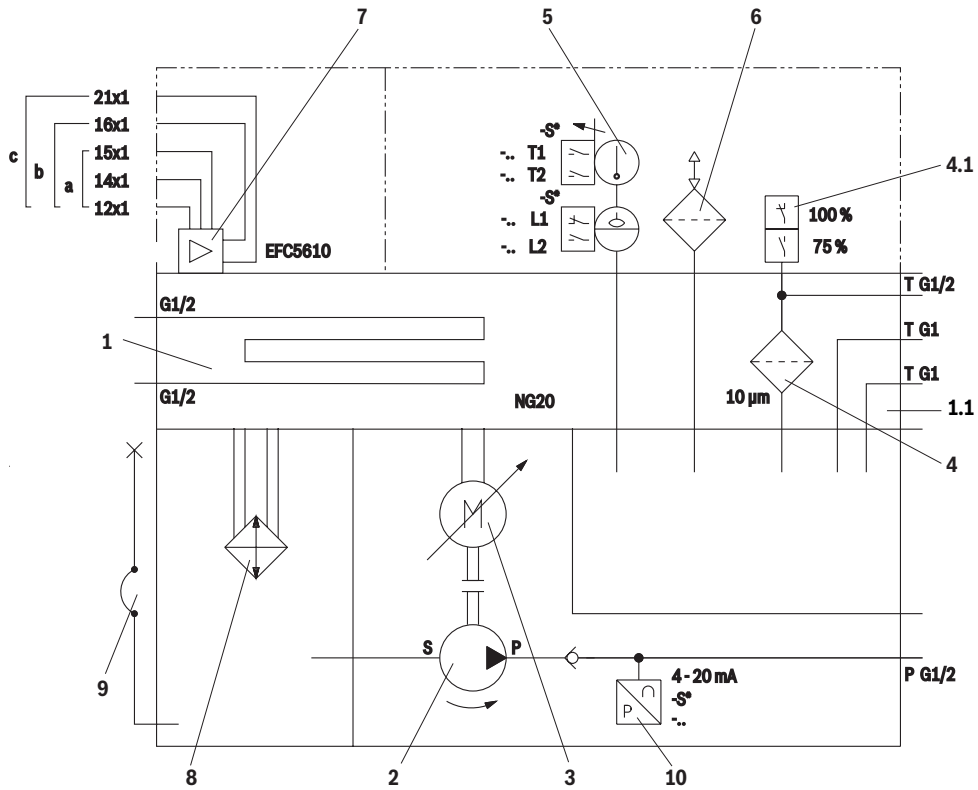
### Characteristic curves

(measured with HLP32,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ ; voltage 380V - 480V)

#### Performance diagram for selecting the pump



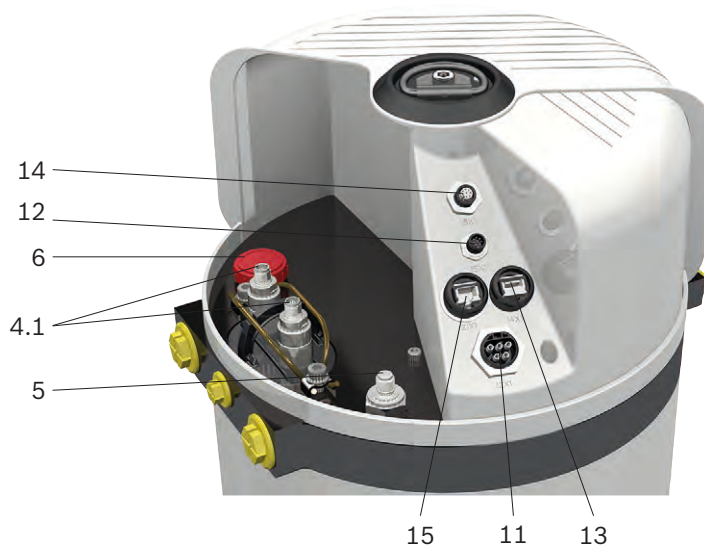
### Circuit diagram, hydraulic



- 1 Oil tank
- 1.1 Heat exchanger
- 2 Pump
- 3 Motor
- 4 Return flow filter
- 4.1 Filter contamination sensors
- 5 Float and oil temperature sensor
- 6 Breathing filter
- 7 Frequency converter
- 8 Cooling package (option)
- 9 Opt. oil level check and oil drain
- 10 Pressure load cell

#### Electrical connections

- a) Basic:
  - 11 12X1: Feed-in
  - 12 15X1: M12x1 customer interface (enable)
  - 13 14X1: USB service interface
- b) Advanced:
  - 14 16X1: M12x1 evaluation sensors (wired at the plant)
- c) Premium:
  - 15 21X1: Multi-Ethernet interface



## Selection of sensors and interfaces

		Basic	Advanced	Premium
<b>Sensor technology</b>	Filling level sensor early warning (10 liters)	✓	✓	✓
	Filling level sensor shut-off (13 liters)	✓	✓	✓
	Oil temperature sensor early warning (55 °C)	✓	✓	✓
	Oil temperature sensor shut-off (65 °C)	✓	✓	✓
	Filter contamination sensor early warning (75%)	✓	✓	✓
	Filter contamination sensor shut-off (100%)	✓	✓	✓
	Shut-off overtemperature of the drive unit	✓	✓	✓
<b>Analysis</b>	Wiring and evaluation of the sensor technology by machine control necessary	✓		
	Wiring and evaluation of the sensor technology integrated in the power unit		✓	✓
	Read-out of all power unit parameters for condition monitoring			✓
<b>Interfaces</b>	Input (24 V) enable power unit	✓	✓	✓
	Input (24 V) reset power unit	✓	✓	✓
	USB service interface	✓	✓	✓
	Output - power unit ready for operation (24 V); fault 0 V	✓	✓	✓
	Output - power unit early warning (24 V)		✓	✓
	Multi-Ethernet interface			✓
<b>Functions</b>	Sleep function for accumulator charging circuit <sup>2)</sup>	✓	✓	✓
	Up to four parameter configurations (e.g. pressure ratings)	✓	✓	✓
	Prestart control <sup>1)</sup>	✓	✓	✓
	Error visualization via LED strip		✓	✓
	Access to and adjustment of all power unit parameters (e.g. pressure ratings, flows)			✓

### 1) Prestart control:

By means of a control signal, the drive unit is already accelerated before hydraulic actuators are connected. This reduces the collapse of pressure and you can possibly do without a hydraulic accumulator.

### 2) Sleep function:

By means of the integrated speed monitoring, the CytroPac is switched off in case of flows smaller than a set threshold value. This increases the energy efficiency and you can, for example, realize an accumulator charging circuit without additional control signals (see R911378635 Sytronix short instructions).

## Electrical connections

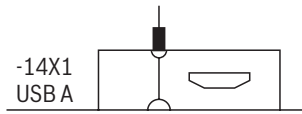
### Feed-in



Feed-in including pre-fuse and mains contactor is to be realized on the customer side.

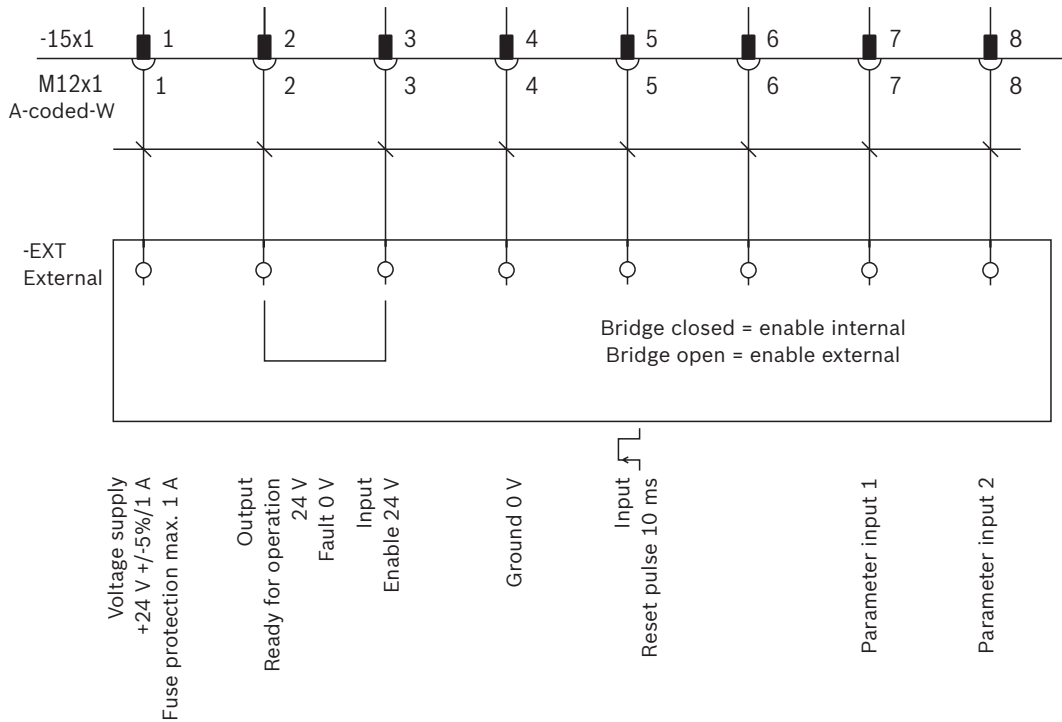
<b>Voltage</b>	3P 380 V ...480 VAC (-15% / +10%)
<b>Frequency</b>	50/60 Hz
<b>Assignment</b>	L1/L2/L3/PE
<b>Rotating field</b>	Rotating field right
<b>Pre-fuse on the customer side</b>	Power 1.5 kW → maximum 10 A Power 2.2 kW → maximum 16 A Power 3.0 kW → maximum 20 A Power 4.0 kW → maximum 20 A

### USB to the frequency converter



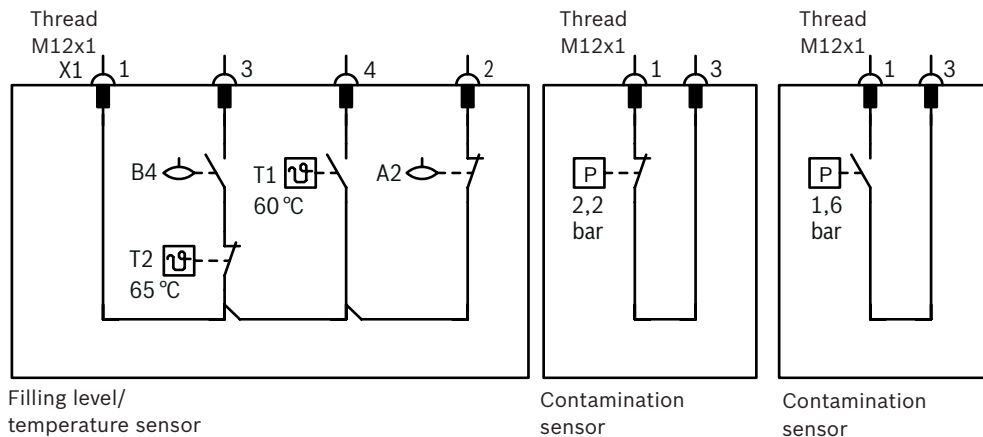
Interface frequency converter (USB A-mini) see page 20.

### Allocation mating connector "Basic" (M12x1 on the customer side)



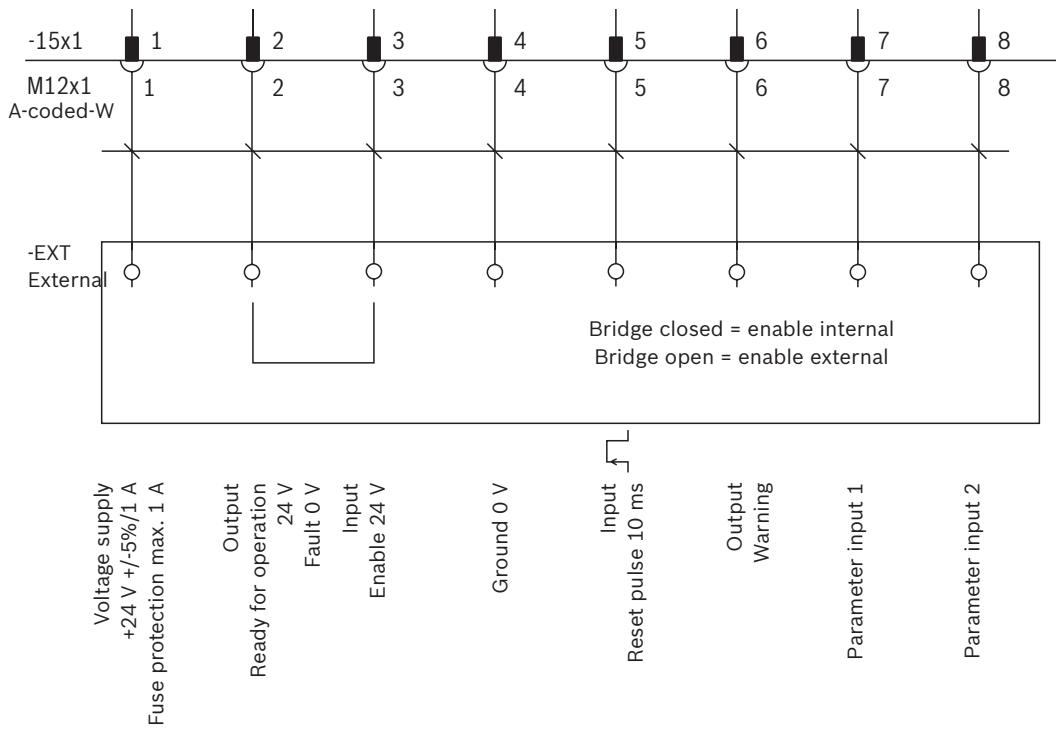
**Notice:**  
If no Ready for operation → then Fault

### Filling level, temperature and filter contamination sensor



**Notice:**  
In the "Basic" configuration level, the sensors have to be wired and evaluated on the customer side.

**Allocation mating connector "Advanced" and "Premium" (M12x1 on the customer side)**



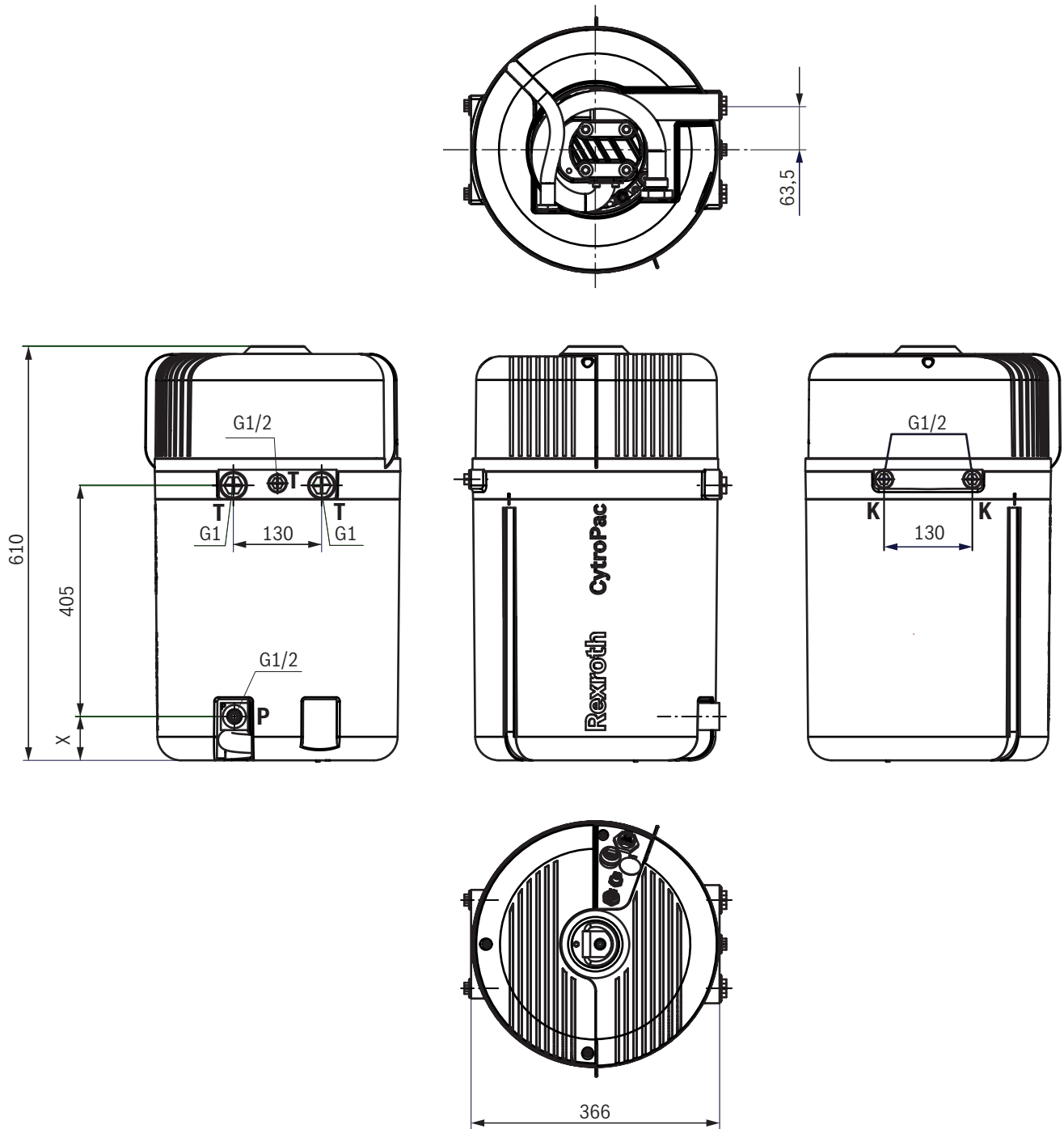
EX3	EX4	
0	0	Parameter set 1
0	1	Parameter set 2
1	0	Parameter set 3
1	1	Parameter set 4

**Notice:**  
If no Ready for operation → then Fault

**Notice:**  
In the "Advanced" and "Premium" configuration level, the sensors are wired with the integrated control and evaluated at the factory.  
  
The sensor conditions are signaled via the integrated LED strip and can be read out via the USB service interface.



**Dimensions**  
(dimensions in mm)



X (port p)	Pump design
65	AS04
64	AS05
61	AS08
58	AS11
57	AS 14

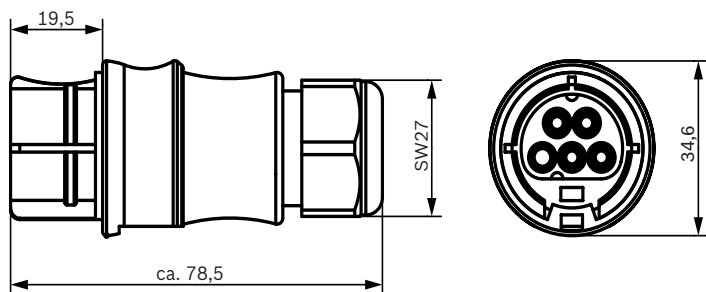


**Notice:**

The power unit must be set up on a level area, preferably on a damping mat.  
For the fastening of the power unit, a fastening set (see Accessories) is available.

**Accessories (separate order)****Fittings**

Material number	Denomination	
R901460961	ANSCHLUSSZUBEHOER HYDR.CON*OPT.CYTROPAC	
consisting of:		
▶ Cooling connection	2x R900006158	EINSCHRAUBVERSCHRA 24SDS-E-C-18L-G1/2-S& (ZN11001-1/11)
▶ Pressure line connection	1x R900762671	EINSCHRAUBVERSCHRA 24SDS-E-S-18L-G1/2-S& (ZN11001-1/11)
▶ Return flow connection via filter	1x R900006158	EINSCHRAUBVERSCHRA 24SDS-E-C-18L-G1/2-S& (ZN11001-1/11)
▶ Return flow connection G1	2x R913011613	VERSCHLUSSSCHRAUBE ZN10001-G1A-F-ST

**Power connector**

Material number	Denomination
R901460889	LEISTUNGSSTECKER ODEG *OPT.CYTROPAC

**Filling coupling**

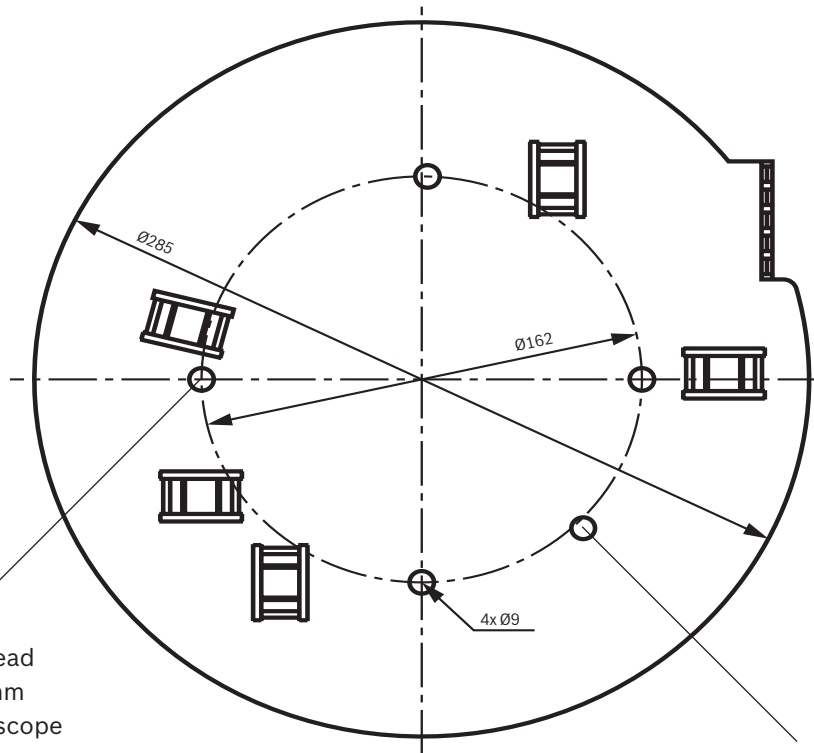
Material number	Denomination
R901460916	FUELLVORRICHTUNG MD-012-2*OPT.CYTROPAC

**Filter element**

Material number	Denomination
R928035258	35.0035CP H10XL-R00-0-M

**Foot mounting**

Material number	Denomination
R901460890	BEFESTIGUNGSSATZ BASE385 *OPT.CYTROPAC



Foot mounting with  
4x hexagon socket head  
cap screw M8 x 20 mm  
(not included in the scope  
of delivery)

Tank mounting at central plate with  
1x hexagon socket head cap screw  
M6 x 430 mm (not included in the  
scope of delivery)



## Project planning information

- ▶ It has to be ensured before the commissioning that on the customer side, a pressure relief valve (set pressure 10% over nominal pressure, however at most 260 bar) has been installed in the pressure line.
- ▶ The feed-in and 24 V supply must be secured on the customer side, as described on page 14.
- ▶ For the cooling of the motor and the frequency converter, the power unit must imperatively be connected to cooling water.
- ▶ The connection of the power unit to the machine must be realized by means of hydraulic hoses (no rigid pipeline admissible).
- ▶ It must be ensured on the customer side that the cooling water supply temperature does not fall below the dewpoint of the ambient air of the power unit.
- ▶ The maximum operating pressure of 240 bar must not be exceeded.

### Read-in and read-out of the power unit parameters

The Rexroth EFC 5610 frequency converter is integrated into the CytroPac; this frequency converter can be connected to an external computer by means of a mini USB cable.

Access to and setting of the frequency converter is possible by means of the ConverterWorks software. The software can be downloaded at the website [www.boschrexroth.de](http://www.boschrexroth.de).

Changing the operating pressure:

1. Connect the power unit to the voltage supply.
2. Open the ConverterWorks software on an external computer
3. Connect the CytroPac to an external computer, using a mini USB cable and interface 14X1

### Further information

- ▶ Hydraulic fluids on mineral oil basis
- ▶ Environmentally compatible hydraulic fluids
- ▶ Selection of filters
- ▶ Information on available spare parts
- ▶ EFC operating instructions
- ▶ Quick guide FcP 5020

Data sheet 90220

Data sheet 90221

[www.boschrexroth.com/filter](http://www.boschrexroth.com/filter)

[www.boschrexroth.com/spc](http://www.boschrexroth.com/spc)

R912006684

R911378635

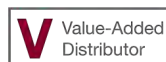
4. The software will automatically establish a connection to the power unit (if not, click Tools → Connect/Switch online)
5. The control pressure can be changed using parameter F1.05 in the parameter editor.

The operating instructions R912006684 contain further information on the handling of the frequency converter. You can also download this document at [www.boschrexroth.de](http://www.boschrexroth.de).

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