Installation Manual

Self-cleaning Hermetic Separators

	Product No.:
A MRPX 614HGV-14C	**881208-01-01**
C MRPX 614HGV-74C	**881208-01-01**
H MRPX 614HGV-74C	**881208-01-01**
W MRPX 614HGV-74C	**881208-01-01**
A MRPX 714HGV-14C	**881208-02-01**
B MRPX 714HGV-14C	**881208-02-01**
C MRPX 714HGV-74C	**881208-02-01**
H MRPX 714 HGV-74C	**881208-02-01**
W MRPX 714HGV-74C	**881208-02-01**
B BRPX 714HGV-34C	**881208-02-01**
D MRPX 714HGV-34C	**881208-02-01**
C MRPX 518HGV-74C	**881209-01-01**
H MRPX 518HGV-74C	**881209-01-01**
W MRPX 518HGV-74C	**881209-01-01**
B MRPX 618HGV-14C	**881209-02-01**
C MRPX 618HGV-74C	**881209-02-01**
F MRPX 618HGV-74C	**881209-02-01**
H MRPX 618HGV-74C	**881209-02-01**
W MRPX 618HGV-74C	**881209-02-01**
B BRPX 618HGV-34C	**881209-02-01**
D MRPX 618HGV-34C	**881209-02-01**
H MRPX 718HGV-74C	**881209-03-01**
W MRPX 718HGV-74C	**881209-03-01**
C MRPX 718HGV-74C	**881209-03-01**
H MRPX 818HGV-74C	**881210-01-01**
B MRPX 818HGV-14C	**881210-01-02**
B BRPX 818HGV-34C	**881210-01-02**
H MRPX 818HGV-74C	**881210-01-02**
W MRPX 818HGV-74C	**881210-01-02**

Product No.:	Multiple
Book No.:	1271057-02 V6

Alfa Laval

Alfa Laval Separation AB
Separator Manuals, dept. SKEL
S-147 80 Tumba, Sweden

Telephone: +46 8 53 06 50 00
Telefax: +46 8 53 03 10 40

Printed in Sweden, 00-05

Study instruction manuals and observe the warnings before installation, operation, service and maintenance.

Not following the instructions can result in serious accidents.

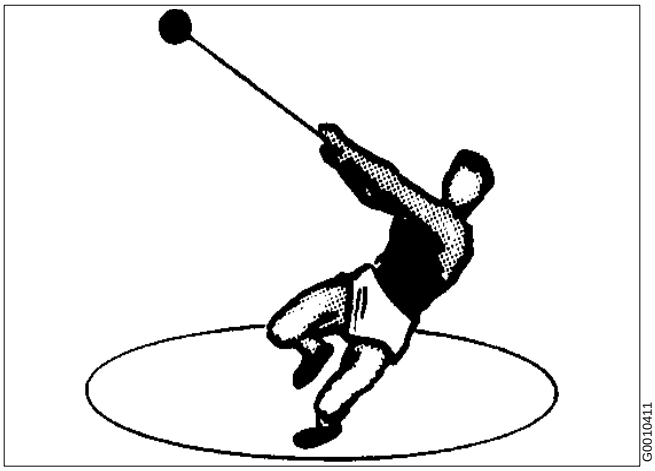
In order to make the information clear only foreseeable conditions have been considered. No warnings are given, therefore, for situations arising from the unintended usage of the machine and its tools.

Contents

1 Safety Instructions

The centrifugal separator includes parts that rotate at high speed. This means that:

- Kinetic energy is high
- Great forces are generated
- Stopping time is long



Manufacturing tolerances are extremely fine. Rotating parts are carefully balanced to reduce undesired vibrations that can cause a breakdown. Material properties have been considered carefully during design to withstand stress and fatigue.

The separator is designed and supplied for a specific separation duty (type of liquid, rotational speed, temperature, density etc.) and must not be used for any other purpose.

Incorrect operation and maintenance can result in unbalance due to build-up of sediment, reduction of material strength, etc., that subsequently could lead to serious damage and/or injury.

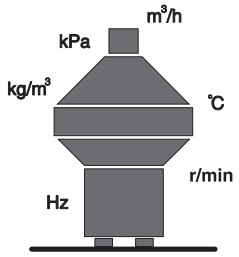
The following basic safety instructions therefore apply:

- **Use the separator only for the purpose and parameter range specified by Alfa Laval.**
- **Strictly follow the instructions for installation, operation and maintenance.**
- **Ensure that personnel are competent and have sufficient knowledge of maintenance and operation, especially concerning emergency stopping procedures.**
- **Use only Alfa Laval genuine spare parts and the special tools supplied.**

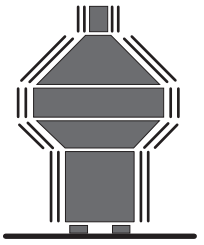
DANGER

Disintegration hazards

- Use the separator only for the purpose and parameter range specified by Alfa Laval.
- If excessive vibration occurs, **stop** separator and **keep bowl filled** with liquid during rundown.
- When power cables are connected, always check direction of motor rotation. If incorrect, vital rotating parts could unscrew.
- Check that the gear ratio is correct for power frequency used. If incorrect, subsequent overspeed may result in a serious break down.
- Welding or heating of parts that rotate can seriously affect material strength.
- Wear on the large lock ring thread must not exceed safety limit. ϕ-mark on lock ring must not pass opposite ϕ-mark by more than specified distance.
- Inspect regularly for **corrosion** and **erosion** damage. Inspect frequently if process liquid is corrosive or erosive.



S0051311



S0055611

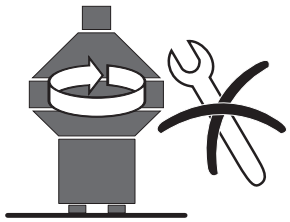
DANGER

Entrapment hazards

- Make sure that rotating parts have come to a **complete standstill** before starting **any** dismantling work.
- To avoid accidental start, switch off and lock power supply before starting **any** dismantling work.
- Assemble the machine **completely** before start. **All** covers and guards must be in place.

Electrical hazards

- Follow local regulations for electrical installation and earthing (grounding).



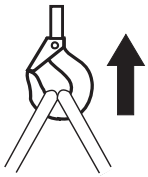
S0051111

S0051011

WARNING

Crush hazards

- Use correct lifting tools and follow lifting instructions.
- Do **not** work under a hanging load.



S0051711

Noise hazards

- Use ear protection in noisy environments.

S0051611

CAUTION

Burn hazards

- Lubrication oil and various machine surfaces can be hot and cause burns.

Cut hazards

- Sharp edges on separator discs and lock ring threads can cause cuts.

S0055411

S0054311

Warning signs in the text

Pay attention to the safety instructions in this manual. Below are definitions of the three grades of warning signs used in the text where there is a risk for injury to personnel.

DANGER

Type of hazard

This type of safety instruction indicates a situation which, if not avoided, could result in **fatal injury** or fatal damage to health.

WARNING

Type of hazard

This type of safety instruction indicates a situation which, if not avoided, could result in **disabling injury** or disabling damage to health.

CAUTION

Type of hazard

This type of safety instruction indicates a situation which, if not avoided, could result in **light injury** or light damage to health.

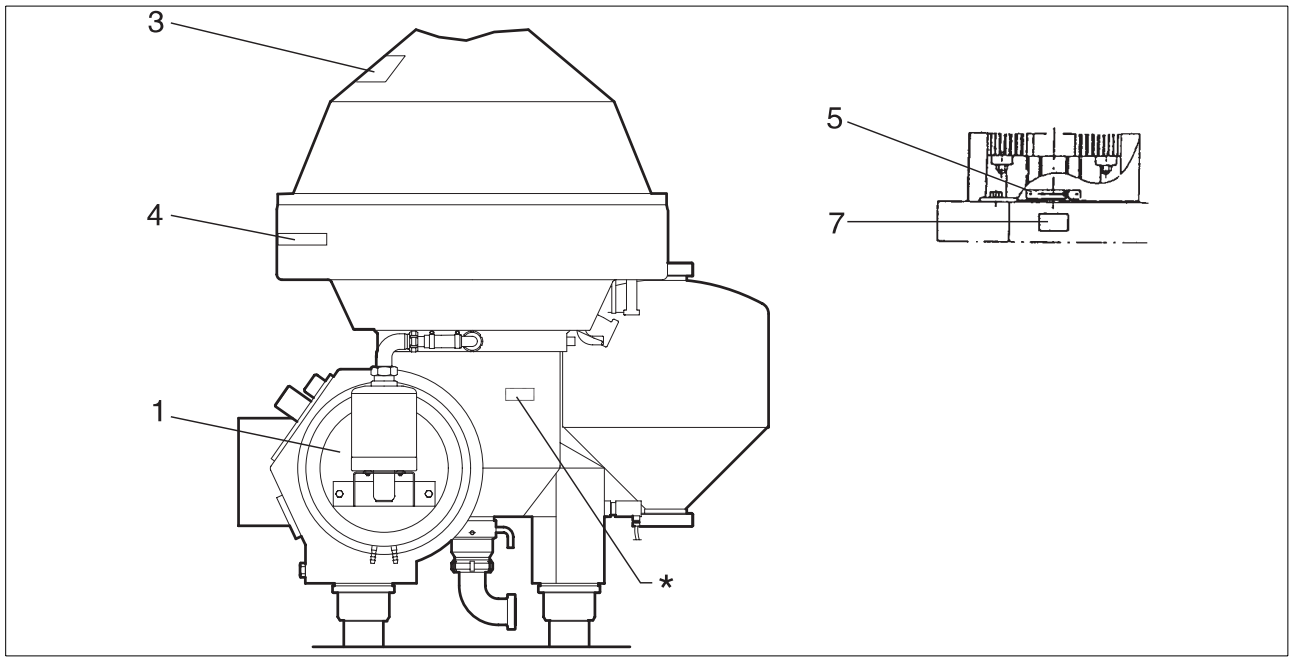
NOTE

This type of instruction indicates a situation which, if not avoided, could result in damage to the equipment.

2 Technical reference

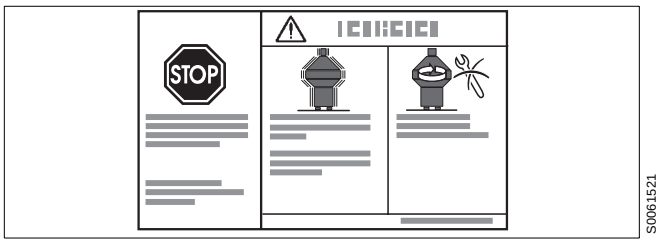
Contents

2.1 Identification and safety signs on the machine



1. Machine plate	Text on plate (**example**):
Separator	A MRPX 614HGV-14C
Manufacturing serial No / Year	XXXX
Product No	881208-01-01
Machine top part	552032-02
Outlet	562013-02
Bowl	546860-12
Machine bottom part	553136-41
Max. speed (bowl)	4265 r/min
Direction of rotation (bowl)	←
Speed motor shaft	1500 r/min
El. current frequency	50 Hz
Recommended motor power	18,5 kW
Max. density of feed	1100 kg/m^3
Max. density of sediment	1380 kg/m^3
Max. density of operating liquid	1000 kg/m^3
Process temperature min./max.	0 - 100 °C

3. Safety label



S0061521

Text on label:

DANGER

Read the instruction manuals **before** installation, operation and maintenance. Consider inspection intervals.

Failure to strictly follow instructions can lead to fatal injury.

If excessive vibration occurs, **stop** separator and **keep bowl filled** with liquid during rundown.

Out of balance vibration will become worse if bowl is not full.

Separator must **stop rotating** before **any** dismantling work is started.

4. Name plate

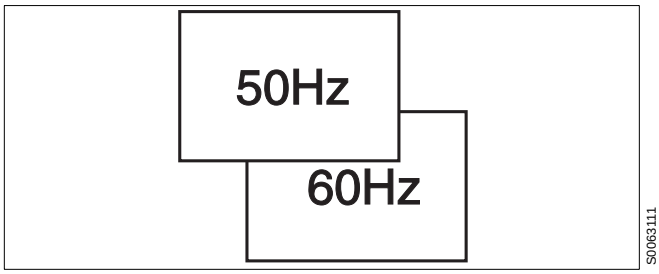
Alfa Laval

S0063211

5. Arrow

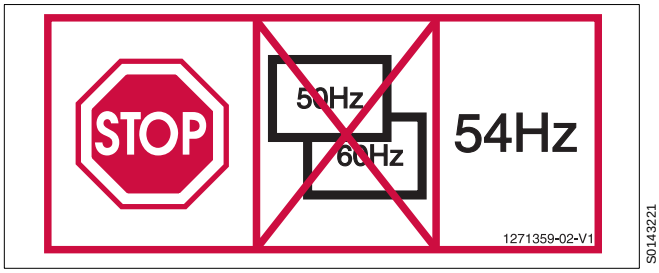
Indicating direction of rotation.

7. Power supply frequency, all separators except HM/BM/BB/WM/ RPX 818



S0063111

Power supply frequency, HMRPX 818 (spec. 881210-01-01)



S0143221

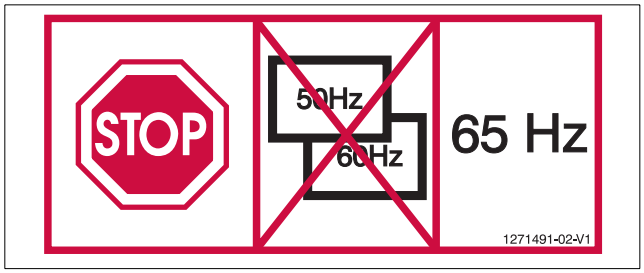
Power supply frequency H MRPX 818

Power supply frequency,
HM/BM/BB/WM/ RPX 818 (spec. 881210-01-02)

DANGER

Disintegration hazard

This machine must not be operated with higher bowl speed than 4607 r/min.



Power supply frequency HM/BM/BB/WM/RPX 818

*** Space reserved for plate indicating representative**

2.2 Technical data

2.2.1 A / C / H / W / MRPX 614HGV-14 / 74C

Alfa Laval ref. 562172, rev. 0 / 562170, rev. 3 (spec. 881208-01-01)

Application	Dairy (AMRPX anhydrous milk fat, CMRPX cold milk, HMRPX hot milk, WMRPX whey).	
Designed in accordance with standards	89/392 EEC 91/368 EEC 93/44 EEC	The Council Directive of the European Communities (CE-marking is possible if manuals are included in the delivery.
	EN 292-2	Safety of machines. Use of the machine in applications subject to hygienic demands requires a well adapted cleaning program.
	89/336	EMC and amendments related to said directive.
Bowl speed, synchronous	4266 / 4250	r/min 50 Hz / 60 Hz
Motor speed, synchronous	1500 / 1800	r/min 50 Hz / 60 Hz
Gear ratio	91:32 85:36	50 Hz 60 Hz
Jp reduced to motor shaft	209,2 / 144,2	kgm^2 50 / 60 Hz
Hydraulic capacity (**A MRPX**)	25	m^3/h
Hydraulic capacity	30	m^3/h
Min./max. discharge volume	5 / 30	litres
Recommended discharge volume	6 - 8	litres
Min. discharge interval	1	minute
Recommended discharge volume in cleaning cycles	14-16	litres
Bowl liquid volume	30	litres
Ambient temperature	+ 5 to + 45	°C
Feed temperature	0 to + 100	°C min./max.
Max. density of feed / sediment	1100 / 1380	kg/m^3
Max. density of operating liquid	1000	kg/m^3
Motor power	18,5	kW
Power consumption	6 / 13	kW (idling / at max. capacity)
Start time	10 / 12	minutes (min./max.)
Stopping time with brake	16 / 18	minutes (min./max.)
Stopping time without brake	45	minutes (average)
Max running time without flow, bowl empty / filled	60 / 80	minutes

Sound power	8,8	Bel(A)
Sound pressure level	71	dB(A)
Vibration level max.	7,1 / 9	mm/s (new sep./sep. in use)
Alarm levels for vibration monitor, connection 750, 1st / 2nd	6 / 8	mm/s
Lubricating oil volume	12,5	litres
Bowl weight	594	kg
Weight of separator	1390	kg (without motor)
Motor weight	290	kg
Max. bowl inner diameter	507	mm
Bowl body material	AL 111 2377-02	

There are no other materials than stainless steel in contact with process fluid except for sealings and gaskets.

Bowl must be kept filled during stopping sequence.

Any risk for corrosion and erosion have to be investigated in each case by the application centre.

Only land based installations permitted.

Further restrictions and instructions are found in the set of complementary documents with the number 562169.

2.2.2 AM / BB / BM / CM / DM / HM / WM / RPX 714HGV-14 / 74C

Alfa Laval ref. 562177, rev. 1 / 562174, rev. 3 (spec. 881208-02-01)

Application	Dairy (AMRPX anhydrous milk fat, BMRPX/ BBRPX bactofuge, CMRPX cold milk, DMRPX/ HMRPX hot milk, WMRPX whey).	
Designed in accordance with standards	89/392 EEC 91/368 EEC 93/44 EEC	The Council Directive of the European Communities (CE-marking is possible if manuals are included in the delivery.
	EN 292-2	Safety of machines. Use of the machine in applications subject to hygienic demands requires a well adapted cleaning program.
	89/336 EEC	EMC and amendments related to said directive.
Bowl speed, synchronous	5069 / 5119	r/min 50 Hz / 60 Hz
Motor speed, synchronous	1500 / 1800	r/min 50 Hz / 60 Hz
Revolution counter speed, synchronous	125 / 150	r/min 50 Hz / 60 Hz
Gear ratio	98:29 91:32	50 Hz 60 Hz
Hydraulic capacity (**A/C/MRPX**)	30	m^3/h
Hydraulic capacity (**BBRPX, B/D/H/ W/MRPX**	40	m^3/h
Min./max. discharge volume	5 / 25 *)	litres
Recommended discharge volume during operation	6 - 8	litres
Min. discharge interval	1	minute
Recommended discharge volume in cleaning cycles	14 - 16	litres
Ambient temperature	+ 5 to + 45	°C
Feed temperature	0 to + 100	°C min./max.
Max. density of feed / sediment	1100 / **)	kg/m^3
Max. density of operating liquid	1000	kg/m^3
Motor power	22	kW
Power consumption	9 / 18	kW (idling / at max. capacity)
Jp reduced to motor shaft	295,4 / 209,2	kgm^2 50 / 60 Hz
Max running time without flow, bowl empty / filled	60 / 80	minutes
Start time	16 / 17	minutes (min./max.)
Stopping time with brake	16 / 18	minutes (min./max.)
Stopping time without brake	45	minutes (average)

Sound power	8,7	Bel(A)
Sound pressure level	70	dB(A)
Vibration level max.	7,1 / 9	mm/s (new sep./sep. in use)
Alarm levels for vibration monitor, connection 750, 1st / 2nd	6 / 8	mm/s
Lubricating oil volume	12,5	litres
Bowl liquid volume	30	litres
Bowl weight	595*	kg
Weight of separator	1390	kg (without motor)
Motor weight	290	kg
Max. bowl inner diameter	507	mm
Bowl body material	AL 111 2377-02	

There are no other materials than stainless steel in contact with process fluid except for sealings and gaskets.

Bowl must be kept filled during stopping sequence.

Any risk for corrosion and erosion have to be investigated in each case by the application centre.

Only land based installations permitted.

Further restrictions and instructions are found in the set of complementary documents with the number 562175.

*) A MRPX, C MRPX, H MRPX, W MRPX:
Min./max. discharge volume 5 / 30 litres
Bowl weight 594 kg

**) B MRPX: 2033 kg/m^3
B BRPX: 1367 kg/m^3
D MRPX: 1247 kg/m^3
A MRPX, C MRPX, H MRPX, W MRPX: 1380 kg/m^3

2.2.3 C / H / W / MRPX 518HGV-74C

Alfa Laval ref. 562184, rev. 1 / 562181, rev. 5 (spec. 881209-01-01)

Application	Dairy (CMRPX cold milk, HMRPX hot milk, WMRPX whey).	
Designed in accordance with standards	89/392 EEC 91/368 EEC 93/44 EEC	The Council Directive of the European Communities (CE-marking is possible if manuals are included in the delivery.
	EN 292-2	Safety of machines. Use of the machine in applications subject to hygienic demands requires a well adapted cleaning program.
	89/336 EEC	EMC and amendments related to said directive.
Bowl speed, synchronous	3955 / 3932	r/min 50 Hz / 60 Hz
Motor speed, synchronous	1500 / 1800	r/min 50 Hz / 60 Hz
Revolution counter, synchronous	125 / 150	r/min 50 Hz / 60 Hz
Gear ratio	87:33 83:38	50 Hz 60 Hz
Jp reduced to motor shaft	595,4 / 408,7	kgm² 50 / 60 Hz
Max. bowl inner diameter	644	mm
Hydraulic capacity	30	m³/h
Min./max. discharge volume during operation	10 / 18	l litres
Min. discharge interval	1	minute
Max. discharge volume during cleaning cycles	35	litres
Ambient temperature	+ 5 to + 45	°C
Feed temperature	0 to + 100	°C min./max.
Max. density of feed / sediment	1100 / 1481	kg/m^3
Max. density of operating liquid	1000	kg/m^3
Max. pressure operating liquid	50	kPa
Motor power	22	kW
Power consumption	12 / 16	kW (idling / at max. capacity)
Start time	14 / 16	minutes (min./max.)
Stopping time with brake	20 / 23	minutes (min./max.)
Stopping time without brake	80	minutes (average)
Max running time without flow, bowl empty / filled	60 / 60	minutes

Sound power	9,2	Bel(A)
Sound pressure level	78	dB(A)
Vibration level max.	7,1 / 9	mm/s (new sep./sep. in use)
Alarm levels for vibration monitor, connection 750, 1st / 2nd	6 / 8	mm/s
Lubricating oil volume	12,5	litres
Bowl liquid volume	65	litres
Sludge volume, efficient / total	17 / 17	litres
Bowl weight	1160	kg
Weight of separator	2080	kg (without motor)
Motor weight	290	kg
Bowl body material	AL 111 2377-02	

There are no other materials than stainless steel in contact with process fluid except for sealings and gaskets.

Bowl must be kept filled during stopping sequence.

Any risk for corrosion and erosion have to be investigated in each case by the application centre.

Only land based installations permitted.

Further restrictions and instructions are found in the set of complementary documents with the number 562183.

2.2.4 BB / BM / CM / DM / FM / HM / WM / RPX 618HGV-14 / 34 / 74C

Alfa Laval ref. 562187, rev. 3 / 562185, rev. 4 (spec. 881209-02-01)

Application	Dairy (BBRPX/BMRPX bactofuge, CMRPX cold milk, DMRPX desludger, FMRPX cream concentration, HMRPX hot milk, WMRPX whey).	
Designed in accordance with standards	89/392 EEC 91/368 EEC 93/44 EEC	The Council Directive of the European Communities (CE-marking is possible if manuals are included in the delivery.
	EN 292-2	Safety of machines. Use of the machine in applications subject to hygienic demands requires a well adapted cleaning program.
	89/336 EEC	EMC and amendments related to said directive.
Bowl speed, synchronous	4266 / 4250	r/min 50 Hz / 60 Hz
Motor speed, synchronous	1500 / 1800	r/min 50 Hz / 60 Hz
Revolution counter, synchronous	125 / 150	r/min 50 Hz / 60 Hz
Gear ratio	91:32 85:36	50 Hz 60 Hz
Hydraulic capacity (**F MRPX**)	25	m³/h
Hydraulic capacity (**H/W MRPX**)	40	m³/h
Hydraulic capacity (**B MRPX**)	30	m³/h
Hydraulic capacity (**C MRPX**)	35	m³/h
Hydraulic capacity (**BBRPX**, **DMRPX**)	45	m³/h
Min. discharge interval	1	minute
Ambient temperature	+ 5 to + 45	°C
Feed temperature	0 to + 100	°C min./max.
Max. density of operating liquid	1000	kg/m^3
Motor power	25	kW
Motor power (**D MRPX**)	37	kW
Power consumption	12 / 28	kW (idling / at max. capacity)
Start time	15 / 17	minutes (min./max.)
Stopping time with brake	22/ 25	minutes (min./max.)
Stopping time without brake	80	minutes (average)
Max running time without flow, bowl empty / filled	60 / 60	minutes

Sound power	9,2	Bel(A)
Sound pressure level	78	dB(A)
Vibration level max.	7,1 / 9	mm/s (new sep./sep. in use)
Alarm levels for vibration monitor, connection 750, 1st / 2nd	6 / 8	mm/s
Lubricating oil volume	12,5	litres
Bowl weight	See below	
Weight of separator	2095	kg (without motor)
Motor weight	290	kg
Bowl body material	AL 111 2377-02	

H / W MRPX 618

Bowl liquid volume	70	litres
Sludge volume, efficient / total	17 / 17	litres
Min./max. discharge volume during operation	10 / 18	litres
Max. discharge volume in cleaning cycles	35	litres
Max. density of feed / sediment	1100 / 1481	kg/m^3
Bowl weight	1120	kg
Jp reduced to motor shaft	681,2 / 469,6	kgm² 50 / 60 Hz

C MRPX 618

Bowl liquid volume	77	litres
Sludge volume, efficient / total	17 / 17	litres
Min./max. discharge volume during operation	10 / 18	litres
Max. discharge volume in cleaning cycles	35	litres
Max. density of feed / sediment	1100 / 1481	kg/m^3
Bowl weight	1055	kg
Jp reduced to motor shaft	661,8 / 456,2	kgm² 50 / 60 Hz

B MRPX 618

Bowl liquid volume	63,5	litres
Sludge volume, efficient / total	1,75 / 17	litres
Min./max. discharge volume during operation	10 / 18	litres
Max. discharge volume in cleaning cycles	35	litres
Max. density of feed / sediment	1100 / 2915	kg/m^3
Bowl weight	1175	kg
Jp reduced to motor shaft	699,0 / 481,9	kgm² 50 / 60 Hz

F MRPX 618

Bowl liquid volume	70	litres
Sludge volume, efficient / total	1,8 / 17	litres
Min./max. discharge volume during operation	10 / 18	litres
Max. discharge volume in cleaning cycles	35	litres
Max. density of feed / sediment	1100 / 1481	kg/m^3
Bowl weight	1140	kg
Jp reduced to motor shaft	681,2 / 469,6	kgm² 50 / 60 Hz

B BRPX 618

Bowl liquid volume	63	litres
Sludge volume, efficient / total	17 / 17	litres
Min./max. discharge volume during operation	10 / 18	litres
Max. discharge volume in cleaning cycles	35	litres
Max. density of feed / sediment	1100 / 1464	kg/m^3
Bowl weight	1175	kg
Jp reduced to motor shaft	697,5 / 480,8	kgm² 50 / 60 Hz

D MRPX 618

Bowl liquid volume	72	litres
Sludge volume, efficient / total	36 / 136	litres
Min./max. discharge volume during operation	10 / 18	litres
Max. discharge volume in cleaning cycles	35	litres
Max. density of feed / sediment	1100 / 1279	kg/m^3
Bowl weight	1105	kg
Jp reduced to motor shaft	661,8 / 456,2	kgm² 50 / 60 Hz

There are no other materials than stainless steel in contact with process fluid except for sealings and gaskets.

Bowl must be kept filled during stopping sequence.

Any risk for corrosion and erosion have to be investigated in each case by the application centre.

Only land based installations permitted.

Further restrictions and instructions are found in the set of complementary documents with the number 562186.

2.2.5 H / W / C MRPX 718HGV-74C

Alfa Laval ref. 562190, rev. 2 / 562188, rev. 4 (spec. 881209-03-01)

Application	Dairy (HMRPX hot milk, WMRPX whey, CMRPX cold milk).	
Designed in accordance with standards	89/392 EEC 91/368 EEC 93/44 EEC	The Council Directive of the European Communities (CE-marking is possible if manuals are included in the delivery.
	EN 292-2	Safety of machines. Use of the machine in applications subject to hygienic demands requires a well adapted cleaning program.
	89/336 EEC	EMC and amendments related to said directive.
Bowl speed, synchronous	4266 / 4250	r/min 50 Hz / 60 Hz
Motor speed, synchronous	1500 / 1800	r/min 50 Hz / 60 Hz
Gear ratio	91:32 85:36	50 Hz 60 Hz
Hydraulic capacity	50	m^3/h
Min./max. discharge volume during operation	10 / 18	litres
Min./Max. discharge interval	1 / 60	minutes
Max. discharge volume in cleaning cycles	35	
Ambient temperature	+ 5 to + 45	°C
Feed temperature	0 to + 100	°C min./max.
Max. density of feed / sediment	1100 / 1481	kg/m^3
Max. density of operating liquid	1000	kg/m^3
Motor power	25	kW
Power consumption	15 / 28,5	kW (idling / at max. capacity)
Start time	20 / 22	minutes (min./max.)
Stopping time with brake	25 / 28	minutes (min./max.)
Stopping time without brake	80	minutes (average)
Max. running time without flow, bowl empty / filled	60 / 60	minutes
Sound power	9,2	Bel(A)
Sound pressure level	78	dB(A)
Vibration level max.	7,1 / 9	mm/s (new sep./sep. in use)
Alarm levels for vibration monitor, connection 750, 1st / 2nd	6 / 8	mm/s
Jp reduced to motor shaft:		
(HMRPX, WMRPX)	691,4 / 476,6	kgm^2 (50Hz / 60Hz)
(CMRPX)	661,8 / 456,2	kgm^2 (50Hz / 60Hz)

Lubricating oil volume	12,5	litres
Bowl weight:		
(HMRPX, WMRPX)	1155	kg
(CMRPX)	1055	kg
Weight of separator	2075	kg
Motor weight	290	kg
Bowl liquid volume, (HMRPX, WMRPX	66	litres
Bowl liquid volume, (CMRPX)	77	litres
Sludge volume, efficient / total	17 / 17	litres
Max. bowl inner diameter	644	mm

Bowl body material	AL 111 2377-02

There are no other materials than stainless steel in contact with process fluid except for sealings and gaskets.

Bowl must be kept filled during stopping sequence.

Any risk for corrosion and erosion have to be investigated in each case by the application centre.

Only land based installations permitted.

Further restrictions and instructions are found in the set of complementary documents with the number 562189.

2.2.6 HMRPX 818HGV-74C

Alfa Laval ref. 564497, rev. 0 / 564499, rev. 2 (spec. 881210-01-01)

Application	Dairy (HMRPX hot milk).	
Designed in accordance with standards	89/392 EEC 91/368 EEC 93/44 EEC	The Council Directive of the European Communities (CE-marking is possible if manuals are included in the delivery.
	EN 292-2	Safety of machines. Use of the machine in applications subject to hygienic demands requires a well adapted cleaning program.
	89/336 EEC	EMC and amendments related to said directive.
Bowl speed, synchronous	4607	r/min 54 Hz
Motor speed, synchronous	1620	r/min 54 Hz
Revolution counter, synchronous	135	r/min 54 Hz
Gear ratio	91:32	54 Hz
Jp reduced to motor shaft	691	kgm^2
Hydraulic capacity	65	m^3/h
Max. discharge volume during operation	17	litres
Min. discharge interval	1	minute
Max. discharge volume in cleaning cycles	35	litres
Bowl liquid volume	66	litres
Sludge volume, efficient / total	17 / 17	litres
Ambient temperature	+ 5 to + 45	°C
Feed temperature	0 to + 100	°C min./max.
Max. density of feed / sediment	1100 / 1481	kg/m^3
Max. density of operating liquid	1000	kg/m^3
Max. pressure operating liquid	50	kPa
Motor power	37	kW
Power consumption	15 / 28,5	kW (idling / at max. capacity)
Start time	12 / 15	minutes (min./max.)
Stopping time with brake	30 / 35	minutes (min./max.)
Stopping time without brake	80	minutes (average)
Max. running time without flow, bowl empty / filled	60 / 60	minutes
Sound power	9,35	Bel(A)
Sound pressure level	76,5	dB(A)
Vibration level max.	7,1 / 9	mm/s (new sep./sep. in use)
Alarm levels for vibration monitor, connection 750, 1st / 2nd	6 / 8	mm/s

Lubricating oil volume	12,5	litres
Bowl weight	1155	kg
Weight of separator	2075	kg (without motor)
Motor weight	290	kg
Max. bowl inner diameter	644	mm
Bowl body material	AL 111 2397-02	

There are no other materials than stainless steel in contact with process fluid except for sealings and gaskets.

Bowl must be kept filled during stopping sequence.

Any risk for corrosion and erosion have to be investigated in each case by the application centre.

Only land based installations permitted.

Further restrictions and instructions are found in the set of complementary documents with the number 564491.

2.2.7 BM / BB / HM / WM / RPX 818 HGV-14 / 34 / 74C

Alfa Laval ref. 565387, rev. 1 / 565275, rev. 1 (spec. 881210-01-02)

Application	Dairy (BBRPX/ bactofuge, HMRPX hot milk, WMRPX whey).	
Designed in accordance with standards	98/37 EC	Directive of the European Parliament and the Council relating to machinery, except for the instruction manuals (i.e. CE-marking is not possible).
	EN 292-2	Safety of machines. Use of the machine in applications subject to hygienic demands requires a well adapted cleaning program.
	ISO 3744	Acoustics - Determination of sound power levels of noice sources using sound pressure.
	89/336 EEC	EMC and amendments related to said directive.
Bowl speed, synchronous	4607 / 4604	r/min 54 / 65 Hz
Motor speed, synchronous	1620 / 1950	r/min 54 / 65 Hz
Gear ratio	91:32 / 85:36	54 / 65 Hz
Jp reduced to motor shaft	691	kgm²
Hydraulic capacity, H/WMRPX	65	m³/h
Hydraulic capacity, BBRPX (high flow)	60	m³/h
Hydraulic capacity, BBRPX (standard)	45	m³/h
Hydraulic capacity, BMRPX	35	m³/h
Max.discharge volume during operation	17	
Min. discharge interval	1	minute
Max. discharge volume in cleaning cycles	35	litres
Ambient temperature	+ 5 to + 45	°C
Feed temperature	0 to + 100	°C min./max.
Max. density of operating liquid	1000	kg/m^3
Motor power	37	kW
Power consumption	15 / 28,5	kW (idling / at max. capacity)
Start time	12 / 15	minutes (min./max.)
Stopping time with brake	30 / 30	minutes (min./max.)
Stopping time without brake	80	minutes (average)
Max. running time without flow, bowl empty / filled	60 / 60	minutes

Sound power	9,35	Bel(A)
Sound pressure level	76,5	dB(A)
Vibration level max.	7,1 / 9	mm/s (new sep./sep. in use)
Alarm levels for vibration monitor, connection 750, 1st / 2nd	6 / 8	mm/s
Lubricating oil volume	12,5	litres
Weight of separator	2075	kg (without motor)
Motor weight	290	kg
Max. bowl inner diameter	644	mm
Bowl body material	AL 111 2398-02	

B BRPX 818

Bowl liquid volume	63	litres
Sludge volume, efficient / total	17 / 17	litres
Max. density of feed / sediment	1100 / 1464	kg/m^3
Bowl weight	1175	kg
Jp reduced to motor shaft	697,5 / 480,8	kgm² 54 / 65 Hz

H / W / MRPX 818

Bowl liquid volume	66	litres
Sludge volume, efficient / total	17 / 17	litres
Max. density of feed / sediment	1100 / 1481	kg/m^3
Bowl weight	1155	kg
Jp reduced to motor shaft	691,4 / 476,6	kgm² 54 / 65 Hz

B MRPX 818

Bowl liquid volume	63	litres
Sludge volume, efficient / total	1,75 / 17	litres
Max. density of feed / sediment	1100 / 2915	kg/m^3
Bowl weight	1175	kg
Jp reduced to motor shaft	699,0 / 481,9	kgm² 54 / 65 Hz

There are no other materials than stainless steel in contact with process fluid except for sealings and gaskets.

Bowl must be kept filled during stopping sequence.

Any risk for corrosion and erosion have to be investigated in each case by the application centre.

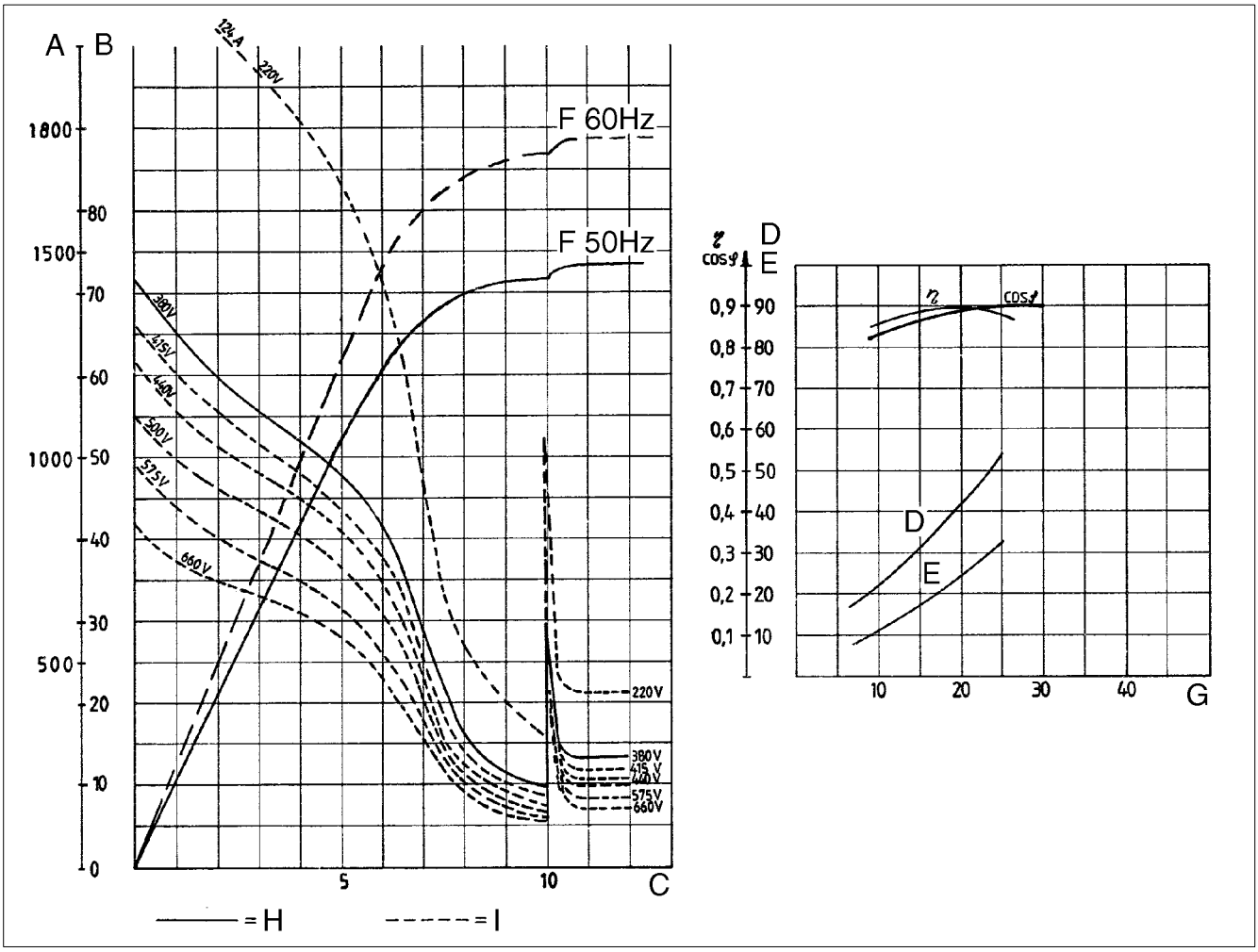
Only land based installations permitted.

Further restrictions and instructions are found in the set of complementary documents with the number 565376.

2.3 Motor drive data (CT-motors)

2.3.1 A / C / H / W / MRPX 614

Alfa Laval ref. 551106, rev. 4



A	*Speed, r/min*	*D*	*amp*	*G*	*kW, output*
B	*Current, amp.*	*E*	*kW, input*	*H*	*Measured*
C	*Time, minutes*	*F*	*Motor speed*	*I*	*Calculated*

Voltage V	**Rated current A**	**Fuse A**	**Cable, Cu min. mm^2**	**Cable, Al min. mm^2**
220	62	100	35	70
380	36	63	16	25
415	33	50	16	16
440	31	50	16	16
550	29	40	10	16
575	23	40	10	16
660	21	32	10	10

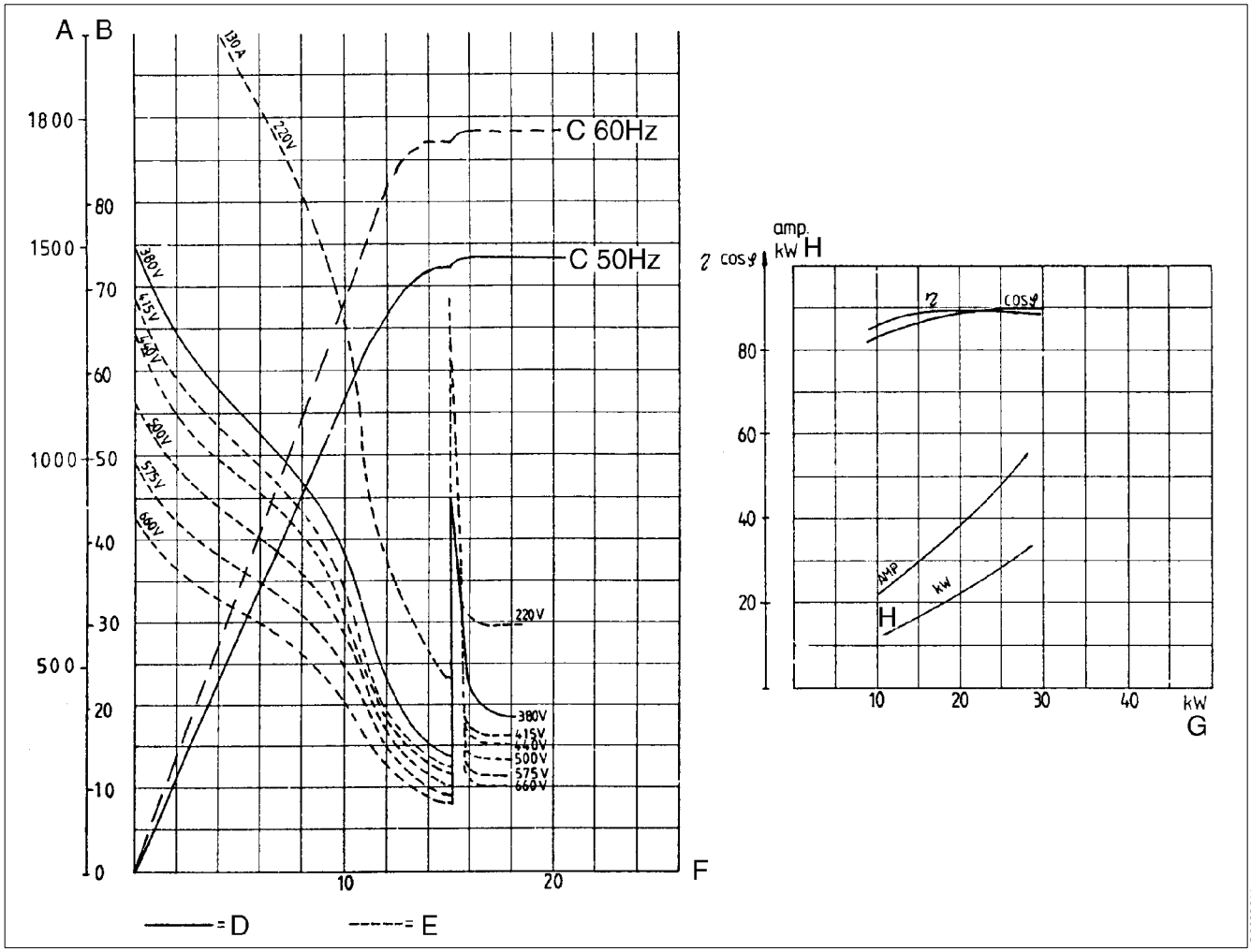
Motor data from Brook type test certificate 41366
Min. cable area: See also local codes
η and cos φ valid for 50 Hz. Values for 60 Hz about 0,5% higher.
Idling power output = 6 kW, input = 6,8 kW
Moment of inertia 25,87 kgm^2 (bowl spindle)
Bowl speed max. 4265 r/min, motor 1500 or 1800 r/min
Tripping temperature 190°

Motor AL-no	*kW*	*Manufact*	*Type*	*No. of poles*	*r/min 50 Hz*	*r/min 60 Hz*	*η %*	*cos φ*	*Nm Ms (Y)*
540924	*18,5*	*Brook*	*UC 225 LHD*	*4*	*1460*	*1760*	*88,8*	*0,89*	*110*

Tripping temperature for standard motor (AL-no 562211), 155°.

2.3.2 AM / BB / BM / CM / DM / HM / WM / RPX 714

Alfa Laval ref. 551105, rev. 3



A	*Speed, r/min*	*D*	*Measured*	*G*	*Output*
B	*Current, amp.*	*E*	*Calculated*	*H*	*Input*
C	*Motor speed*	*F*	*Time, minutes*		

Voltage V	**Rated current A**	**Fuse A**	**Cable, Cu min. mm^2**	**Cable, Al min. mm^2**
220	74	100	35	70
380	43	63	16	25
415	39	50	16	16
440	37	50	16	16
500	33	40	10	16
575	28	40	10	16
660	25	32	10	10

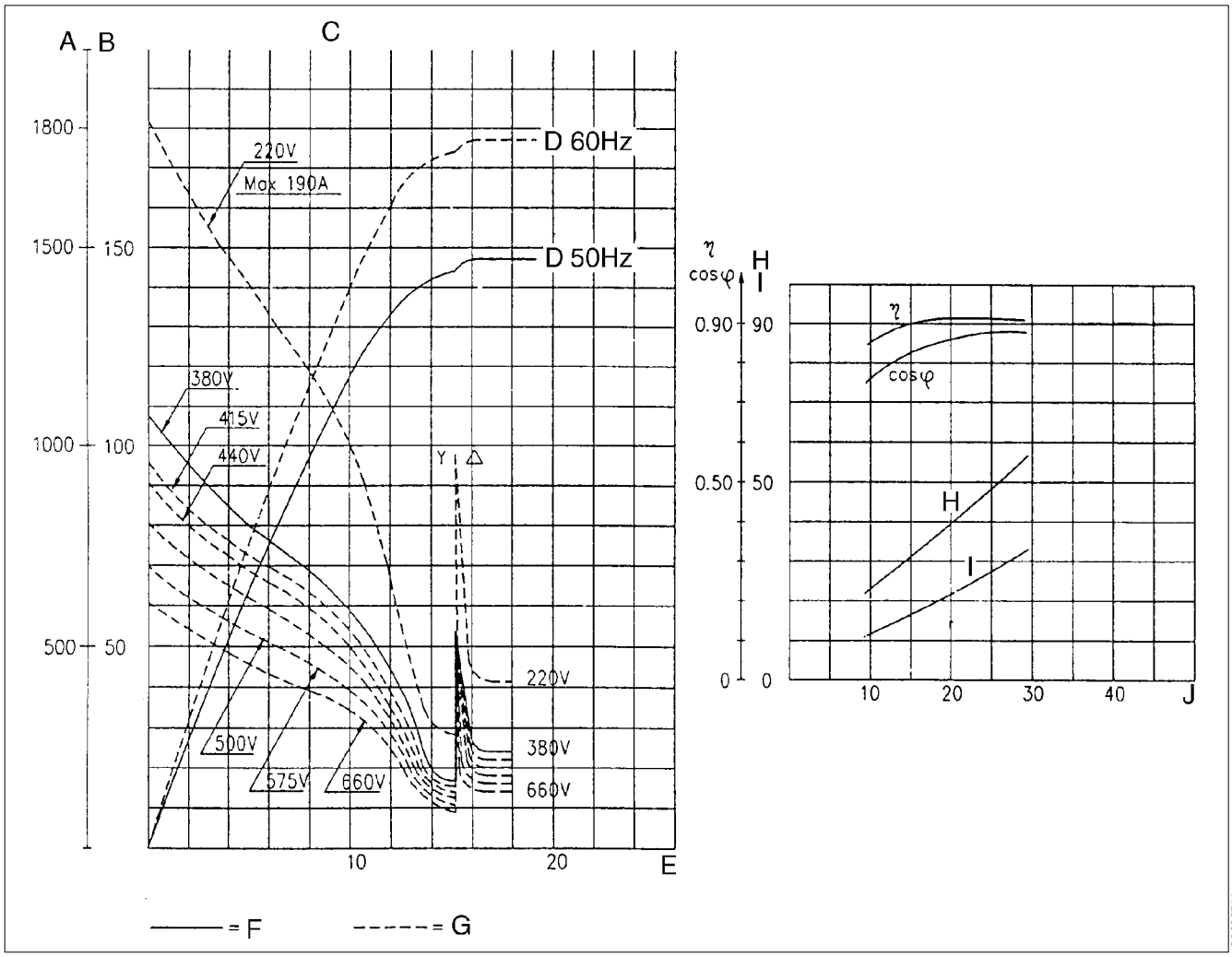
Motor data from Brook test certificate 41365
Min. cable area: See also local codes
η and cos φ valid for 50 Hz. Values for 60 Hz about 0,5% higher.
Idling power output = –, input = 10,2 kW
Moment of inertia 25,87 kgm^2 (bowl spindle)
Bowl speed max. 5120 r/min, motor 1500 or 1800 r/min
Tripping temperature 190°

Motor AL-no	*kW*	*Manufact*	*Type*	*No. of poles*	*r/min 50 Hz*	*r/min 60 Hz*	*η %*	*cos φ*	*Nm Ms (Y)*
540924	*22*	*Brook*	*UC 225 LHD*	*4*	*1460*	*1760*	*88,9*	*0,88*	*110*

Tripping temperature for standard motor (AL-no 562210), 155°.

2.3.3 C / H / W / MRPX 518

Alfa Laval ref. 550624, rev. 3



A	*Speed, r/min*	*D*	*Motor speed*	*H*	*amp*
B	*Current, amp.*	*E*	*Time, minutes*	*I*	*kW (input)*
C	*Starting characteristics at Y/Δ-starting*	*F*	*Measured*	*J*	*kW (output)*
		G	*Calculated*		

Voltage V	Rated current A	Fuse A	Cable, Cu min. mm^2	Cable, Al min. mm^2
220	73	125	50	70
380	42	80	25	35
415	38	80	25	35
440	37	80	25	35
500	32	63	16	25
575	28	63	16	25
660	24	50	10	16

NOTE

Recommended cable area is valid for a max. ambient temperature of 25 °C and with the cables freely installed.

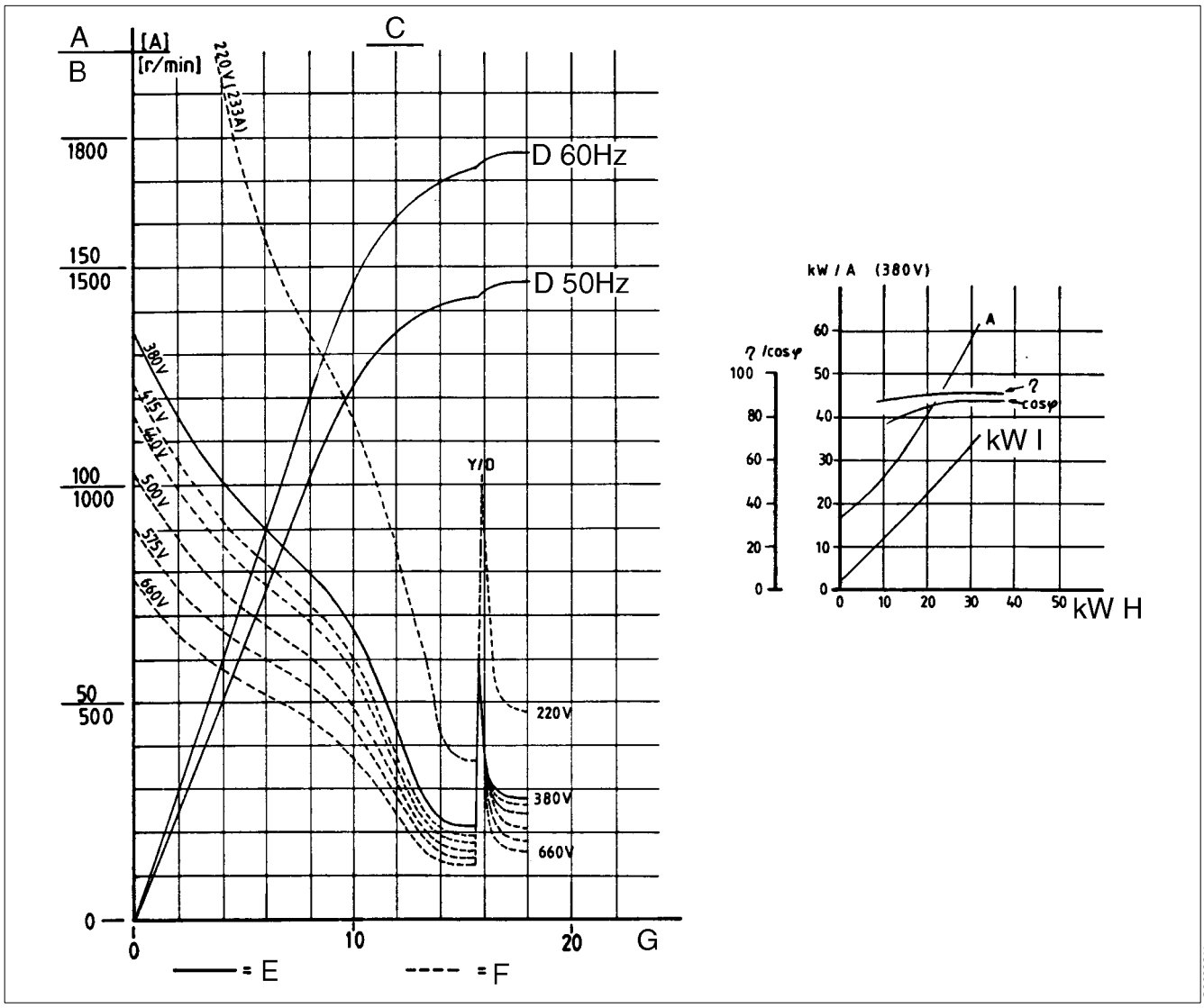
Motor data acc. to Brooks type test certificate TT 42400 at 380 V 50 Hz
η and cos φ for 60 Hz. appr. of same values as for 50 Hz
Min. cable area: See also local codes
Idling power output = –, input = 12 kW
Moment of inertia 77,10 kgm^2 (bowl spindle)
Bowl speed max. 3955 r/min (motor 1500 or 1800 r/min)
Tripping temperature 190°

Motor AL-no	kW	Manufact	Type	No. of poles	r/min 50 Hz	r/min 60 Hz	η %	cos φ	Nm Ms (Y)
544143	22	Brook	UC 225 LHD	4	1475	1770	91	0,86	174

Tripping temperature for standard motor (AL-no 562210), 155°.

2.3.4 BB / BM / CM / DM / FM / HM / HWM / WM / RPX 618

Alfa Laval ref. 550623, rev. 2



A	*Current*	*D*	*Motor speed*	*G*	*Time, minutes*
B	*Speed*	*E*	*Measured*	*H*	*Output*
C	*Start characteristics*	*F*	*Calculated*	*I*	*Input*

Voltage V	***Rated current A***	***Fuse A_{min}***	***Cable, Cu min. mm^2***	***Cable, Al min. mm^2***
220	*85*	*160*	*95*	*120*
380	*49*	*100*	*35*	*70*
415	*45*	*80*	*25*	*35*
440	*42*	*80*	*25*	*35*
500	*37*	*63*	*16*	*25*
575	*32*	*63*	*16*	*25*
660	*28*	*50*	*10*	*16*

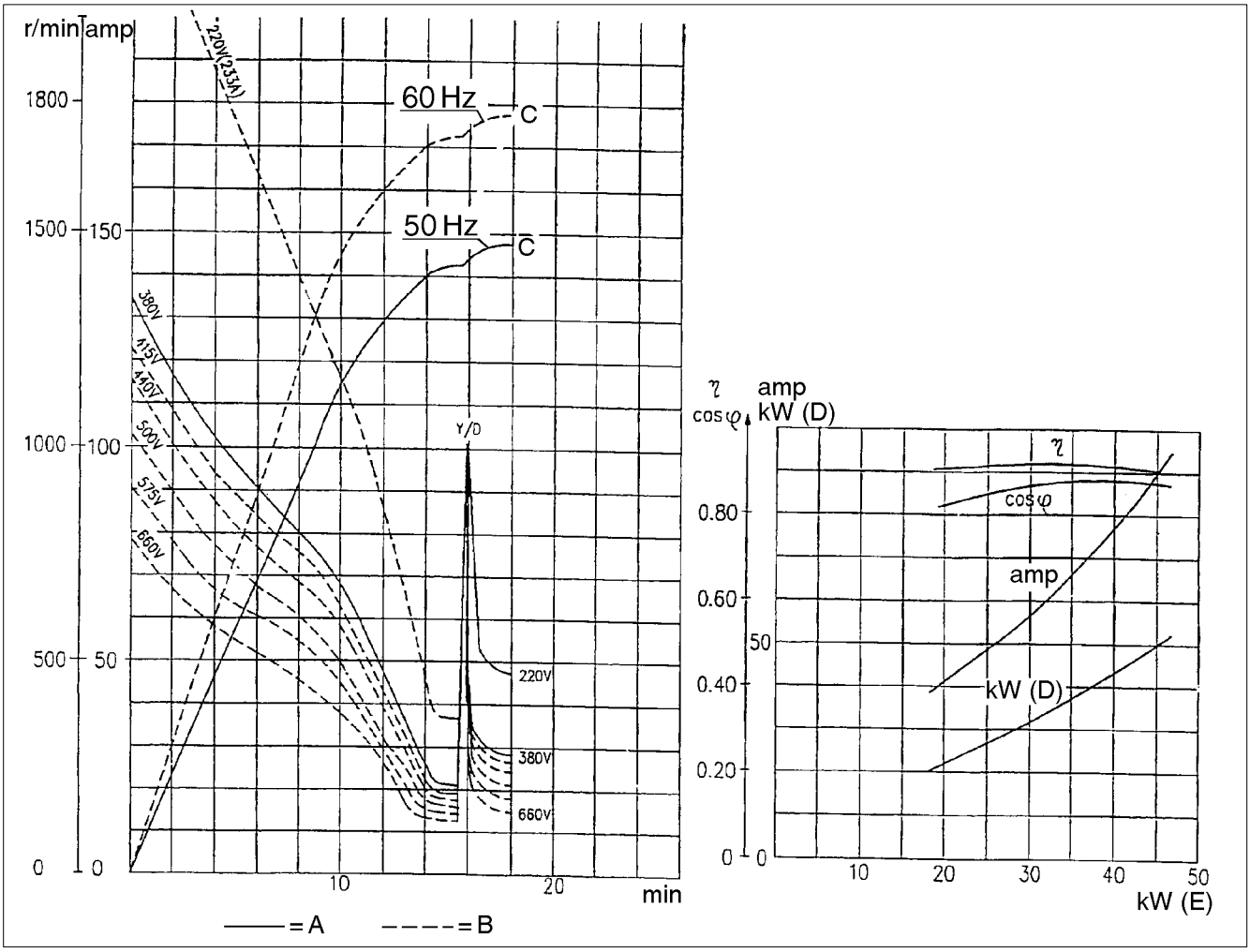
Motor data from Brooks type test certificate: T T42398
Min. cable area: See also local codes
η and cos φ valid for 50 Hz. Values for 60 Hz about 0,5% higher
Idling power: output = 12,2 kW, input = 14 kW
Moment of inertia 77,10 kgm^2 (bowl spindle)
Bowl speed max. 4265 r/min (motor 1500 or 1800 r/min)
Tripping temperature 190°

Motor AL-no	*kW*	*Manufact*	*Type*	*No. of poles*	*r/min 50 Hz*	*r/min 60 Hz*	*η %*	*cos φ*	*Nm Ms (Y)*
544143	*25*	*Brook*	*UC 225 LH*	*4*	*1470*	*1760*	*92*	*0,86*	*210*

Tripping temperature for standard motor (AL-no 562209), 155°.

2.3.5 DMRPX 618

Alfa Laval ref. 553577, rev. 0



A Measured
B Calculated
C Motor speed
D Input
E Output

Voltage V	**Rated current A**	**Fuse A**	**Cable, Cu min. mm^2**	**Cable, Al min. mm^2**
220	121	160	95	120
380	70	100	35	70
415	64	80	25	35
440	60	80	25	35
500	53	63	16	25
575	46	63	16	25
660	40	50	10	16

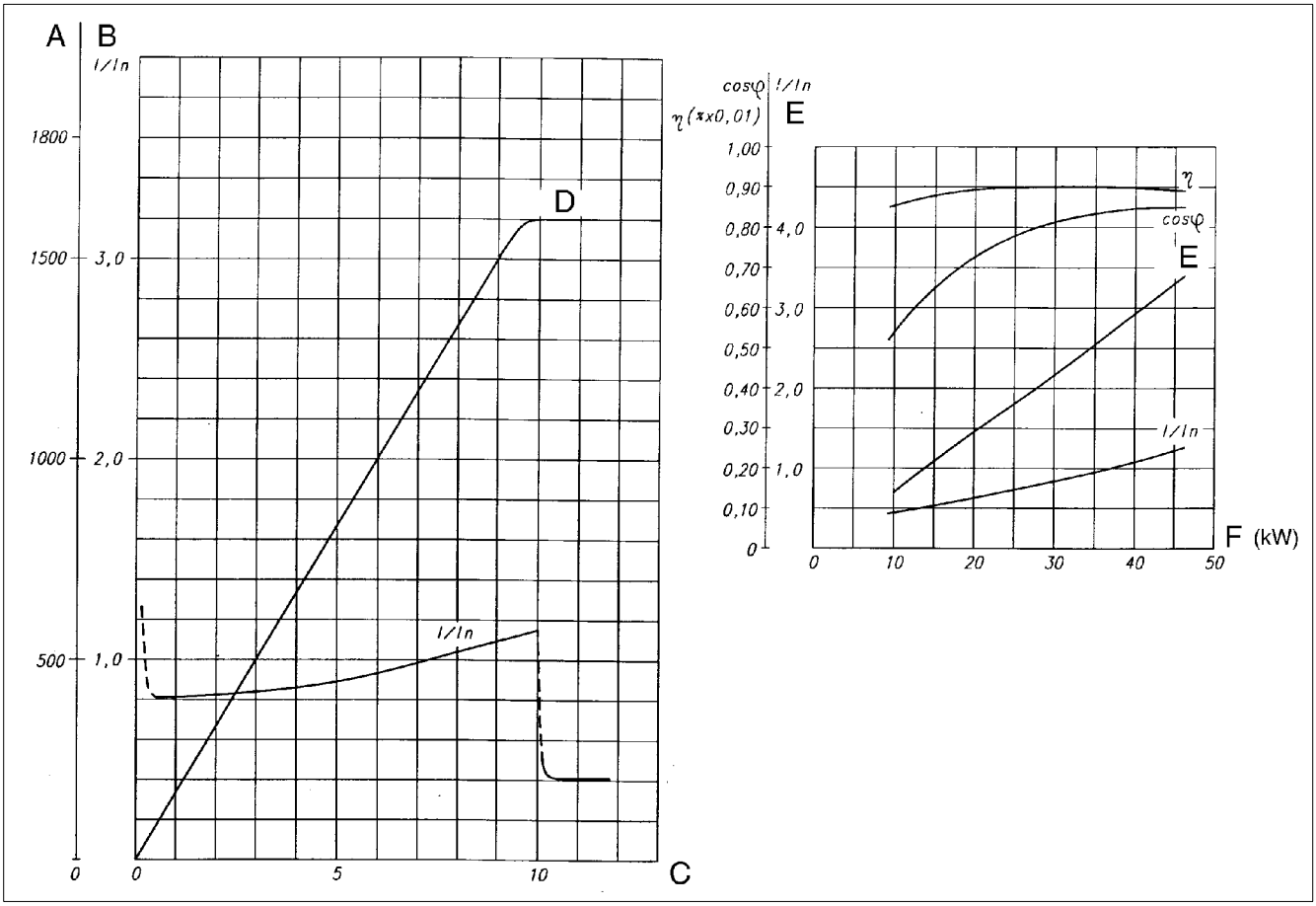
Motor data from Brooks test certificate: T T42397, 380 V, 50 Hz
Min. cable area: See also local codes
η and cos φ valid for 50 Hz. Values for 60 Hz about 0,5% higher
Idling power: output = -, input = 12 kW
Moment of inertia 77,08 kgm^2 (bowl spindle)
Bowl speed max. 4265 r/min (motor 1500 or 1800 r/min)
Tripping temperature 190°

Motor AL-no	*kW*	*Manufact*	*Type*	*No. of poles*	*r/min 50 Hz*	*r/min 60 Hz*	*η %*	*cos φ*	*Nm Ms (Y)*
544143	*37*	*Brook*	*UC 225 LH*	*4*	*1450*	*1750*	*91,5*	*0,87*	*210*

Tripping temperature for standard motors (AL-no 562209 and 562650 37 kW), 155°.

2.4 Motor drive data (standard motor) BM / BB / HM / WM / RPX 818

Alfa Laval ref. 564687, rev. 0



To the left:
Current and speed curves at start with frequency converter.
Calculated curves. Acceleration time 10 minutes.

To the right:
I/In = load current / rated motor current.

Motor current = I/In x rated current

A Speed
B Current
C Time, minutes
D Motor speed

E Slip
F Output

Cables and fuses (recommendations)

Voltage	***Rated current***	***Cable size (copper) mm²***		***Fuse (mains)***
V	***A***	***motor***	***mains***	***A***
230	*122*	*35*	*50*	*125*
400	*70*	*16*	*25*	*80*
440	*64*	*16*	*25*	*80*
500	*56*	*10*	*16*	*63*
575	*49*	*10*	*16*	*50*
690	*41*	*10*	*16*	*50*

Note:
The motor and the mains cables must be dimensioned acc. to local safety regulations. Shielded symmetrical motor cable is recommended.

Performance curves acc. to Brook Hansen type test cert. at 50 Hz								
Machine idling power consumption = 15 kW (motor input)								
Moment of inertia 85,45 kgm² (bowl)								
Bowl speed max. 4607 r/min. Motor synchronous speed 1620 r/min								
Tripping temperature 155°								
Motor AL No.	*Output, kW*	*Manu-facturer*	*Type*	*No. of poles*	*Speed 54 Hz, r/min*	*Efficiency, η, %*	*Power factor, cos φ*	*Rated torque, M_n, Nm*
562650	*37*	*Brook Hansen*	*CF 200 M*	*4*	*1580*	*90,0*	*0,84*	*240*

2.5 Foundations

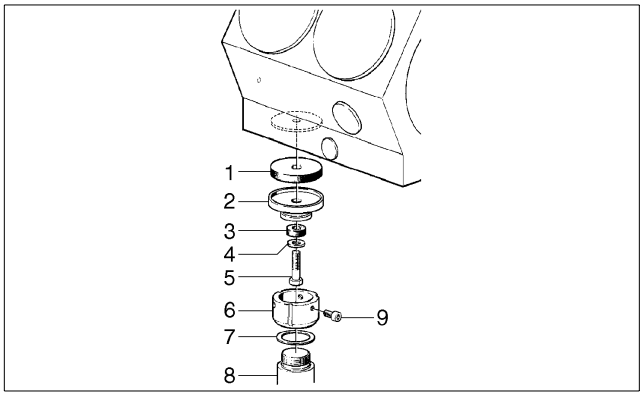
NOTE

When lifting a separator it must always be **hung securely**. See chapter .

Specification

- The separator should be installed at floor level, see chapters “2.7 Foundation drawing” on page 50 for measures and how to pour the foundation plate in concrete.
- The separator must be installed on a strong and rigid foundation to reduce the influence of vibrations from adjacent machinery.

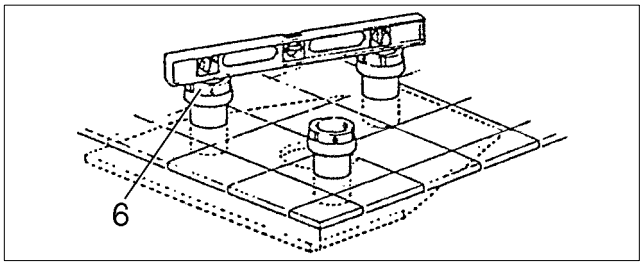
At delivery the parts 1-5 are fitted on the separator. The screw (5) is locked with Loctite 243 and tightened with **40 Nm**.



1. *Rubber cushion*
2. *Frame foot*
3. *Rectangular ring*
4. *Washer*
5. *Screw*
6. *Holder*
7. *Adjusting washer*
8. *Foot on foundation plate*
9. *Set screw*

Proceed in the following way when mounting the separator onto the feet of the foundation plate (8):

1. Level against the upper face of the three holders (6). Screw the holders to compensate for inclination, if any. Any gap between a holder and a foundation foot (8) must be eliminated by adding one or more adjusting washers (7).



Level against the upper face of the holders (6)

2. Lower the separator into the three holders.
3. Tighten the set screws (9), first by hand (or by a hand tool, if necessary) until all of them are in contact with the frame feet (2).

   Then tighten the set screws with **10 Nm**.

> **NOTE**
>
> Tighten the set screws before mounting the bowl or cyclone.

4. Mount the bowl and check that the frame is horizontal by means of a level placed on the outer frame rim.

   Make a new adjustment if necessary.

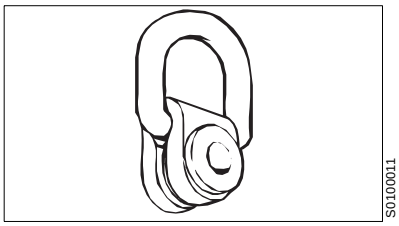
Further information can be found in chapter “2.8 Basic size drawings” on page 54.

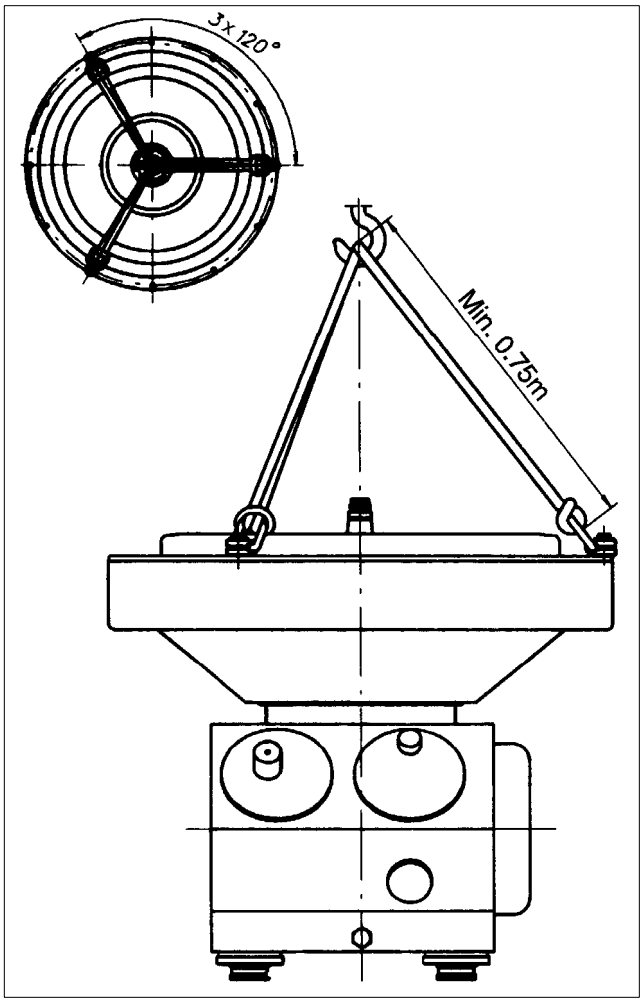
2.6 Lifting instructions

2.6.1 Separator

Alfa Laval ref. 557183, rev. 1 / 557187, rev. 1

Attach three endless slings or cables to the lifting eyes (the screws must be tightened with spanner).





Length of each sling must be **min. 1,5 metres** in circumference.

NOTE

Machine weight without frame hood and bowl is approx. **1000 kg (PX 614, 714) and 1200 kg (PX 518, 618, 718, 818).**

Do not lift the separator unless the inlet/outlet frame hood, cyclone, motor protecting cap and bowl have been removed.

WARNING

Crush hazards

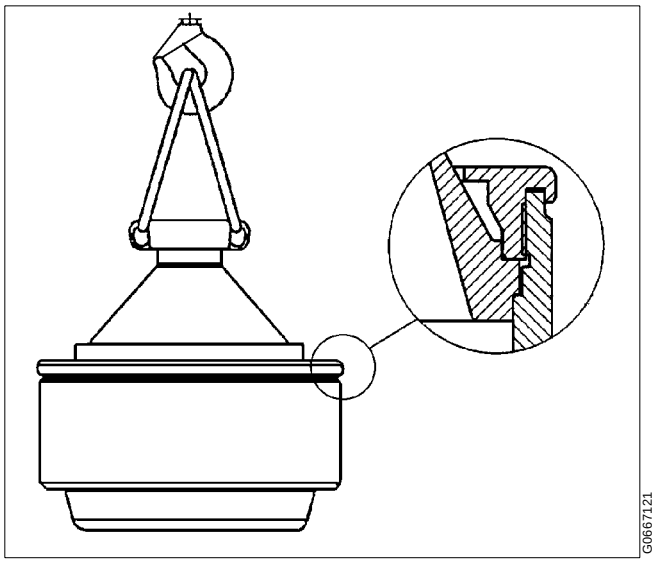
Use only the three **special lifting eyes** for lifting the machine, and follow lifting instructions. Do **not** work under hanging load.

A falling separator can cause accidents resulting in serious injury to persons and damage to equipment.

2.6.2 Bowl

This instruction describes how to lift a complete bowl, which normally is done only during a transport of the separator.

When lifting the bowl, use the special lifting tool fastened on the bowl hood.



NOTE

Check that the lock ring is properly tightened.

Weight to lift is approx. **600 kg (PX 614, 714) and 1100 kg (PX 518, 618, 718, 818)**.

When lifting the bowl out of the separator frame, the cap nut fixing the bowl to the bowl spindle and the screws fixing the bowl body to the operating water device must first be removed.

2.6.3 Other parts

The frame hood and the heavy bowl parts must be lifted by means of a hoist. Position the hoist exactly above the bowl centre. Use endless lifting straps and a lifting hook with safety catch.

Special tools from the tool kit must be used for dismantling and assembly. The special tools are specified in the *Spare Parts Catalogue* and are shown as illustrations together with the dismantling/assembly instructions.

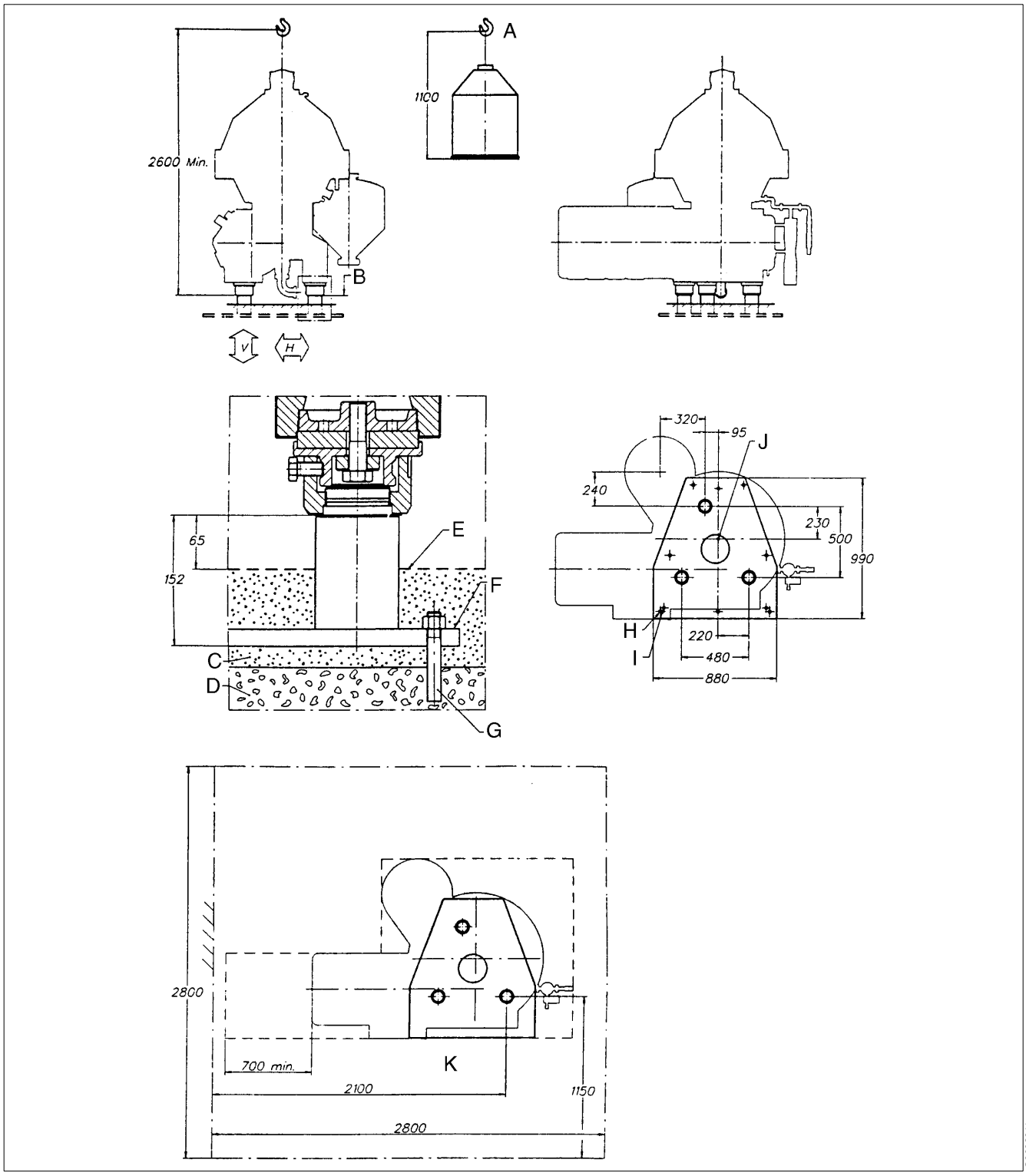
NOTE

When lifting parts without weight specifications, always use lifting straps with the capacity of at least **500 kg**.

2.7 Foundation drawing

2.7.1 PX 614 / 714

Alfa Laval ref. 553751, rev. 3



A. Min. lifting capacity required when doing service:
1500 kg
Max. height of largest component incl. lifting tool
Recommended speed for lifting:
– Low speed 0,5–1,5 m/min
– High speed 2–6 m/min
B. Horizontal max. deviation 0,4°
C. Expanding concrete
D. Structural concrete
E. Floor level
F. Foundation plate
G. Anchor bolts
H. 7 holes Ø20 for anchorage
I. 3 holes M20 for horizontal adjustment
J. Centre of separator bowl
K. Service side

Recommended free floor space for unloading when doing service

No fixed installations within this area

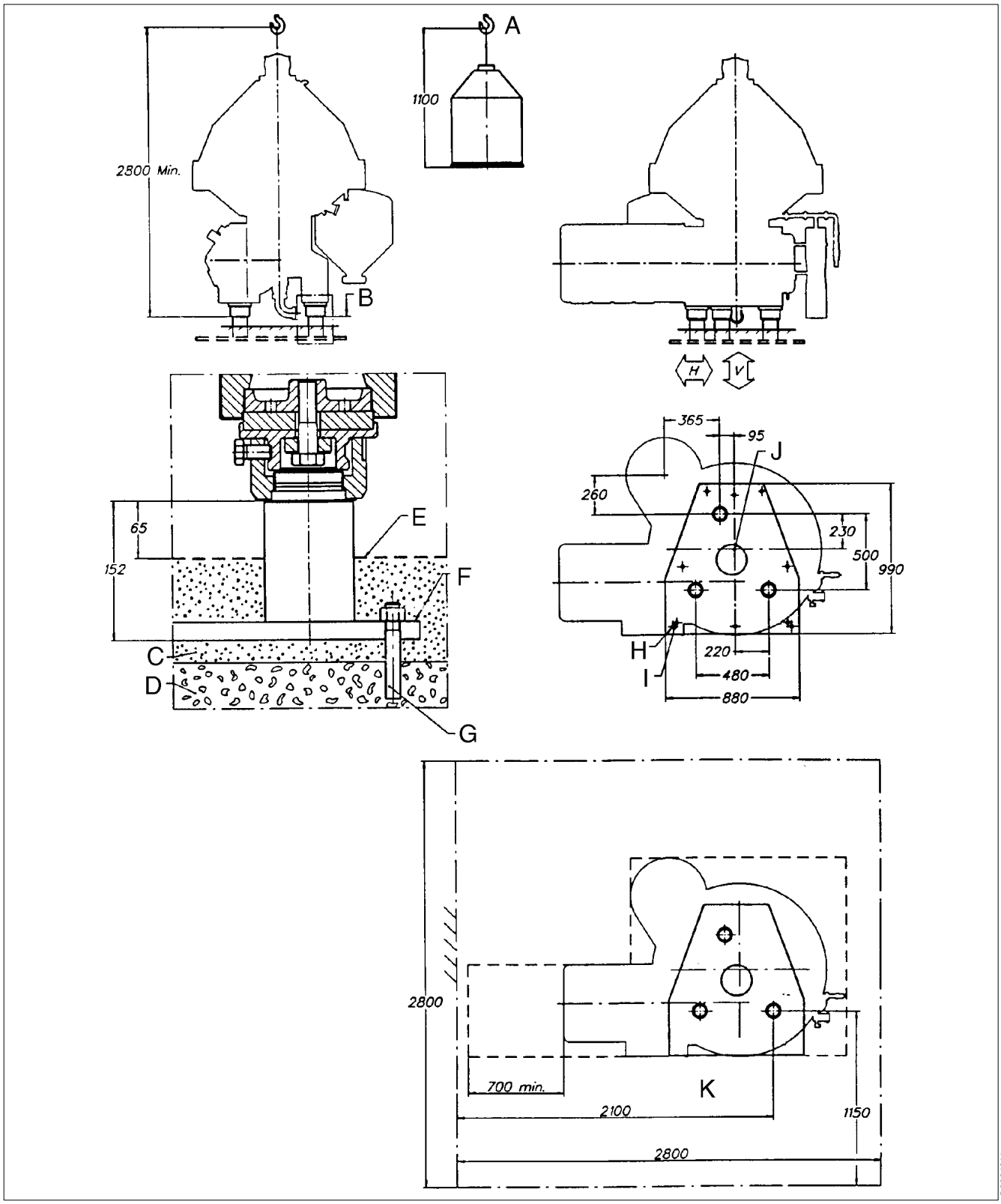
Vertical force not exceeding 25 kN/foot

Horizontal force not exceeding 25 kN/foot

Total static load max. 17 kN

2.7.2 PX 518 / 618 / 718 / 818

Alfa Laval ref. 553747, rev. 4



A. Min lifting capacity required when doing service: 1500 kg
Max height of largest component incl. lifting tool
Recommended speed for lifting:
– Low speed 0,5–1,5 m/min
– High speed 2–6 m/min
B. Horizontal max. deviation 0,4°
C. Expanding concrete
D. Structural concrete
E. Floor level
F. Foundation plate
G. Anchor bolts
H. 7 holes Ø20 for anchorage
I. 3 holes M20 for horizontal adjustment
J. Centre of separator bowl
K. Service side

Recommended free floor space for unloading when doing service

No fixed installations within this area

Vertical force not exceeding 30 kN/foot

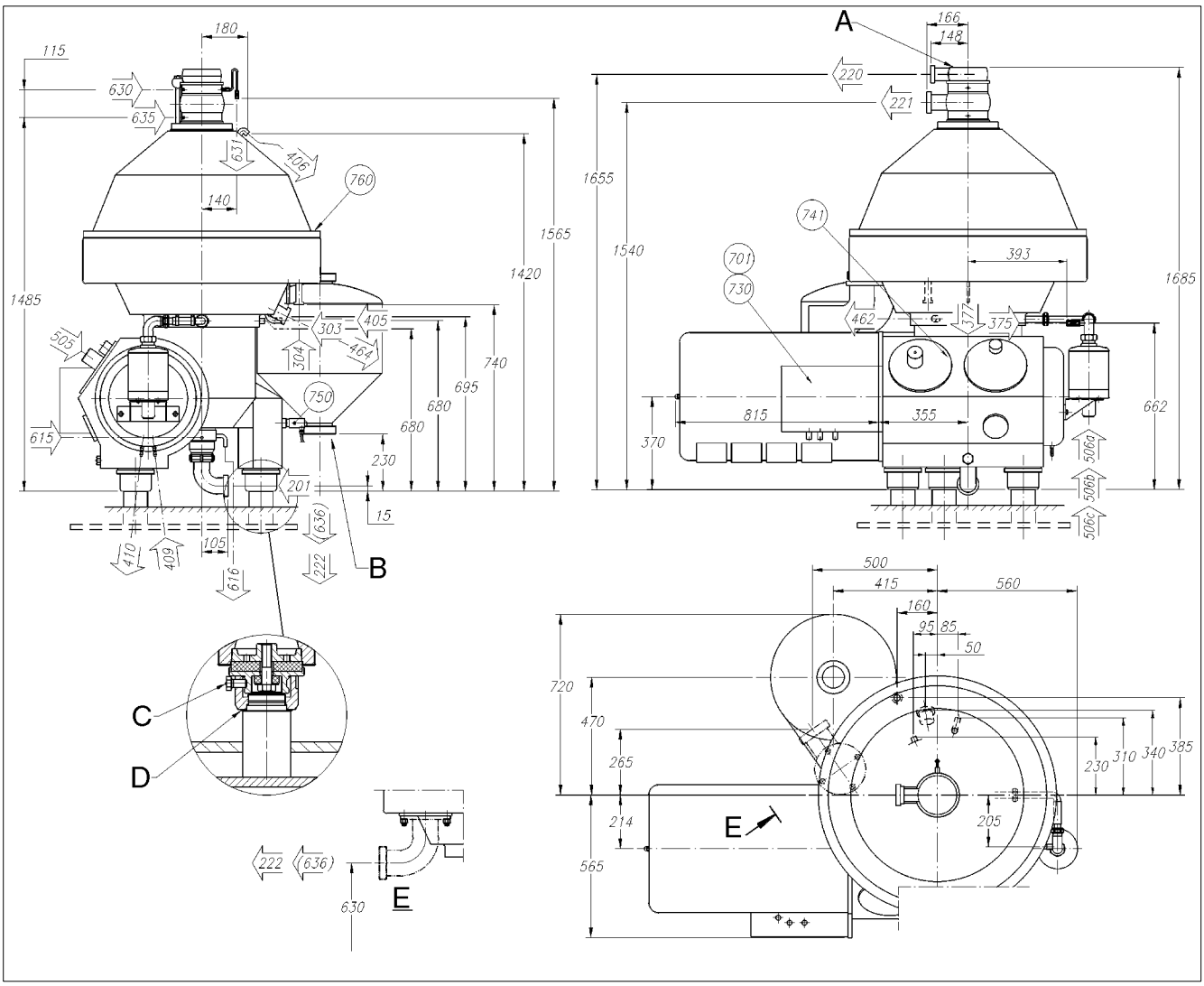
Horizontal force not exceeding 30 kN/foot

2.8 Basic size drawings

2.8.1 A / B / MRPX 614 / 714

SMS couplings

Alfa Laval ref. 562207, rev. 1



A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 220 and 221 turnable 360°.

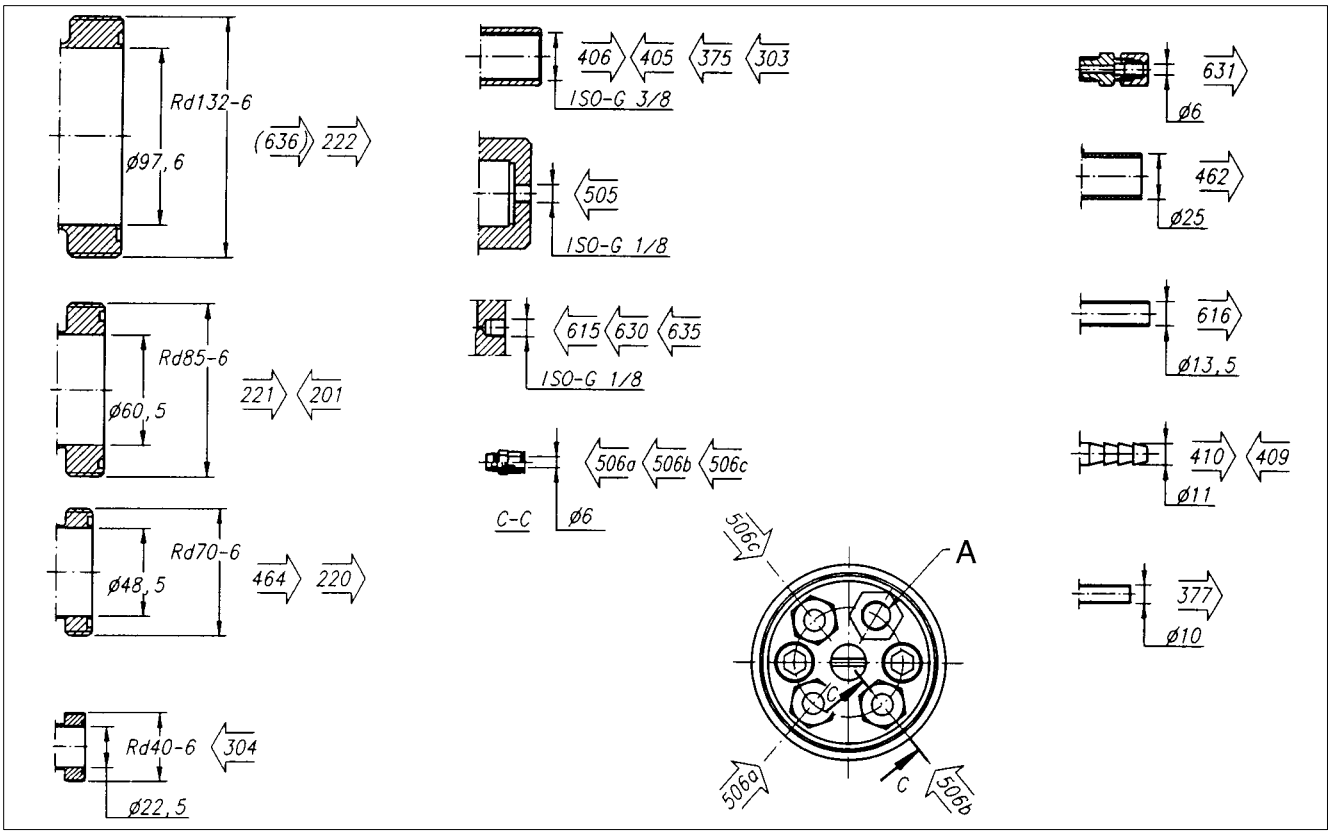
All connections to be installed non-loaded and flexible

Data for connections, see"2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818" on page 82.

A / B / MRPX 614 / 714

SMS couplings

Alfa Laval ref. 562207, rev. 1

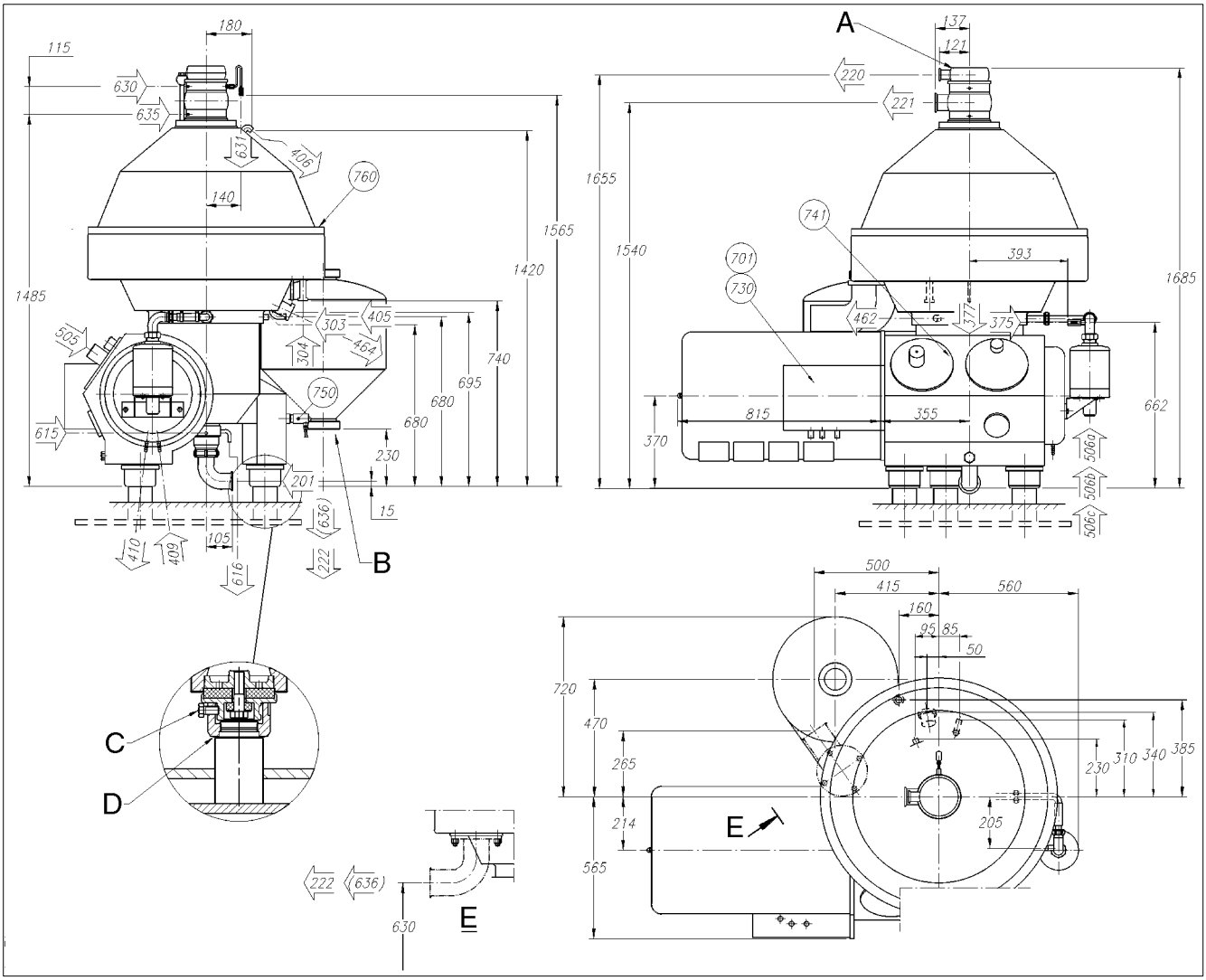


A. Needle valve

A / B / MRPX 614 / 714

Clamp couplings

Alfa Laval ref. 562219, rev. 2



A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 220 and 221 turnable 360°.

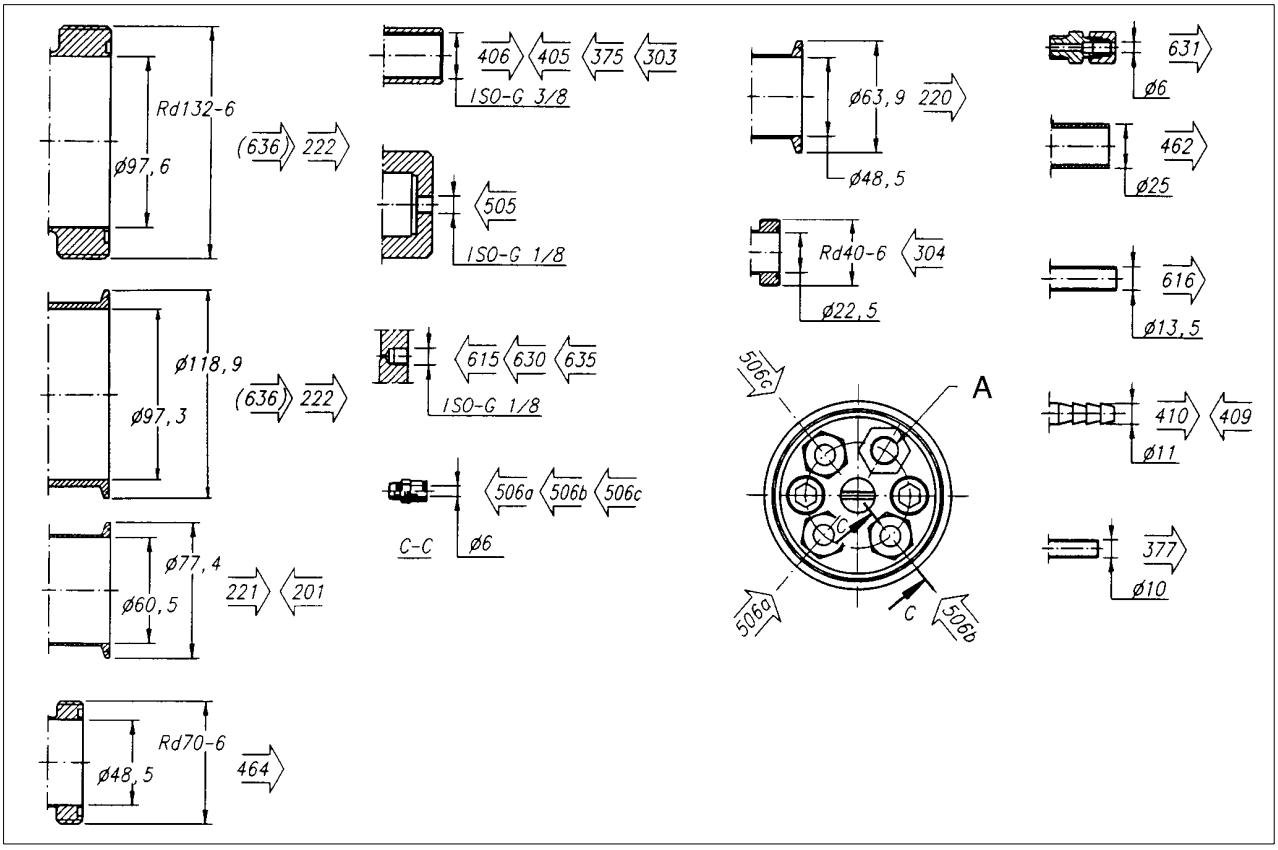
All connections to be installed non-loaded and flexible

Data for connections, see “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82.

A / B / MRPX 614 / 714

Clamp couplings

Alfa Laval ref. 562219, rev. 2

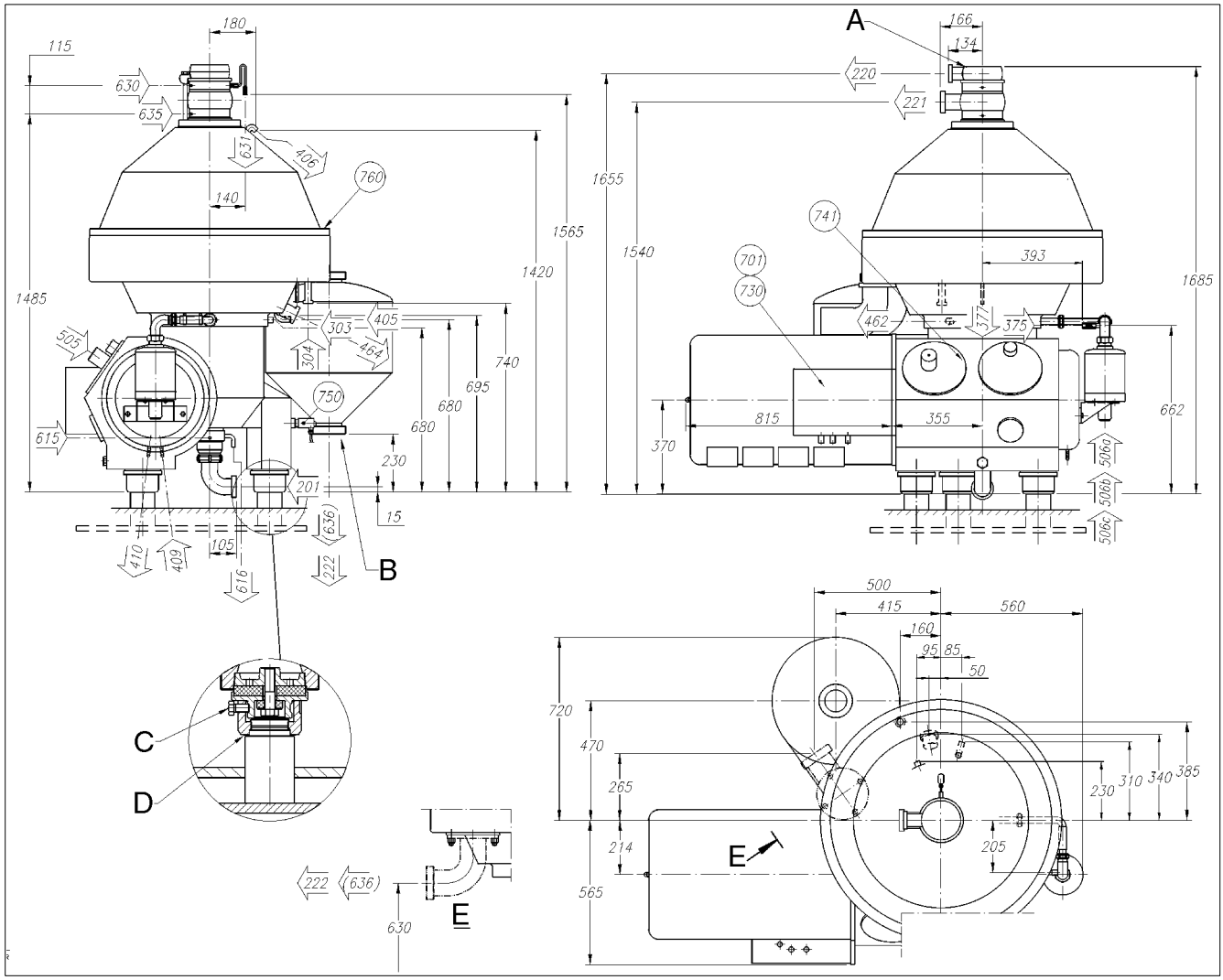


A. Needle valve

2.8.2 C / H / W / MRPX 614 / 714

SMS couplings

Alfa Laval ref. 562071, rev. 1



A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 220 and 221 turnable 360°.

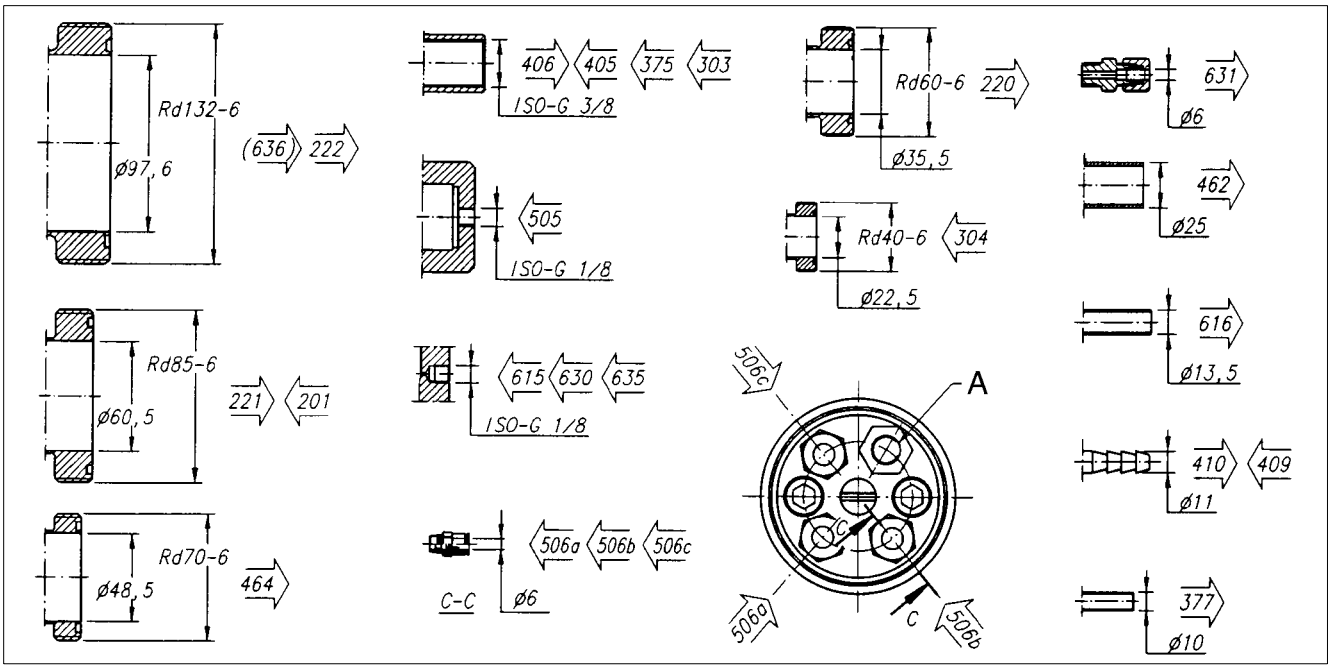
All connections to be installed non-loaded and flexible

Data for connections, see “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82.

C / H / W MRPX 614 / 714

SMS couplings

Alfa Laval ref. 562071, rev. 1

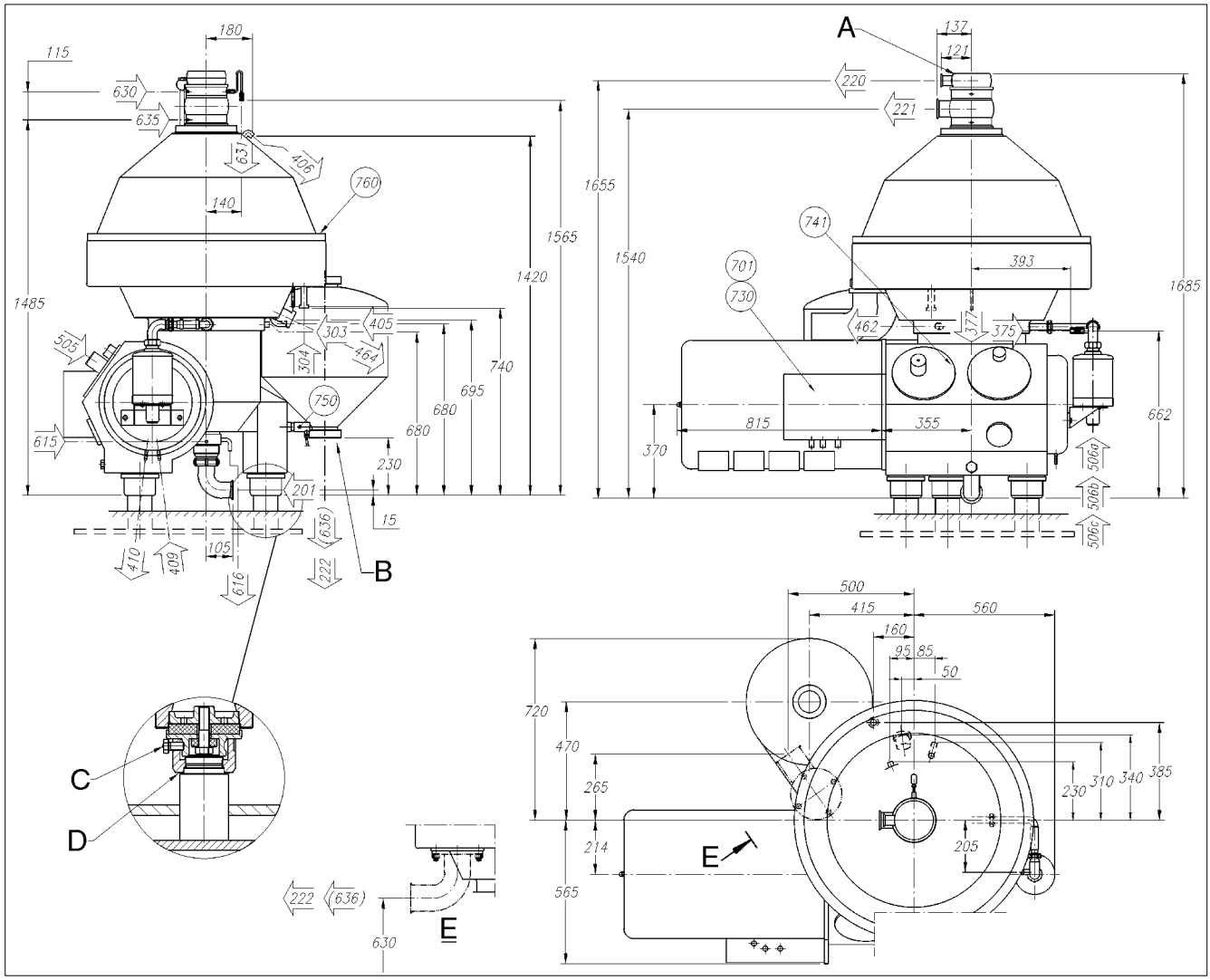


A. Needle valve

C / H / W / MRPX 614 / 714

Clamp couplings

Alfa Laval ref. 562218, rev. 2



A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 220 and 221 turnable 360°.

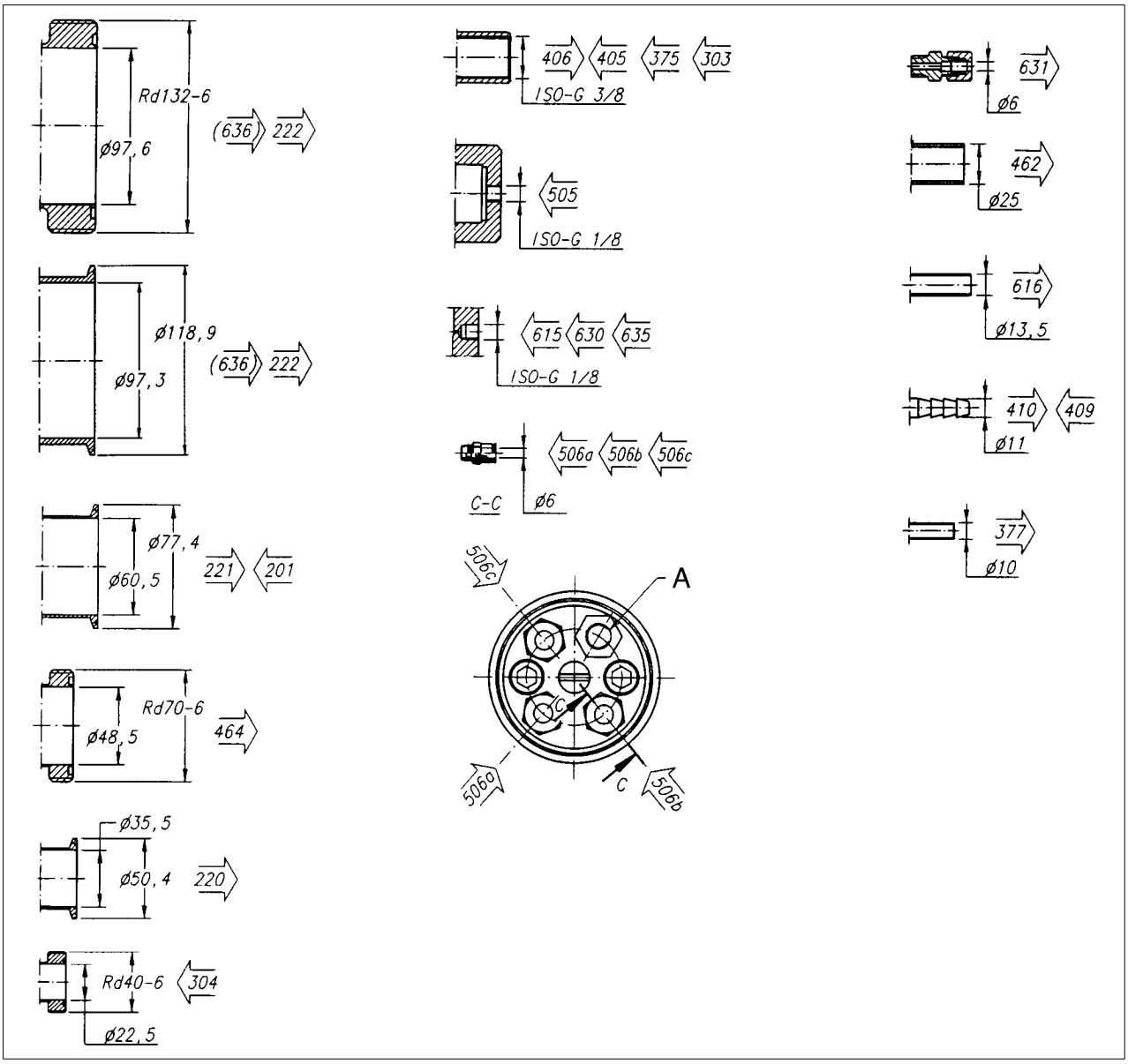
All connections to be installed non-loaded and flexible.

Data for connections, see “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82.

C / H / W MRPX 614 / 714

Clamp couplings

Alfa Laval ref. 562218, rev. 2

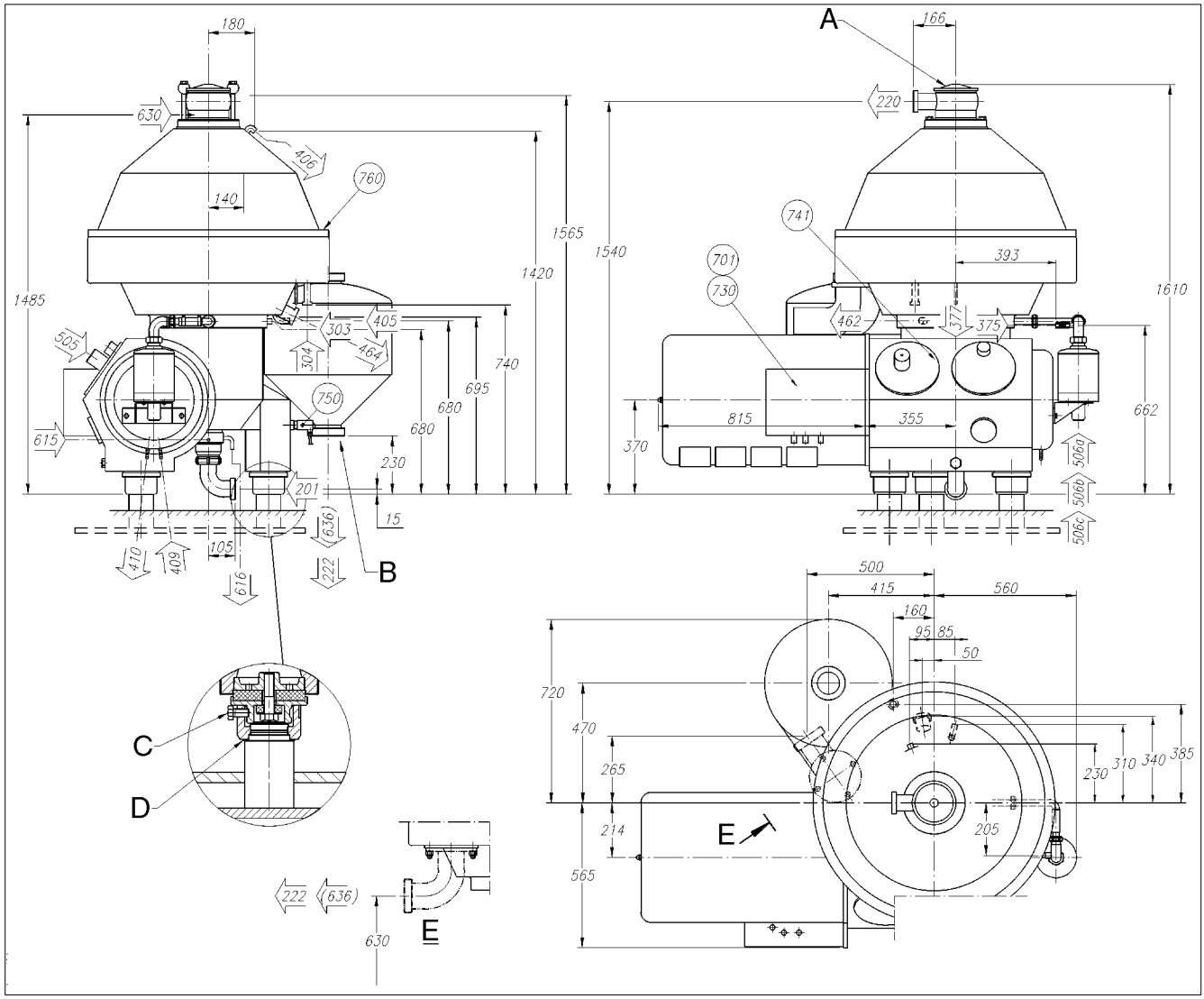


A. Needle valve

2.8.3 BBRPX / DMRPX 714

SMS couplings

Alfa Laval ref. 562220, rev. 1



A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 220 turnable 360°.

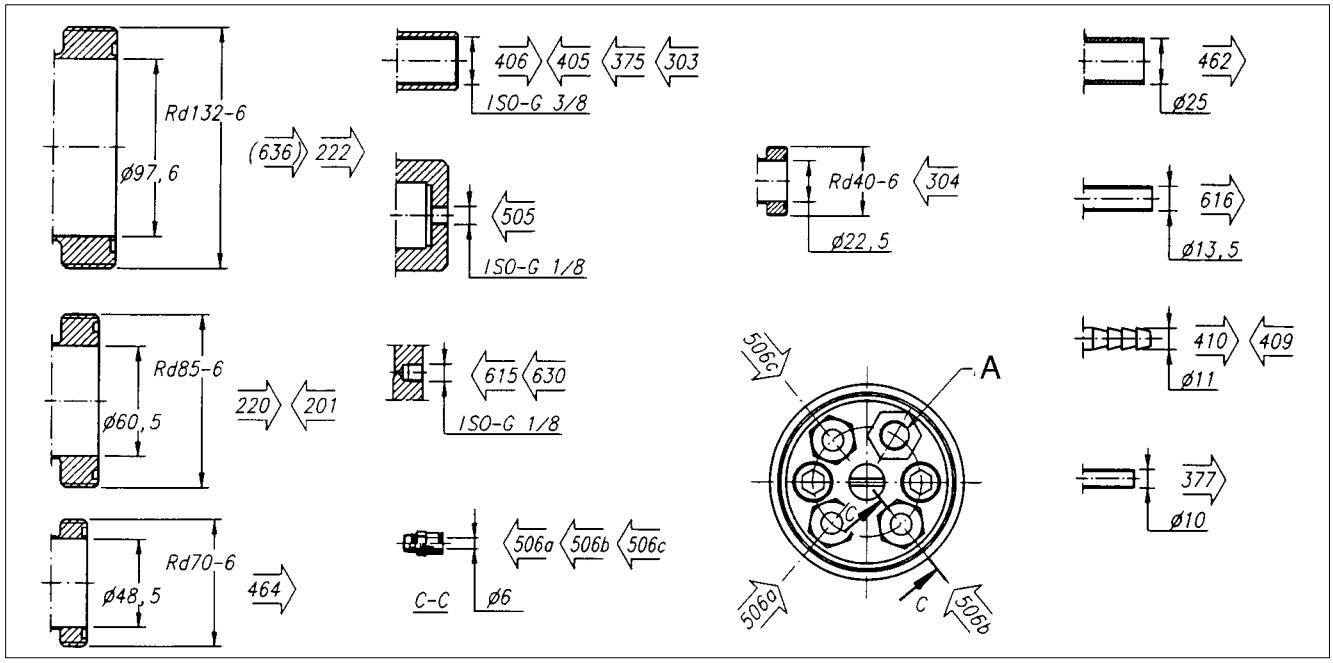
All connections to be installed non-loaded and flexible.

Data for connections, see ‘‘2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82.

B BRPX / D MRPX 714

SMS couplings

Alfa Laval ref. 562220, rev. 1

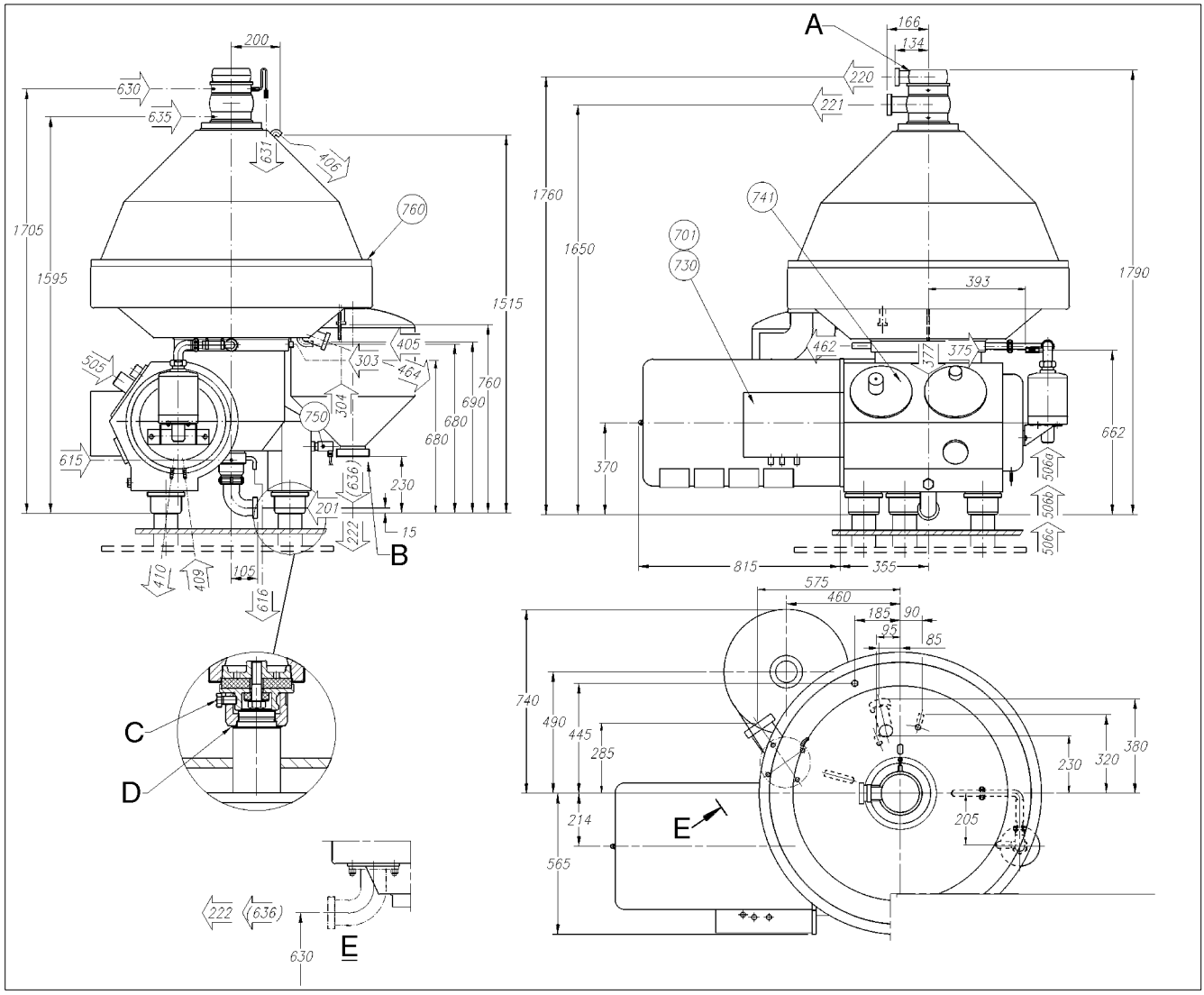


A. Needle valve

2.8.4 C / H / W / MRPX 518 / 618

SMS couplings

Alfa Laval ref. 562224, rev. 1



A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 220 and 221 turnable 360°.

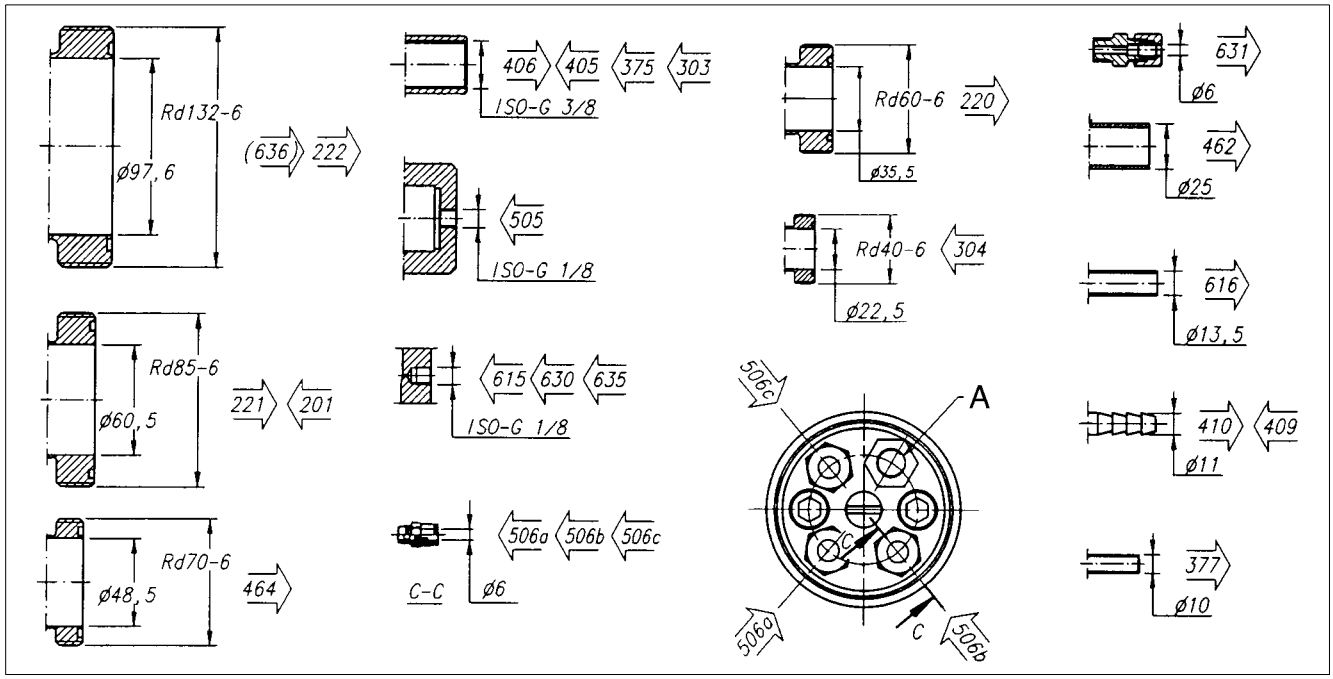
All connections to be installed non-loaded and flexible.

Data for connections, see ‘‘2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82.

C / H / W MRPX 518 / 618

SMS couplings

Alfa Laval ref. 562224, rev. 1

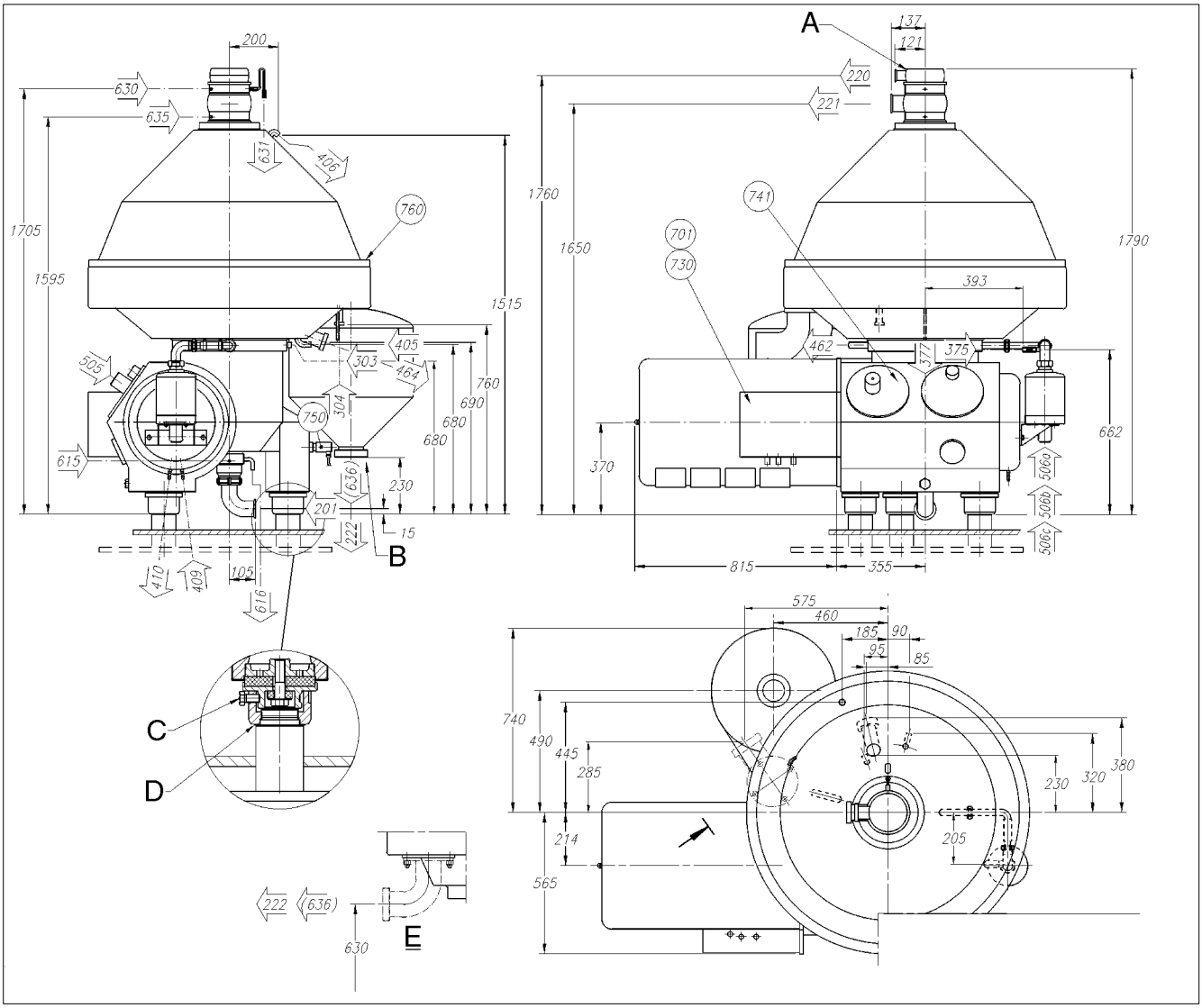


A. Needle valve

C / H / W / MRPX 518 / 618

Clamp couplings

Alfa Laval ref. 562226, rev. 2



A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 221 and 220 turnable 360°.

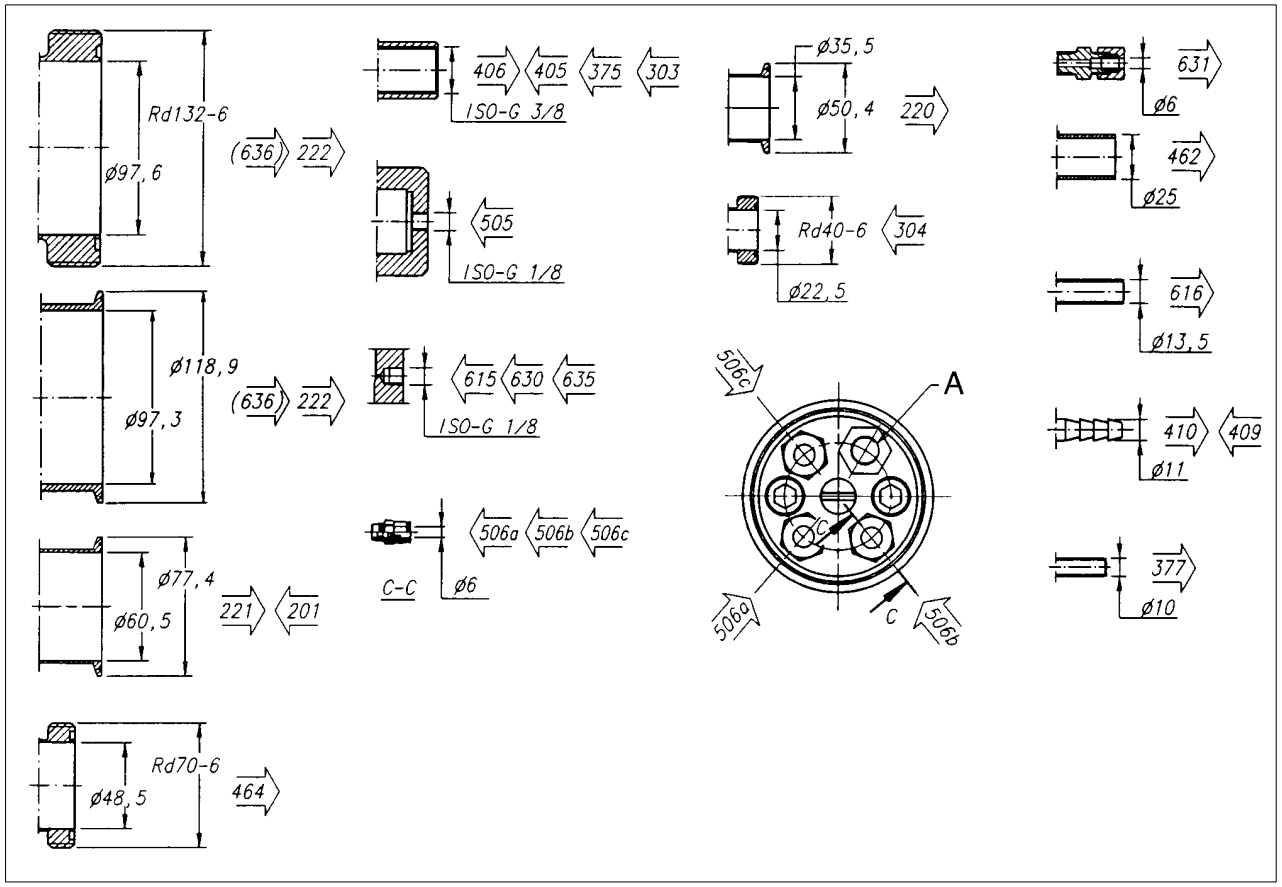
All connections to be installed non-loaded and flexible.

Data for connections: See “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82.

C / H / W MRPX 518 / 618

Clamp couplings

Alfa Laval ref. 562226, rev. 2

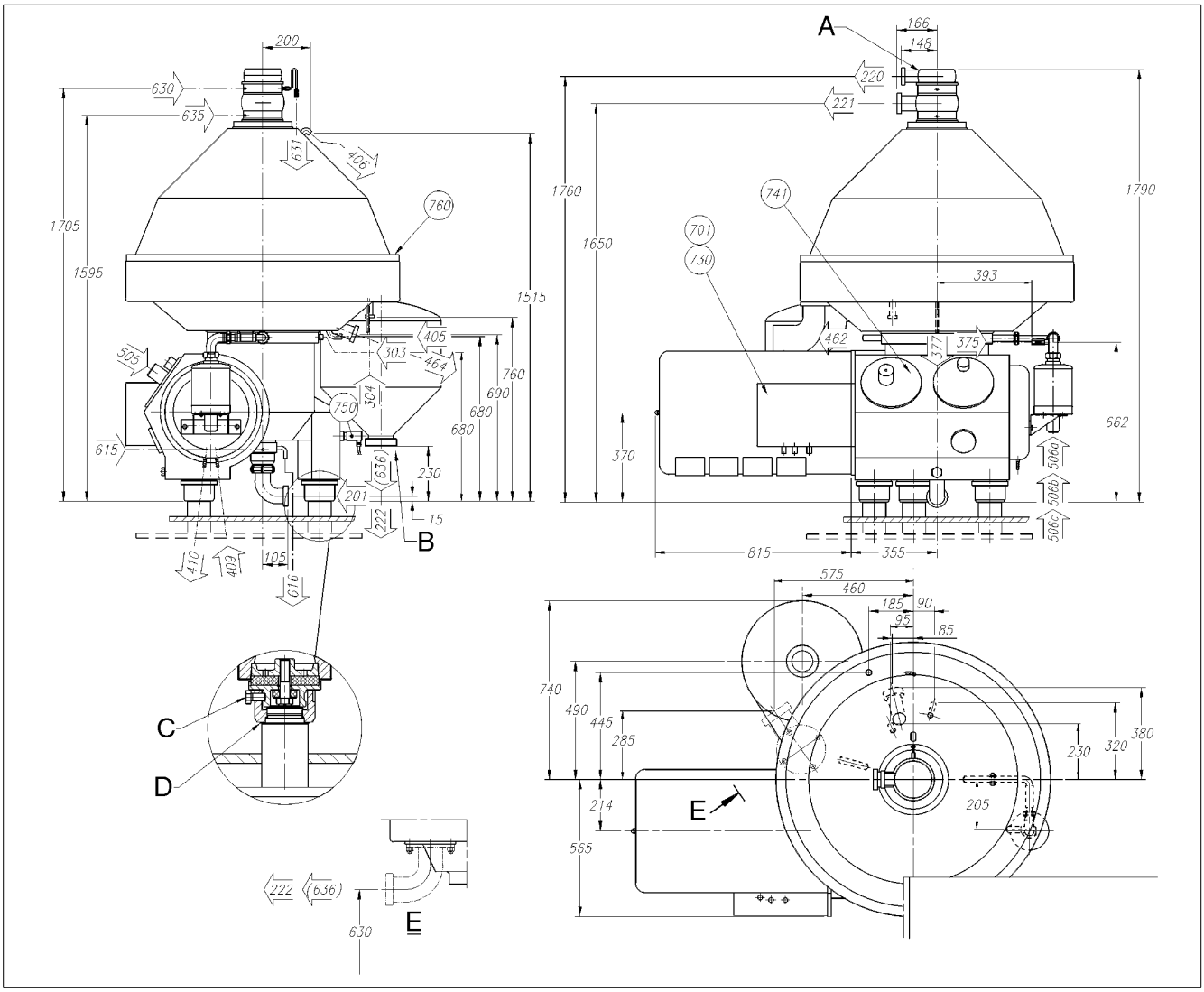


A. Needle valve

2.8.5 B / F / MRPX 618, BMRPX 818

SMS couplings

Alfa Laval ref. 562228, rev. 2



A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 221 and 220 turnable 360°.

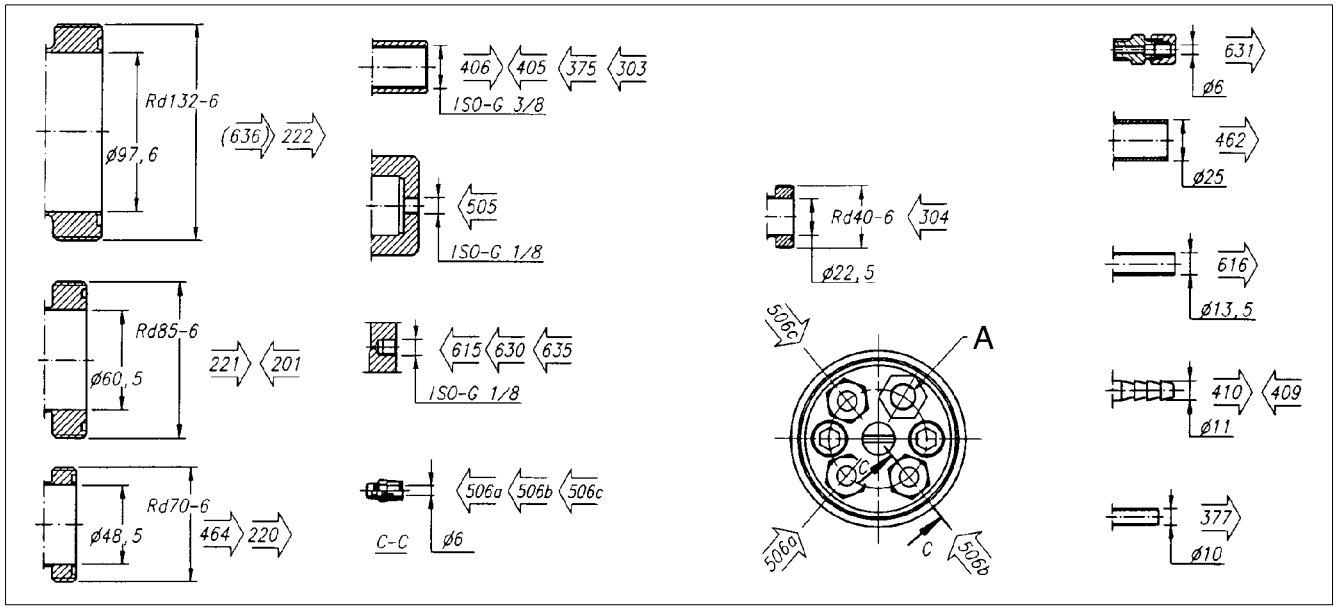
All connections to be installed non-loaded and flexible.

Data for connections: See “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82.

B / F / MRPX 618, BMRPX 818

SMS couplings

Alfa Laval ref. 562228, rev. 2

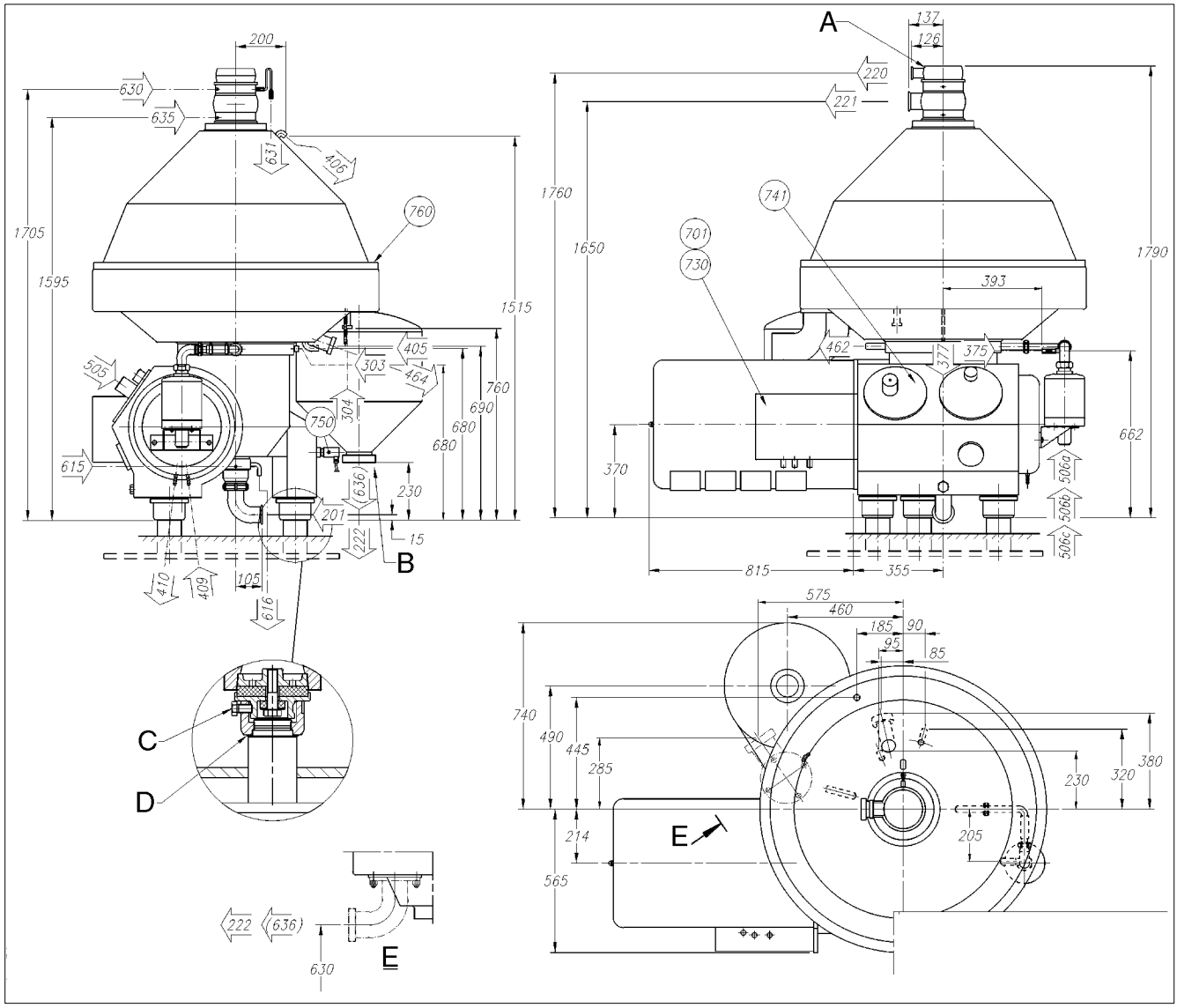


A. Needle valve

B / F / MRPX 618, BMRPX 818

Clamp couplings

Alfa Laval ref. 562229, rev. 3



A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 221 and 220 turnable 360°.

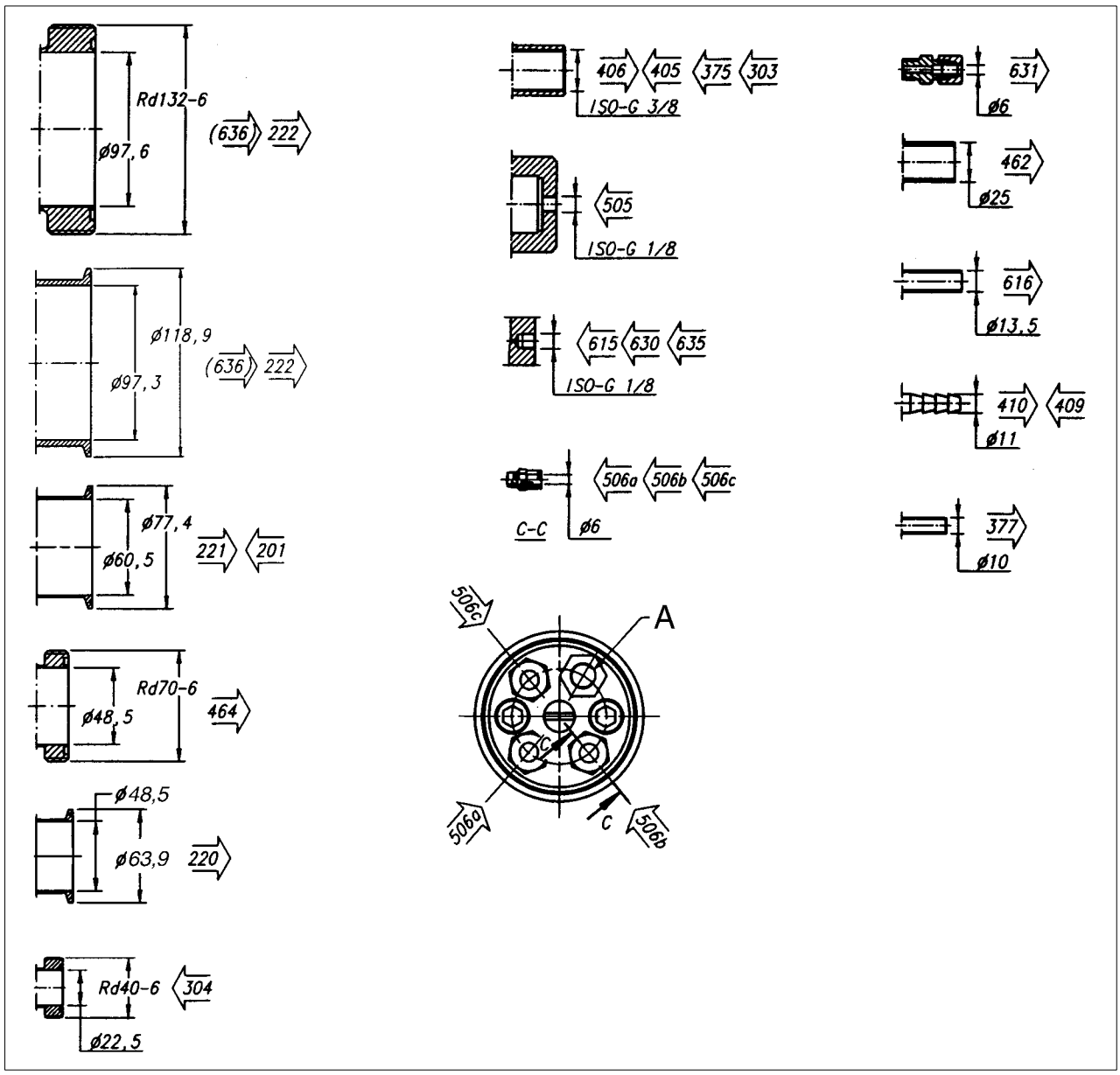
All connections to be installed non-loaded and flexible.

Data for connections: See “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82.

B / F / MRPX 618, BMRPX 818

Clamp couplings

Alfa Laval ref. 562229, rev. 3

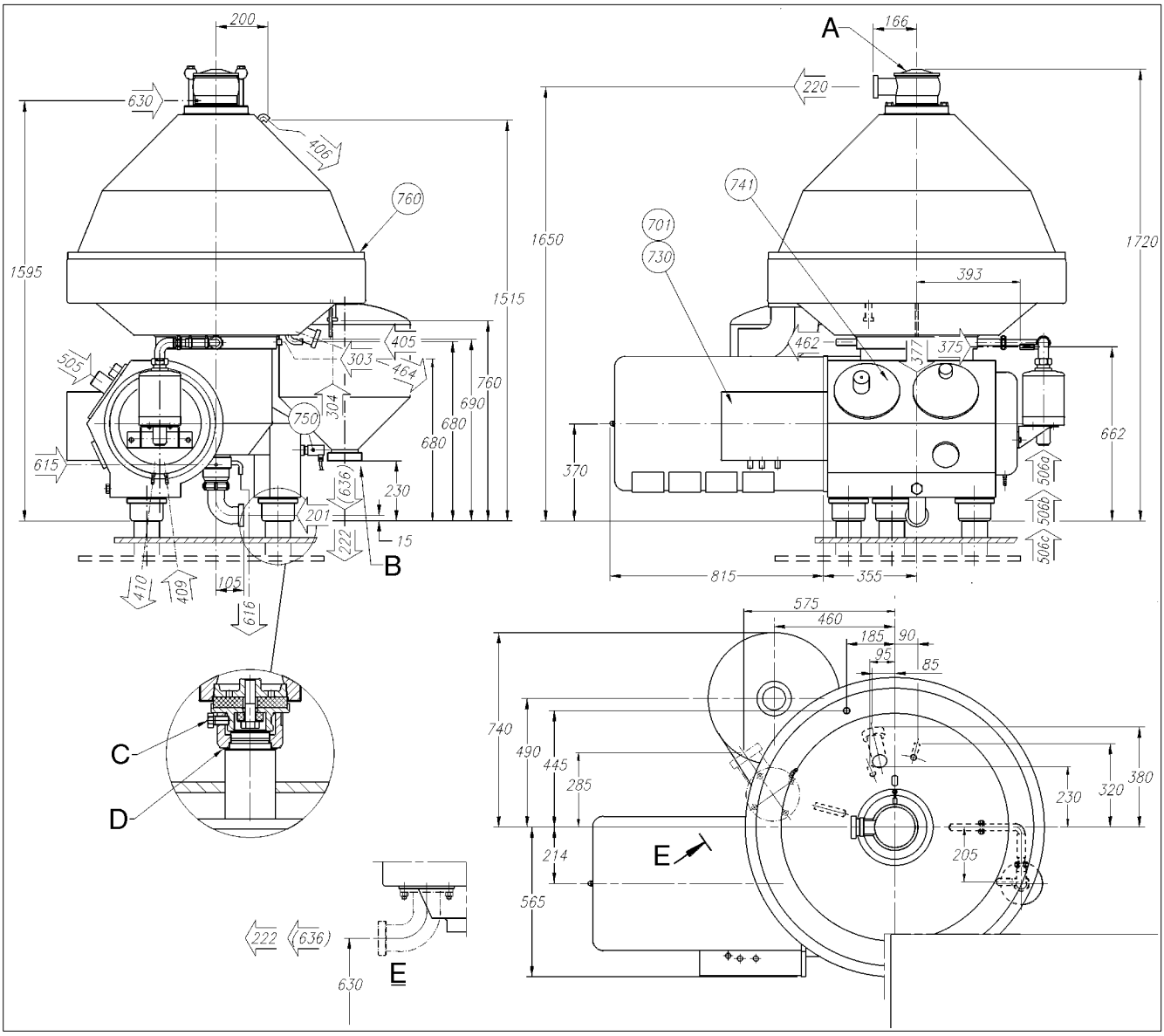


A. Needle valve

2.8.6 BBRPX 618, 818 / DMRPX 618

SMS couplings

Alfa Laval ref. 562227, rev. 1



A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 220 turnable 360°.

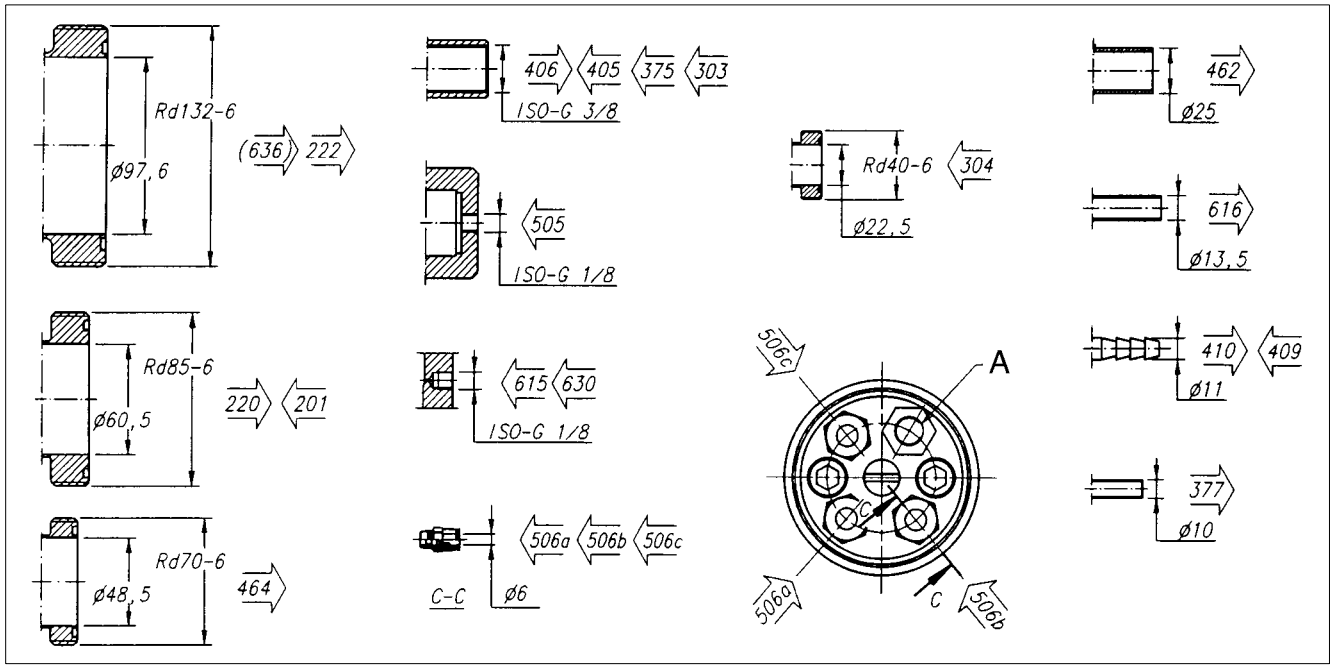
All connections to be installed non-loaded and flexible.

Data for connections: See “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82.

BBRPX 618, 818 / DMRPX 618

SMS couplings

Alfa Laval ref. 562227, rev. 1

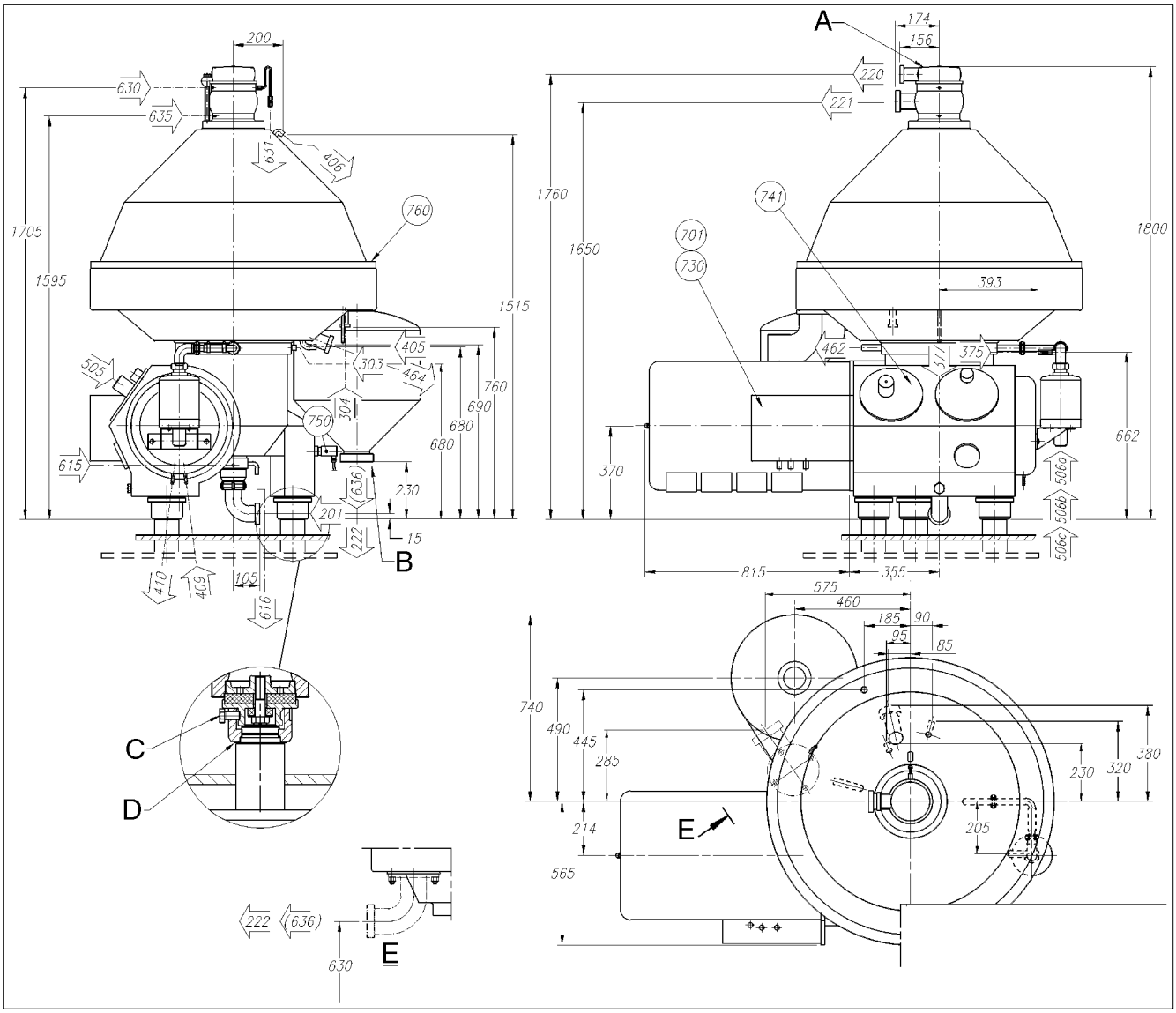


A. Needle valve

2.8.7 H / W / C MRPX 718
H / W / MRPX 818

SMS couplings

Alfa Laval ref. 562230, rev. 2



A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 220 and 221 turnable 360°.

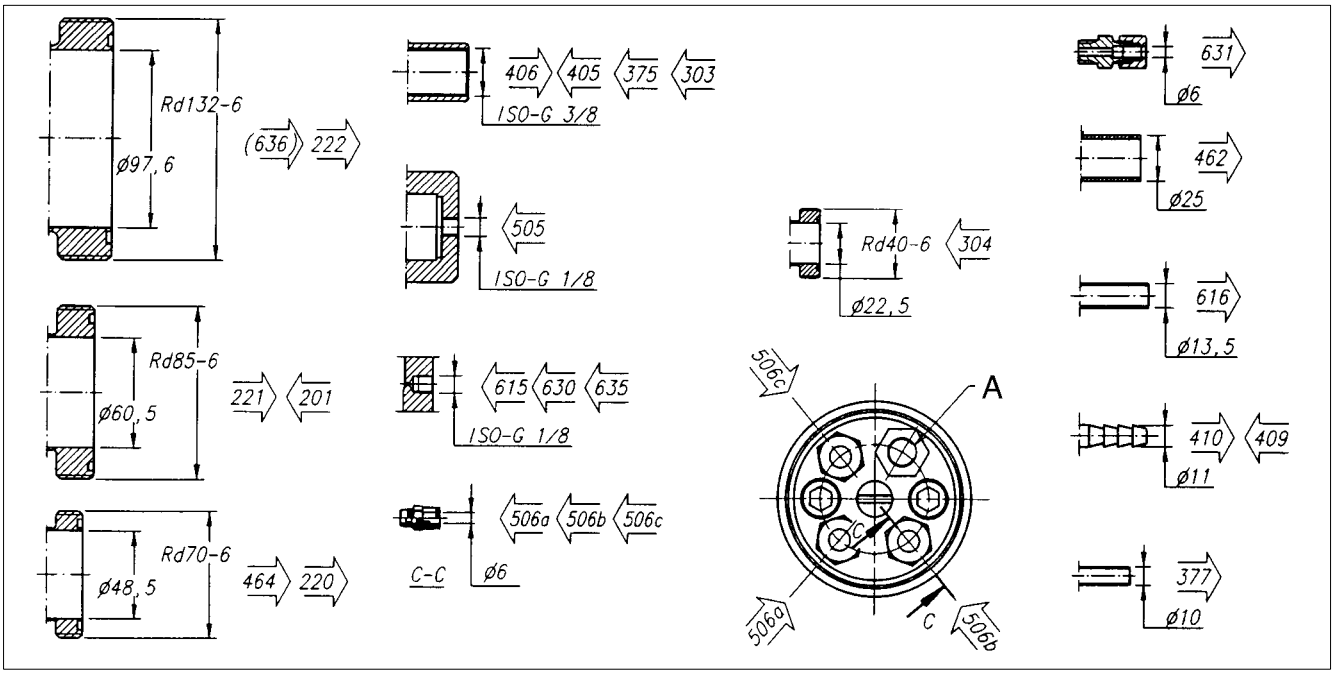
All connections to be installed non-loaded and flexible.

Data for connections, see ‘‘2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82 and ‘‘2.10 Connection list, BM / BB / HM / WM / RPX 818” on page 86.

H / W / C MRPX 718
H / W / MRPX 818

SMS couplings

Alfa Laval ref. 562230, rev. 2

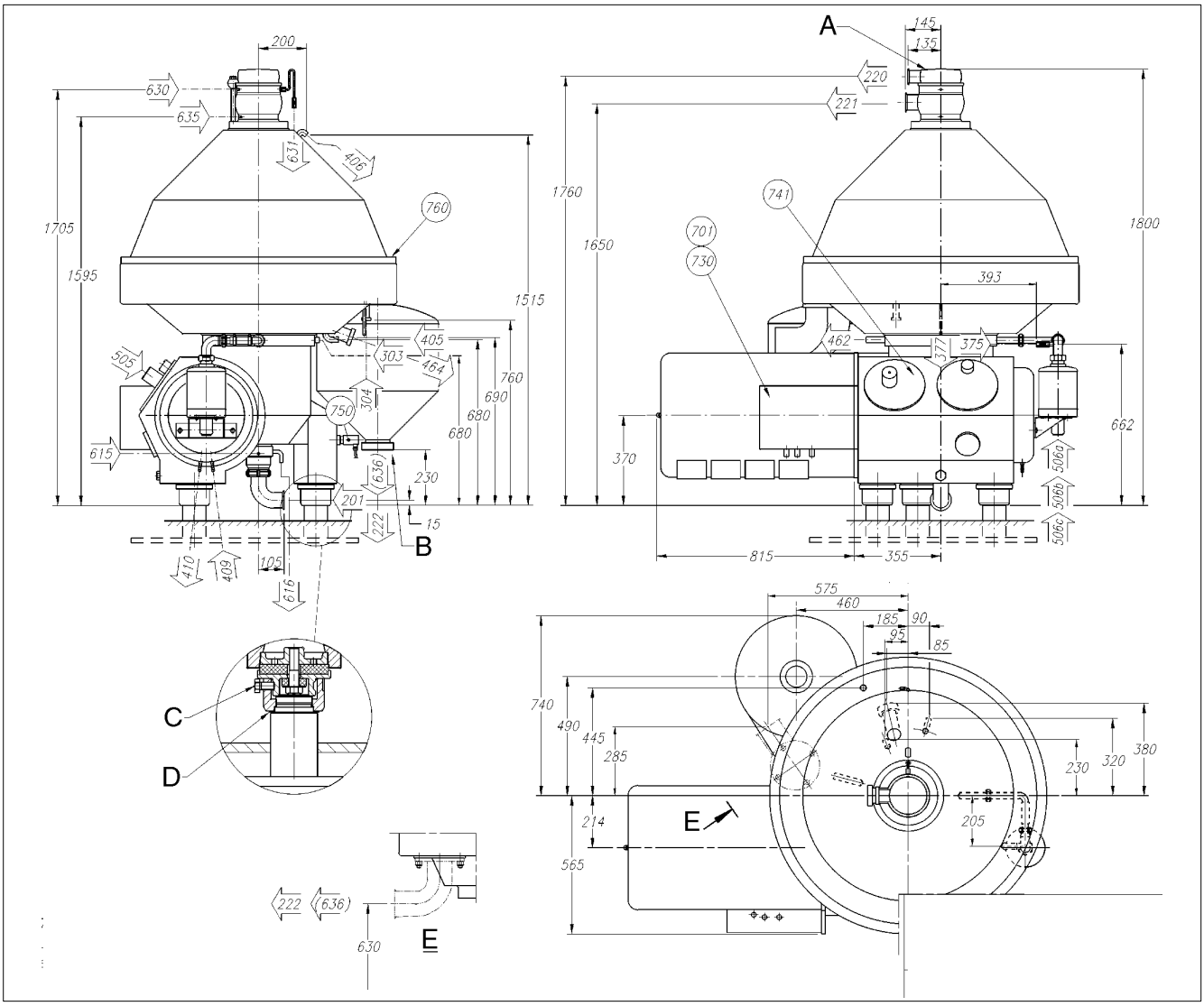


A. Needle valve

H / W / C MRPX 718
H / W / MRPX 818

Clamp couplings

Alfa Laval ref. 562231, rev. 3



A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 220 and 221 turnable 360°.

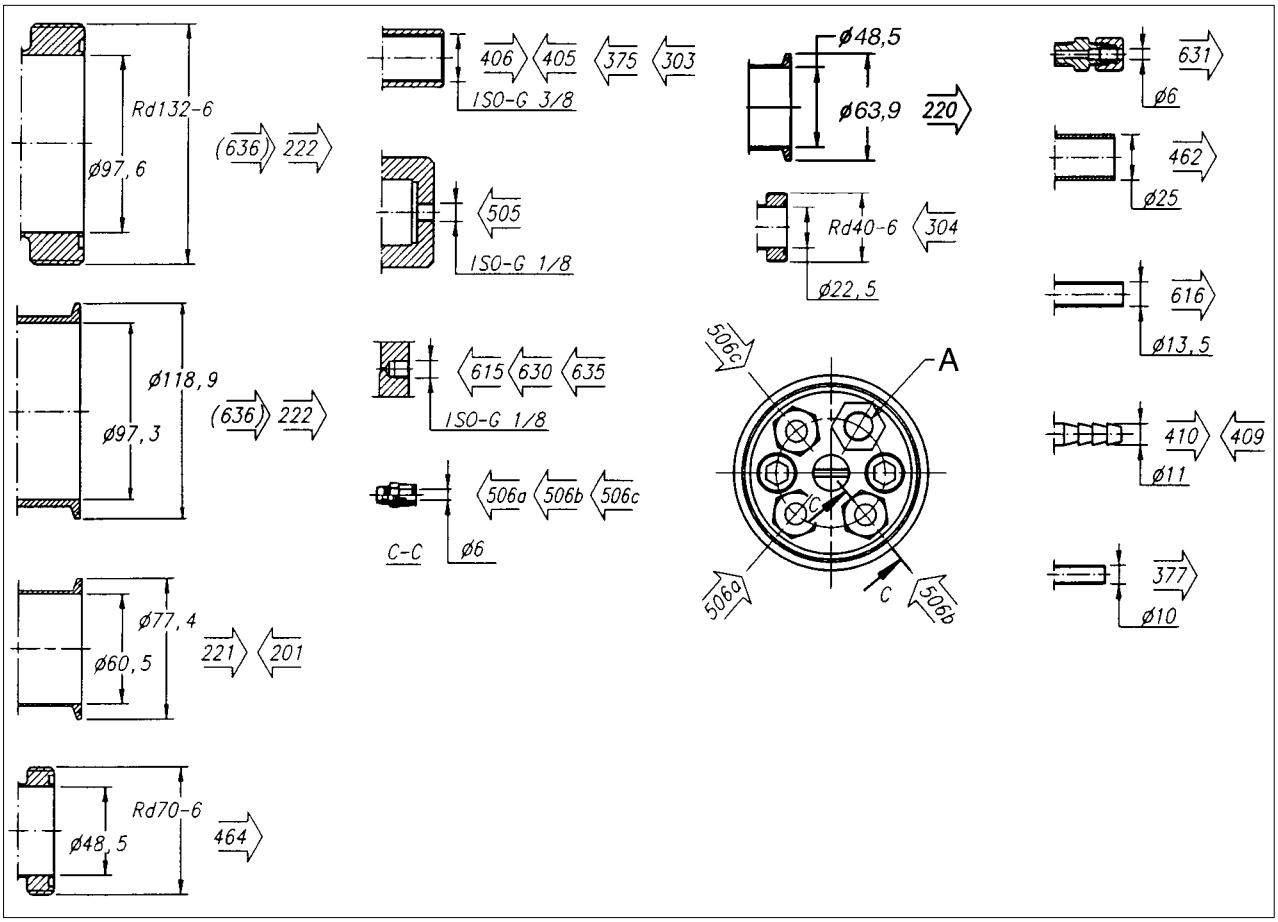
All connections to be installed non-loaded and flexible.

Data for connections, see “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82 and “2.10 Connection list, BM / BB / HM / WM / RPX 818” on page 86.

H / W / C MRPX 718
H / W / MRPX 818

Clamp couplings

Alfa Laval ref. 562231, rev. 3

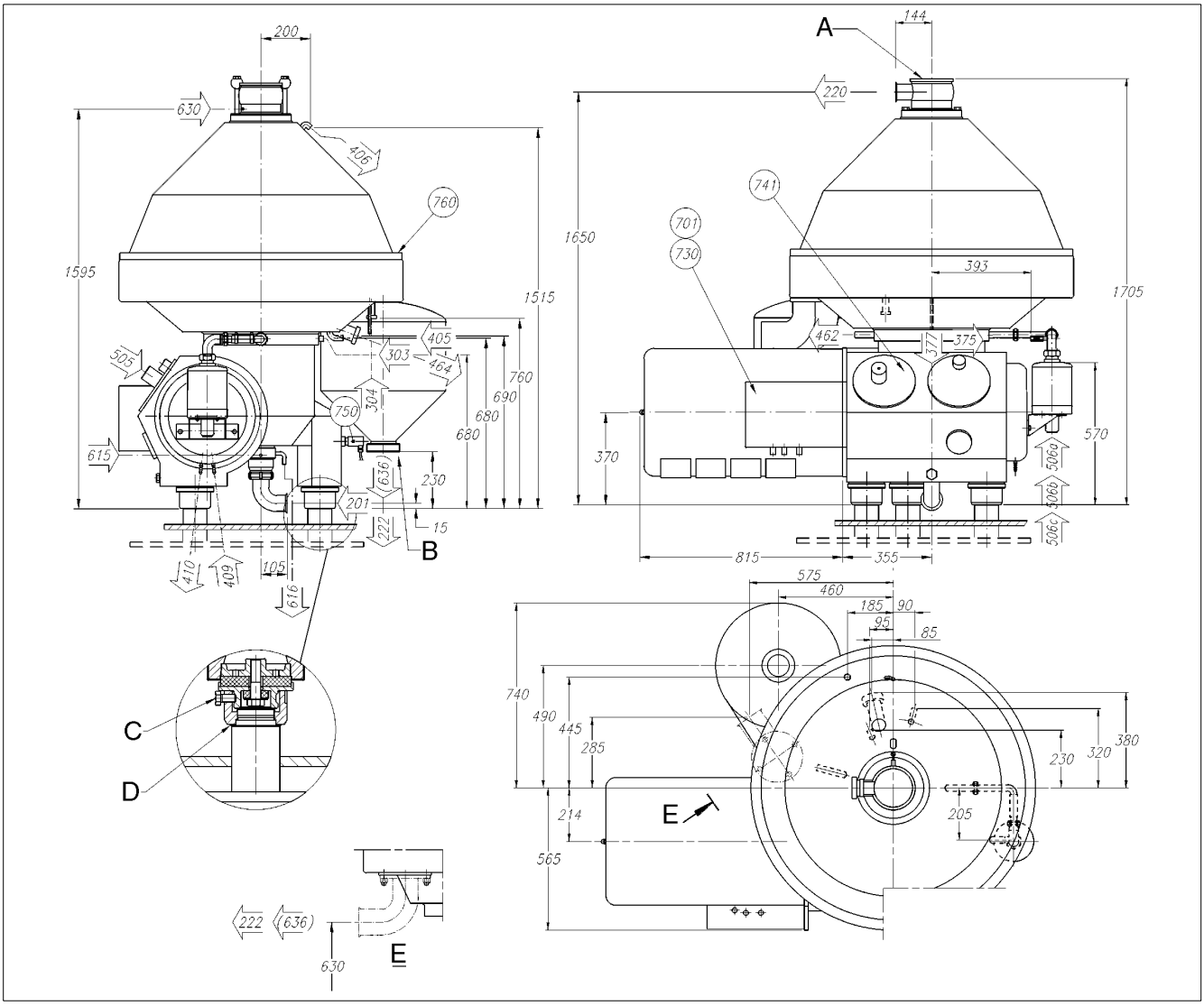


A. Needle valve

2.8.8 BBRPX 818, high flow

Clamp couplings

Alfa Laval ref. 565379, rev. 1



G0928611

A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 220 turnable 360°.

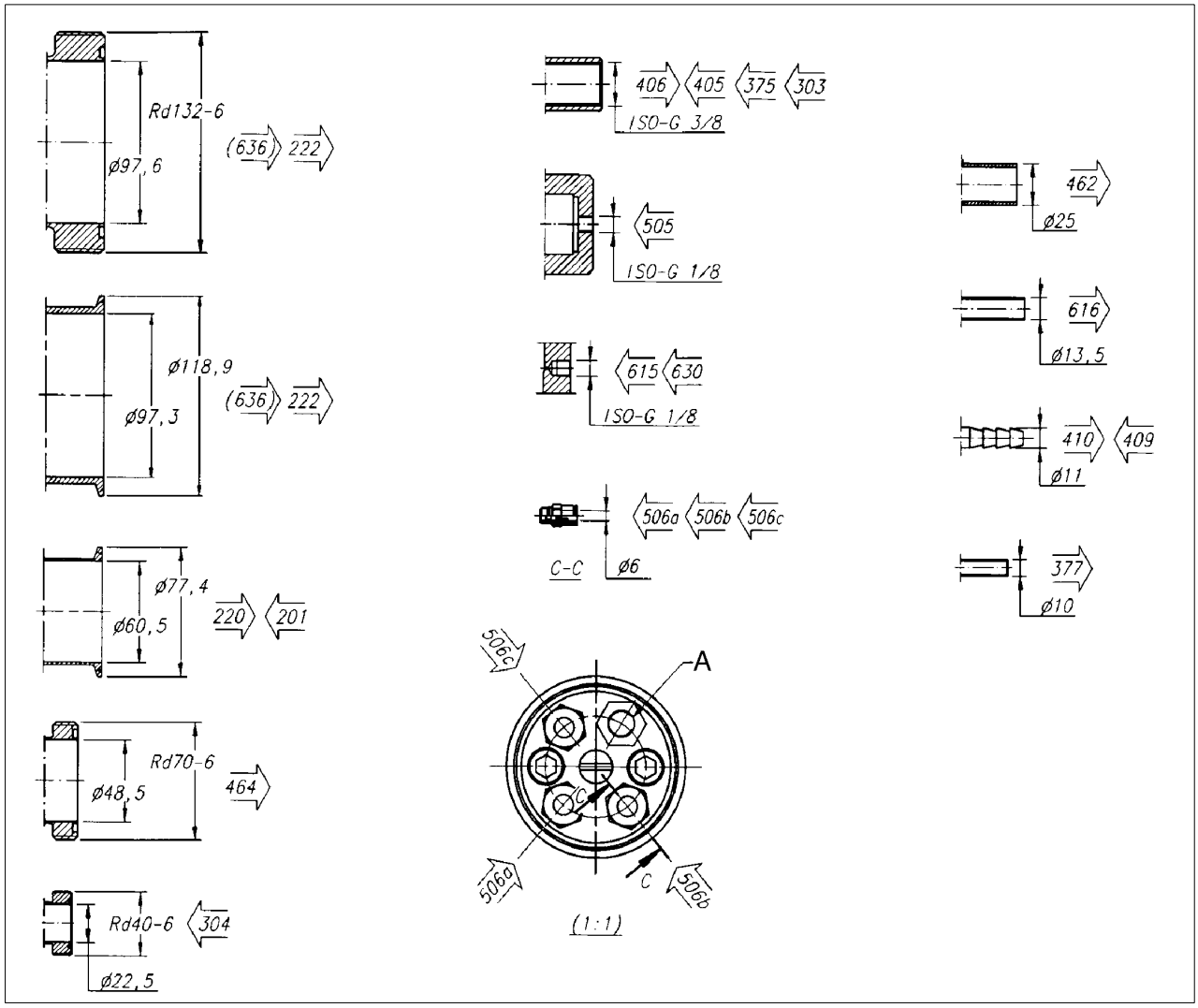
All connections to be installed non-loaded and flexible.

Data for connections, see ‘‘2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82 and ‘‘2.10 Connection list, BM / BB / HM / WM / RPX 818” on page 86.

BBRPX 818, high flow

Clamp couplings

Alfa Laval ref. 565379, rev. 1

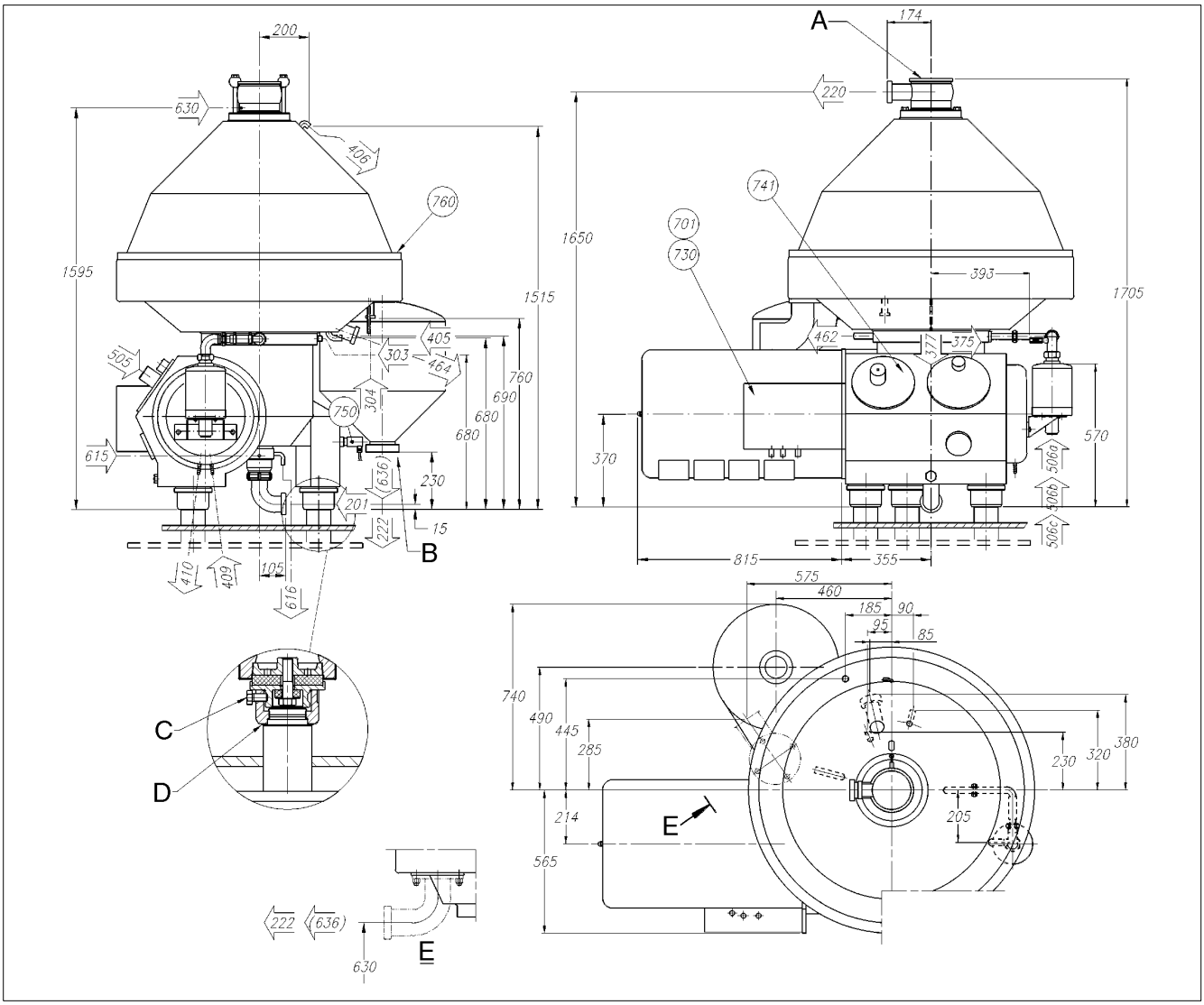


A. Needle valve

BBRPX 818, high flow

SMS couplings

Alfa Laval ref. 565380, rev. 1



G0928711

A. Maximum horizontal displacement at the outlet connections during operation ±20 mm
B. Maximum vertical displacement at the cyclone connection during operation ±10 mm
C. Tightening torque 100 Nm
D. Adjusting washers, max. 4 pcs/foot
E. Alternative execution

Connection 220 turnable 360°.

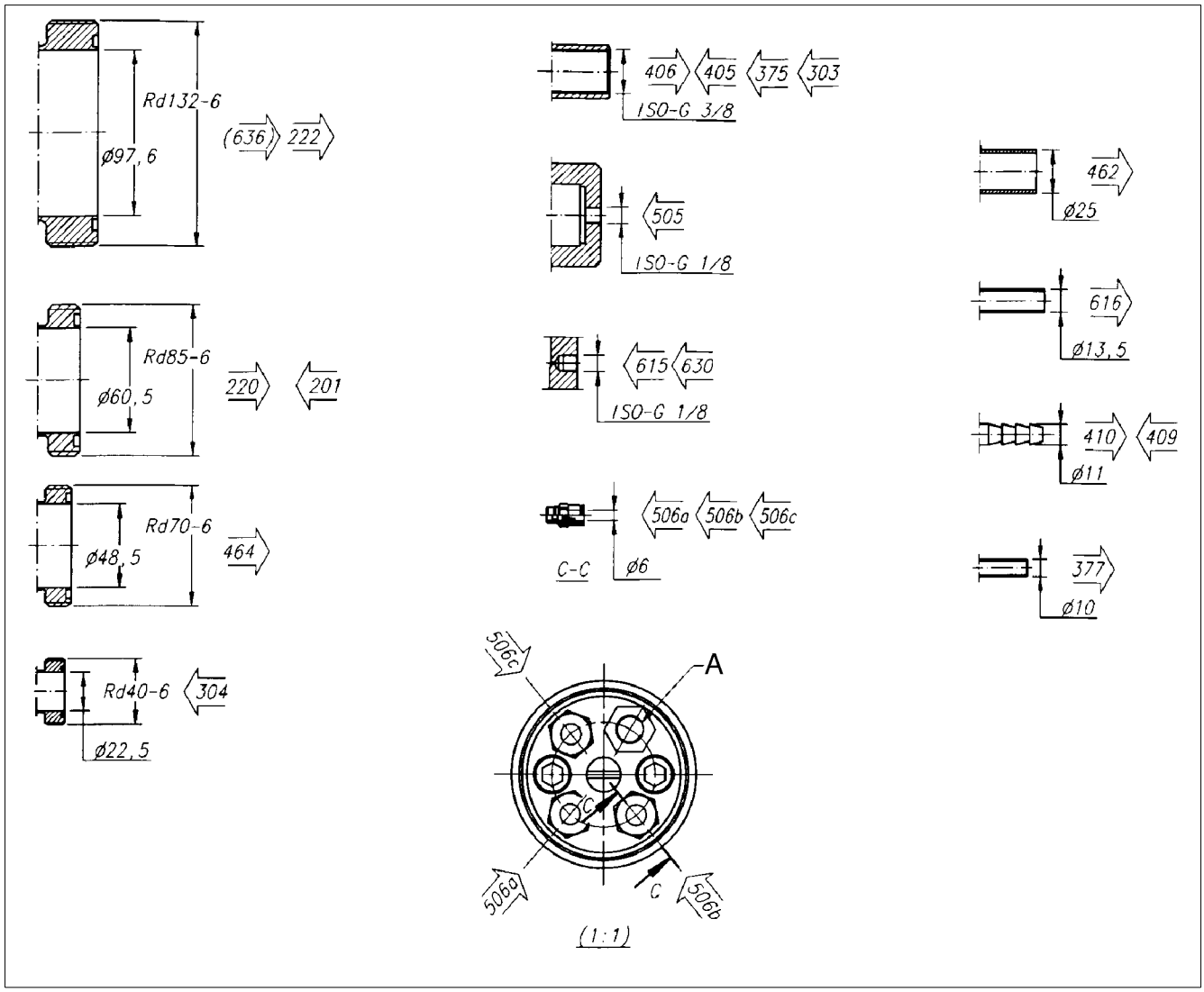
All connections to be installed non-loaded and flexible.

Data for connections, see “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82 and “2.10 Connection list, BM / BB / HM / WM / RPX 818” on page 86.

BBRPX 818, high flow

SMS couplings

Alfa Laval ref. 565380, rev. 1



A. Needle valve

2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818

Alfa Laval ref. 562178, rev. 1 / 562179, rev. 0

Connection No	Description	Requirements / limits
201	Inlet for process liquid • Pressure	 Max 600 kPa
220	Light phase (clarified liquid) outlet • Back pressure	 0 – 700 kPa
221	Heavy phase outlet (twin phase sep. only)	0 – 600 kPa
222	Outlet for solid phase • Discharge interval	 Max. 60 disch/h The outlet from the cyclone should be installed in such a way that the cyclone can not be filled with sludge
303	Flushing under the bowl Normally used only in the discharge sequence and / or for cleaning • Pressure • Pressure (recommended) • Flow (momentary at rec. pressure) • Consumption	 100 – 600 kPa 300 kPa 460 litres/h 0 - 6 litres / discharge
304	Flushing in sediment outlet • Consumption • Pressure	 Ca 25 litres / discharge 400 – 700 kPa
375	Inlet for operating liquid • Pressure • Capacity • Quality requirements • Pipe length via a check valve • Pipe dimension	 40 – 80 kPa Min. 5 litres/min see ‘‘4.1 Service water” on page 110 Max. 30 m Min. 10 x 1 mm
377	Outlet for operating liquid	

DANGER

Disintegration hazard

Pressure in connections 405 and 406 must not be higher than 50 kPa. Risk for deformation of frame hood and consequent contact with rotating parts.

Connection No.	Description	Requirements / limits
405	Inlet for cooling liquid, frame part • Consumption • Pressure • Quality requirements	100 litres/h Max. 50 kPa See “4.1 Service water” on page 110
406	Outlet for cooling liquid, frame parts	No back pressure allowed
409	Inlet for liquid to oil cooler • Consumption • Pressure • Quality requirements	80 – 100 litres/h Max. 50 kPa see “4.1 Service water” on page 110
410	Outlet for liquid to oil cooler	
462	Drain of frame top part, lower	
464	Drain of frame top part	
505	Inlet for compressed air to brake • Pressure • Compressed air, demands and quality	400 ± 50 kPa see “4.2 Compressed air” on page 111
506 a	Inlet for compressed air to OWMC • Pressure • Quality requirements	300 – 700 kPa see “4.2 Compressed air” on page 111
506 b	Inlet for control of small discharge • Pressure • Quality requirements	300 – 700 kPa see “4.2 Compressed air” on page 111
506 c	Inlet for control of large discharge • Pressure • Quality requirements	300 – 700 kPa see “4.2 Compressed air” on page 111

Connection No.	Description	Requirements / limits
615	Inlet for sealing liquid • Consumption • Quality requirements	 60 – 80 litres/h see “4.1 Service water” on page 110
616	Outlet for sealing liquid	Free outlet, without water trap
630	Inlet for sealing liquid • Consumption • Quality requirements	 60 – 80 litres/h see “4.1 Service water” on page 110
631	Outlet for sealing liquid	
635	Inlet for sealing liquid • Consumption • Quality requirements	 60 – 80 litres/h see “4.1 Service water” on page 110
(636)	Outlet for sealing liquid	
701	Motor for separator Technical data: Max. deviation from nominal frequency	 see “2.3 Motor drive data (CT-motors)” on page 34 ± 5%
730	Temperature sensor for motor winding Type: PTC thermistor Technical data:	 Contact the supplier representative.
741 a	Speed sensor for motor shaft (option) Electrical data: Type: Inductive proximity switch, NAMUR type For technical data: Connection: Supply voltage, nominal Output current: • With sensor activated (near metal) • With sensor not activated (far from metal) Number of pulses per revolution The secondary switching device for speed indicating and alarm functions must be capable of handling pulses with a duration of 0,5 ms	 Contact the supplier representative. see “2.11 Interconnection diagram” on page 90 8 V less than 1 mA, (typical 0,7 mA) greater than 3 mA, (typical 6 mA) 4

Connection No.	Description	Requirements / limits
741 b	Speed sensor for motor shaft (option) Electrical data: Type: Inductive proximity switch, PNP type For technical data: Supply voltage Output current Connection	 Contact the supplier representative. 10 - 30 V **DC** Max. 200 mA “2.11 Interconnection diagram” on page 90
750	Vibration sensor (option) Type: Vibration velocity transducer For technical data: Contact the supplier representative. Signal output at 80 Hz $R_L \geq 1$ Mohm Frequency range	 100 mV / mm / s 10 – 2000 Hz
760	Cover interlocking switch (option) Type: Double, two-way microswitch	

2.10 Connection list, BM / BB / HM / WM / RPX 818

Alfa Laval ref. 564659, rev. 1 / 565381, rev. 0

Connection No	Description	Requirements / limits
201	Inlet for process liquid • Pressure	 Max 700 kPa
220	Light phase outlet • Back pressure	 0 – 700 kPa
221*	Heavy phase outlet (twin phase sep. only)	0 – 600 kPa
222	Outlet for solid phase • Discharge interval	 Max. 60 disch/h The outlet from the cyclone should be installed in such a way that the cyclone can not be filled with sludge
303	Flushing under the bowl Normally used only in the discharge sequence and / or for cleaning • Pressure • Pressure (recommended) • Flow (momentary at rec. pressure) • Consumption	 100 – 600 kPa 300 kPa 460 litres/h 0 - 6 litres / discharge
304	Flushing in sediment outlet • Consumption • Pressure	 Ca 25 litres / discharge 400 – 700 kPa
375	Inlet for operating liquid • Pressure • Capacity • Quality requirements • Pipe length via a check valve • Pipe dimension	 40 – 80 kPa Min. 5 litres/min see “4.1 Service water” on page 110 Max. 30 m Min. 10 x 1 mm
377	Outlet for operating liquid	

*Only H / W / B / MRPX 818

Connection No.	Description	Requirements / limits
405	Inlet for cooling liquid, frame part • Consumption • Pressure • Quality requirements	100 litres/h Max. 50 kPa See “4.1 Service water” on page 110
406	Outlet for cooling liquid, frame parts	No back pressure allowed
409	Inlet for liquid to oil cooler • Consumption • Pressure • Quality requirements	80 – 100 litres/h Max. 50 kPa see “4.1 Service water” on page 110
410	Outlet for liquid to oil cooler	
462	Drain of frame top part, lower	
464	Drain of frame top part	
505	Inlet for compressed air to brake • Pressure • Compressed air, demands and quality	400 ± 50 kPa see “4.2 Compressed air” on page 111
506 a	Inlet for compressed air to OWMC • Pressure • Quality requirements	300 – 700 kPa see “4.2 Compressed air” on page 111
506 b	Inlet for control of small discharge • Pressure • Quality requirements	350 – 700 kPa see “4.2 Compressed air” on page 111
506 c	Inlet for control of large discharge • Pressure • Quality requirements	350 – 700 kPa see “4.2 Compressed air” on page 111
615	Inlet for sealing liquid • Consumption • Quality requirements	60 – 80 litres/h see “4.1 Service water” on page 110
616	Outlet for sealing liquid	Free outlet, without water trap
630	Inlet for sealing liquid • Consumption • Quality requirements	60 – 80 litres/h see “4.1 Service water” on page 110
631*	Outlet for sealing liquid	

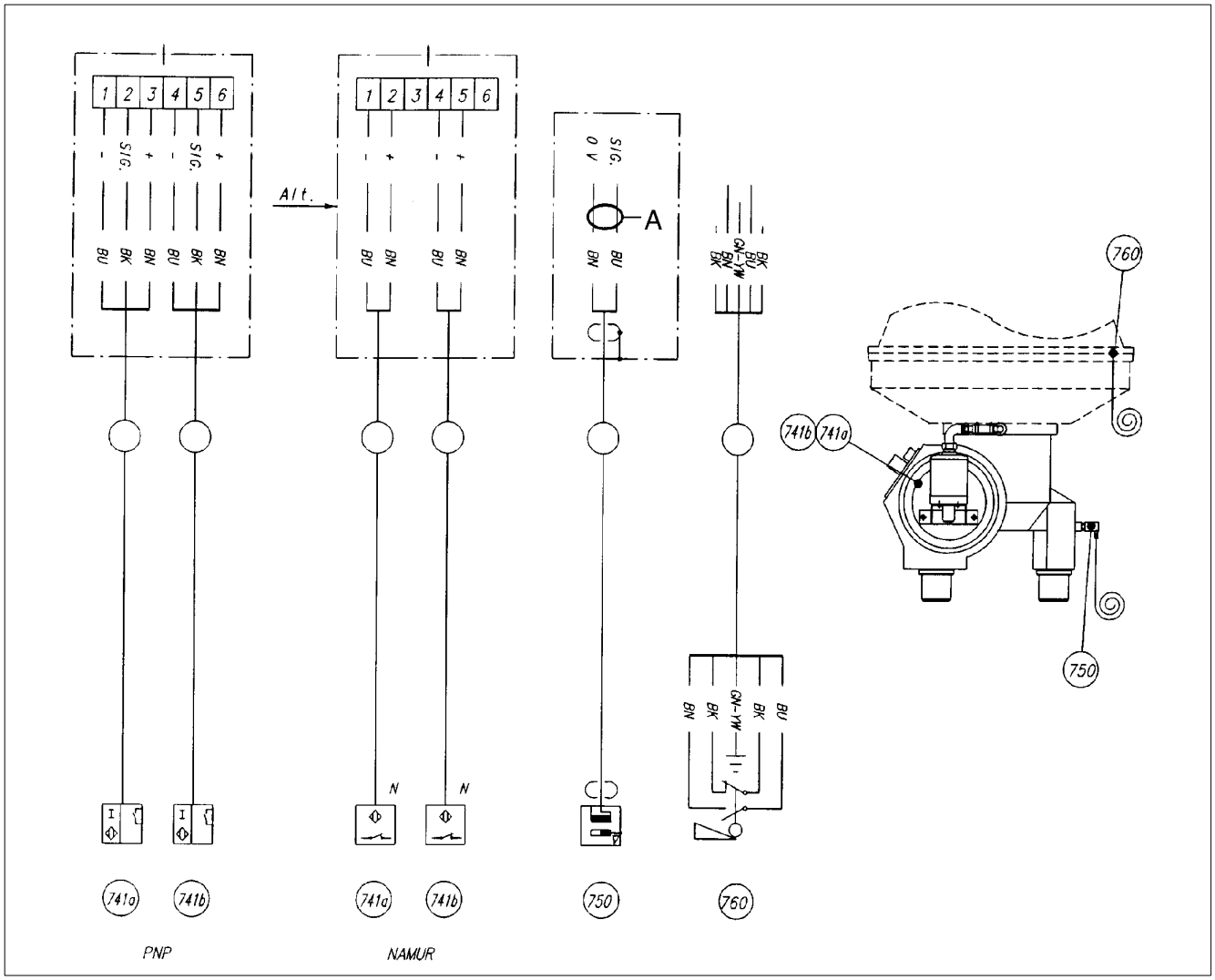
Connection No.	Description	Requirements / limits
635*	Inlet for sealing liquid • Consumption • Quality requirements	 60 – 80 litres/h see “4.1 Service water” on page 110
(636)	Outlet for sealing liquid	
701	Motor for separator Technical data: Max. deviation from nominal frequency	 see “2.3 Motor drive data (CT-motors)” on page 34 ± 5%
730	Temperature sensor for motor winding Type: PTC thermistor Technical data:	 Contact the supplier representative.
741 a	Speed sensor for motor shaft (option) Electrical data: Type: Inductive proximity switch, NAMUR type For technical data: Connection: Supply voltage, nominal Output current: • With sensor activated (near metal) • With sensor not activated (far from metal) Number of pulses per revolution The secondary switching device for speed indicating and alarm functions must be capable of handling pulses with a duration of 0,5 ms	 Contact the supplier representative. see “2.11 Interconnection diagram” on page 90 8 V less than 1 mA, (typical 0,7 mA) greater than 3 mA, (typical 6 mA) 4
741 b	Speed sensor for motor shaft (option) Electrical data: Type: Inductive proximity switch, PNP type For technical data: Supply voltage Output current Connection	 Contact the supplier representative. 10 - 30 V **DC** Max. 200 mA “2.11 Interconnection diagram” on page 90

Connection No.	Description	Requirements / limits
750	Vibration sensor (option) Type: Vibration velocity transducer For technical data: Signal output at 80 Hz $R_L \geq 1$ Mohm Frequency range	 Contact the supplier representative. 100 mV / mm / s 10 – 2000 Hz
760	Cover interlocking switch (option) Type: Double, two-way microswitch	

2.11 Interconnection diagram

Optional equipment

Alfa Laval ref. 562208, rev. 0



Wire colour codes:
BK = black
BN = brown
BU = blue
GN-YW = green-yellow

SIG = signal

741a - Speed sensor (motor shaft speed), NAMUR or PNP type

741b - Speed sensor (motor shaft speed), NAMUR or PNP type

750 - Vibration sensor (velocity transducer)

760 -Interlocking switch (frame top part)
Normally open when cover not fitted

A. Ferrite core

3 Interface description

Contents

3.1 Interface description, standard motor, frequency drive

Alfa Laval ref. 562168, rev. 0

3.1.1 General

This document describes limitations and conditions for safe control, monitoring and reliable operation. Further information is found in ‘‘2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82 and ‘‘2.10 Connection list, BM / BB / HM / WM / RPX 818” on page 86 . The document contains definitions, requirements (normative) and recommendations (informative) at the end of the document a function graph with running limitations.

3.1.2 Definitions

”Stand still” means:

- The separator is correctly assembled.
- All connections are made according to Connection List, Interconnection Diagram, Motor Drive Data and Interface Description.
- The electrical power to the separator control system is on or off.

”Start mode” means:

- Start to be initiated from position close to separator (not remotely).
- The electrical power to the separator motor is on.
- The acceleration must be supervised to ensure that a certain speed has been reached within a certain time.

”Running mode” means:

- ”Running mode” is in effect 1 minute after the time 98% of synchronous speed has been reached.
- The feed to the separator is on or off.

”Stop mode” means:

- The electrical power to the separator motor is off.
- ”Stop mode” is in effect until the separator has stopped completely.

”Normal stop” means:

- Stopping of the separator, manually or automatically, at any time with or without brake applied.
- The bowl shall be kept filled.
- Sludge discharge must not be made.

”Safety stop” means:

A stop due to unsafe conditions (e.g. vibrations) automatically initiated by the control system. The separator shall be automatically stopped in the quickest and safest way possible. Comply with following conditions:

- The bowl shall be kept filled.
- Sludge discharge must not be made.
- The separator shall not be restarted before the reason for the ”Safety stop” has been investigated and action has been taken.

”Emergency stop” means:

A manually initiated stop due to emergency.

Actions:

- Same as for ”Safety stop” but with consideration to what is described in EN 418.

3.1.3 Requirements (normative)

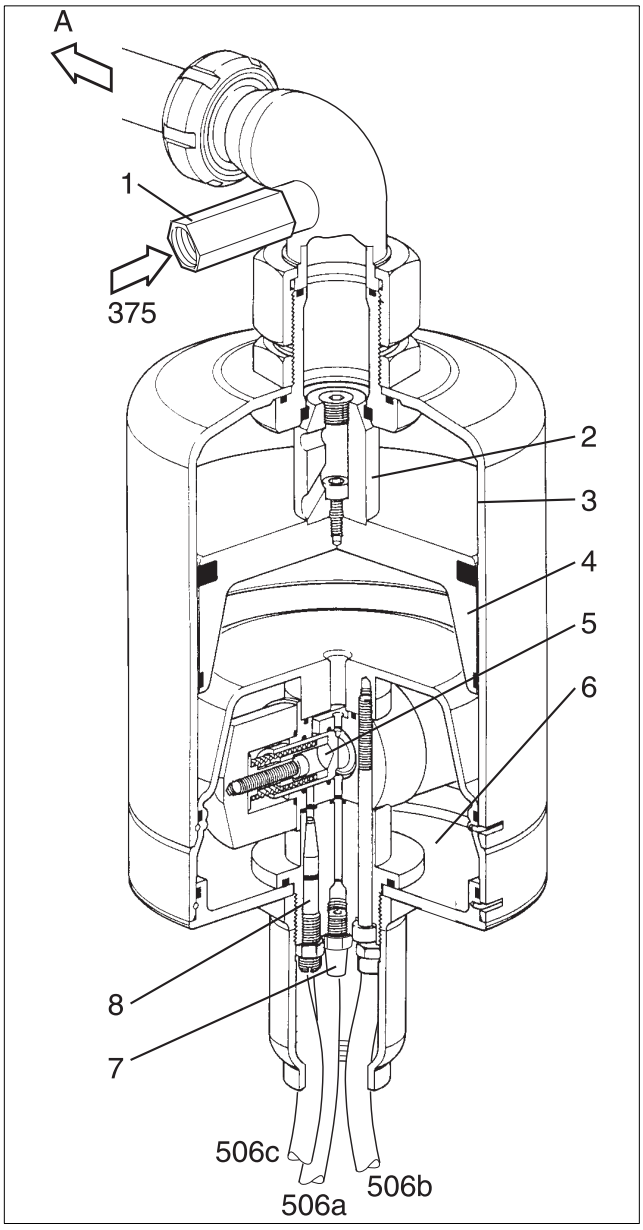
506 Air connection for OWMC (operating water module)

The separator is equipped with a pneumatic controlled operating water module.

When compressed air is supplied to connection 506a, the discharge can be initiated from the control system via two pneumatic inputs (valves), one input for the small discharge, connection 506b and one for the large discharge, connection 506c. Allowed pressures to each connection, see ‘‘2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82 and ‘‘2.10 Connection list, BM / BB / HM / WM / RPX 818” on page 86.

The volume of the large discharge should be adjusted first by adding various inlet pressure to connection 506a. When the large discharge volume has been set, the small discharge volume can be adjusted with the needle valve (**8**) fitted on the OWMC-unit.

Activating time for the control inputs shall be min. 5 seconds in the discharge sequence.



8. Needle valve
(All numbers are explained in the Operator’s Manual.)

701 Separator motor

The separator is equipped with a 3-phase standard motor. The motor is fed from a frequency converter.

The frequency converter must have overspeed alarm function which stops the separator if the speed exceeds the nominal synchronous speed more than 5%.

730 Motor temperature sensor

The separator motor is equipped with three thermistor sensors, one in each winding. The sensors are connected in series and should be connected to a thermistor relay that trips and interlocks the frequency converter and initiates a Normal Stop without brake when the temperature exceeds the tripping level, see Motor Drive Data.

741a Speed sensor

Proximity sensor of inductive type PNP or NAMUR standard giving number of pulses per revolution of the motor shaft. See “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82 and “2.10 Connection list, BM / BB / HM / WM / RPX 818” on page 86.The bowl speed is gear ratio (see “2.2 Technical data” on page 19) multiplied by the speed of the motor shaft.

741b Speed sensor (option)

The bracket for the speed sensor and the junction box is prepared for an extra speed sensor, if needed.

Signal processing in ”Start mode”:

- The separator shall be stopped automatically according to ”Normal stop” procedure, and a low speed alarm shall be given when the accumulated time for acceleration is longer than the maximum time specified in “2.2 Technical data” on page 19. An abnormal start time indicates some malfunction of the separator equipment and should be investigated.
- If the speed exceeds the nominal synchronous speed with more than 5%, the separator shall be stopped automatically according to ”Normal stop” procedure, and a high speed alarm shall be given. Excessive bowl speeds generate stress levels to the material that can be damaging.
- In case of sudden lack of pulses from the speed sensor, the separator shall be stopped automatically according to ”Safety stop” procedure with a timer controlled stop sequence, and an alarm for speed sensor failure shall be given.

Signal processing in ”Running mode”:

The running speed is obtained when the 98% of the synchronous speed has been reached.

- If the speed exceeds the nominal synchronous speed with more than 5%, the separator shall be stopped automatically according to ”Safety stop” procedure, and a high speed alarm shall be given. Excessive bowl speeds generate stress levels to the material that can be damaging.
- If the speed falls more than 5% below the synchronous speed for a period longer than 1 minute, a low speed alarm shall be given. Low speed indicates some malfunction of the separator equipment and should be investigated.
- In case of sudden lack of pulses from the speed sensor an alarm for speed sensor failure shall be given.

750 Unbalance sensor

For indication of any abnormal unbalance and to be able to perform appropriate countermeasures, the separator has been equipped with a vibration velocity transducer on the separator frame. The signal from the transducer shall be monitored, and two alarm levels according to the vibration alarm levels in “2.2 Technical data” on page 19 shall be set.

The vibration monitor shall include a safety, self check function to be performed at initiation of ”Start mode”, ”Running mode” and ”Stop mode”. That means that if any part of the complete Unbalance Sensor System fails an alarm shall be given and action must be taken.

Signal processing in ”Start mode”:

- If vibrations exceed the second alarm level, the separator shall be stopped automatically according to ”Safety stop” procedure. Vibrations of this magnitude might generate severe damages and the cause must be eliminated immediately.
- For bowl speeds in the span 600 to 1000 r/ min vibration monitoring must be blocked. This is to eliminate alarm triggering from (normal) vibrations when the speed passes the critical speed.
- If the self check system triggers, an alarm shall be given and an automatic stop according to ”Safety stop” procedure should be initiated.

Signal processing in ”Running mode”:

- If vibrations exceed the first alarm level, an alarm shall be given. Vibrations of this magnitude will reduce the expected life time of the bearings and should therefore be eliminated.
- If vibrations exceed the second alarm level, the separator shall be stopped automatically according to ”Safety stop” procedure. Vibrations of this magnitude might generate severe damages, and the cause must be eliminated immediately.
- Vibration monitoring shall be blocked for 5 seconds from initiation of a discharge. Unwanted alarms are in this way eliminated as high vibrations during discharge are normal.

Signal processing in ”Stop mode”:

- If the self check system triggers, an alarm shall be given, and an automatic stop according to ”Safety stop” procedure should be initiated.

3.1.4 Recommendations (informative)

760 Cover interlocking switch

The separator is equipped with an interlocking switch to detect if the cover is mounted.

Signal processing during ”Stand still”:

- The circuit is closed when the cover of the separator is mounted.
- The interlocking switch should be connected in such a way that starting of the motor (”Start mode”) is prevented when the separator cover is not mounted.

Signal processing in ”Running mode”:

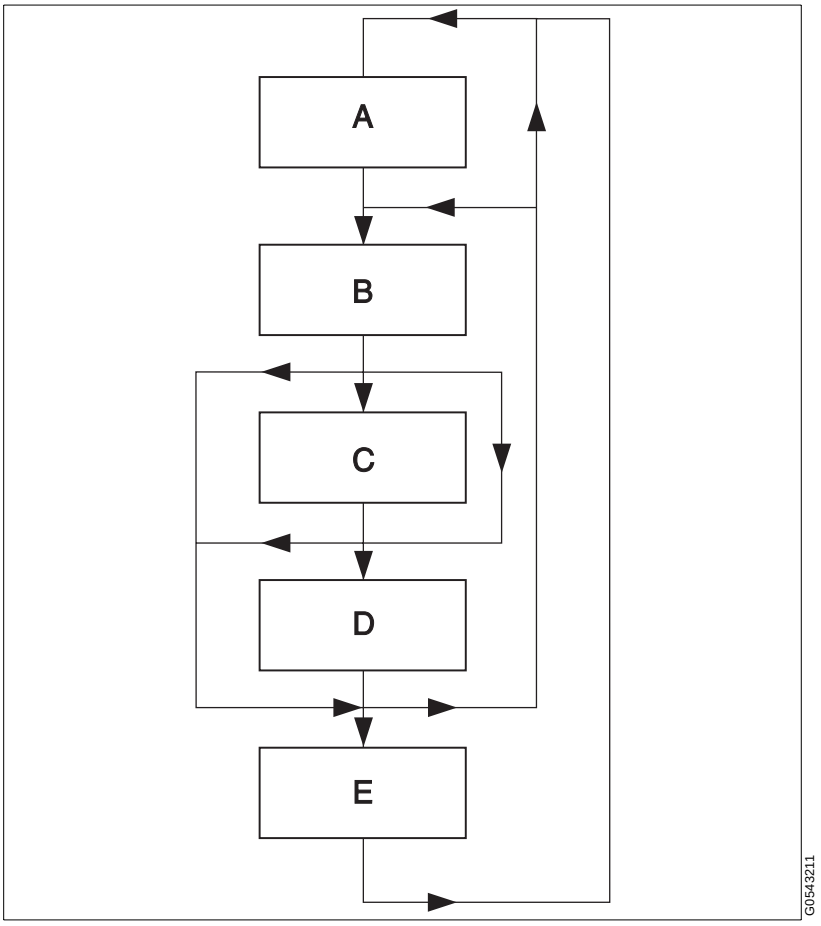
- If the circuit is broken, an alarm should be given. This is to minimise the risk of having access to moving parts.

Discharge system

Signal processing in ”Running mode”:

At indication of the absence of a discharge the operator or the control system must initiate a new discharge and corrective action must be taken. The occurrence of a discharge can for instance be monitored with the aid of a system for checking the rise of separator motor electrical current. Absence of a discharge may result in problems due to solidification of the sludge.

3.1.5 Function graph and running limitations



A. Stand still (Ready for start)
B. Starting mode
C. Running mode
D. Stop mode
E. Safety or emergency stop

3.2 Interface description, CT-motor

Alfa Laval ref. 562167, rev. 0

3.2.1 General

This document describes limitations and conditions for safe control, monitoring and reliable operation. Further information is found in ‘‘2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82 and ‘‘2.10 Connection list, BM / BB / HM / WM / RPX 818” on page 86. The document contains definitions, requirements (normative) and recommendations (informative) at the end of the document a function graph with running limitations.

3.2.2 Definitions

”Stand still” means:

- The separator is correctly assembled.
- All connections are made according to Connection List, Interconnection Diagram, Motor Drive Data and Interface Description.
- The electrical power to the separator control system is on or off.

”Start mode” means:

- Start to be initiated from position close to separator (not remotely).
- The electrical power to the separator motor is on.
- The acceleration must be supervised to ensure that a certain speed has been reached within a certain time.

”Running mode” means:

- ”Running mode” is in effect 1 minute after the time 93% of synchronous speed has been reached.
- The feed to the separator is on or off.

”Stop mode” means:

- The electrical power to the separator motor is off.
- ”Stop mode” is in effect until the separator has stopped completely.

”Normal stop” means:

- Stopping of the separator, manually or automatically, at any time with or without brake applied.
- The bowl shall be kept filled.
- Sludge discharge must not be made.

”Safety stop” means:

A stop due to unsafe conditions (e.g. vibrations) automatically initiated by the control system. The separator shall be automatically stopped in the quickest and safest way possible. Comply with following conditions:

- The bowl shall be kept filled.
- Sludge discharge must not be made.
- The separator shall not be restarted before the reason for the ”Safety stop” has been investigated and action has been taken.

”Emergency stop” means:

A manually initiated stop due to emergency.

Actions:

- Same as for ”Safety stop” but with consideration to what is described in EN 418.

3.2.3 Requirements (normative)

506 Air connection for OWMC (operating water module)

The separator is equipped with an air controlled operating water module.

When compressed air is supplied to connection 506a, the discharge can be initiated from the control system via two pneumatic inputs (valves), one input for the small discharge, connection 506b and one for the large discharge, connection 506c. Allowed pressures to each connection, see ‘‘2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82 and ‘‘2.10 Connection list, BM / BB / HM / WM / RPX 818” on page 86.

The volume of the large discharge should be adjusted first by adding various inlet pressure to connection 506a. When the large discharge volume has been set, the small discharge volume can be adjusted with the needle valve (**8**) fitted on the OWMC-unit.

Activating time for the control inputs shall be min. 5 seconds in the discharge sequence.

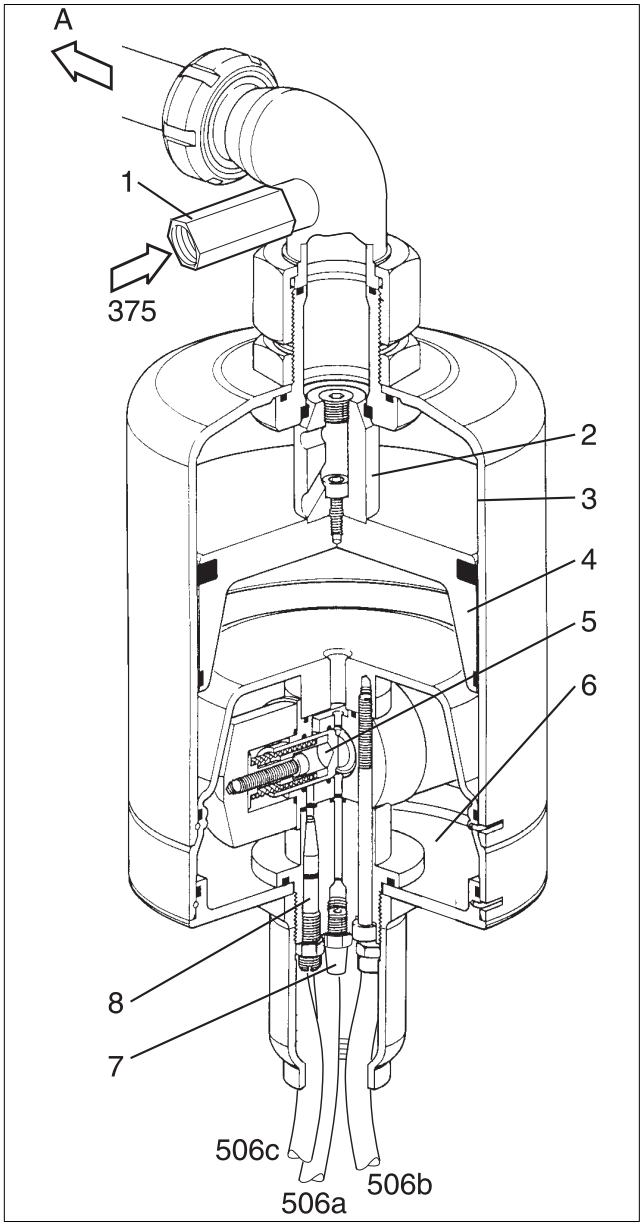
701 Separator motor

The separator is equipped with a 3-phase Y-D started motor. The motor is of control torque type and built for extended starting time.

The starting equipment shall be dimensioned for twice the rated current of the motor. The purpose for this is to prevent overheating during start. The overload relay shall only be connected in D-line.

730 Motor temperature sensor

The separator motor is equipped with three thermistor sensors, one in each winding. The sensors are connected in series and should be connected to a thermistor relay that trips and interlocks the starting equipment and initiates a Normal Stop without brake when the temperature exceeds the tripping level, see “2.3 Motor drive data (CT-motors)” on page 34.



8. Needle valve
(All numbers are explained in the Operator’s Manual.)

741a Speed sensor

Proximity sensor of inductive type PNP or NAMUR standard giving number of pulses per revolution of the motor shaft. See “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82 and “2.10 Connection list, BM / BB / HM / WM / RPX 818” on page 86. The bowl speed is gear ratio (see “2.2 Technical data” on page 19) multiplied by the speed of the motor shaft.

741b Speed sensor (option)

The bracket for the speed sensor and the junction box is prepared for an extra speed sensor, if needed.

Signal processing in ”Start mode”:

When the speed of 93% of the synchronous speed is reached, the Y-D starting equipment should switch over to D.

- The separator shall be stopped automatically according to ”Normal stop” procedure, and a low speed alarm shall be given when the accumulated time for acceleration is longer than the maximum time specified in “2.2 Technical data” on page 19. An abnormal start time indicates some malfunction of the separator equipment and should be investigated.
- If the speed exceeds the nominal synchronous speed with more than 5%, the separator shall be stopped automatically according to ”Normal stop” procedure, and a high speed alarm shall be given. Excessive bowl speeds generate stress levels to the material that can be damaging.
- In case of sudden lack of pulses from the speed sensor, the separator shall be stopped automatically according to ”Safety stop” procedure with a timer controlled stop sequence, and an alarm for speed sensor failure shall be given.

Signal processing in ”Running mode”:

The running speed is obtained when the 98% of the synchronous speed has been reached.

- If the speed exceeds the nominal synchronous speed with more than 5%, the separator shall be stopped automatically according to ”Safety stop” procedure, and a high speed alarm shall be given. Excessive bowl speeds generate stress levels to the material that can be damaging.
- If the speed falls more than 5% below the synchronous speed for a period longer than 1 minute, a low speed alarm shall be given. Low speed indicates some malfunction of the separator equipment and should be investigated.
- In case of sudden lack of pulses from the speed sensor an alarm for speed sensor failure shall be given.

750 Unbalance sensor

For indication of any abnormal unbalance and to be able to perform appropriate countermeasures, the separator has been equipped with a vibration velocity transducer on the separator frame. The signal from the transducer shall be monitored, and two alarm levels according to the vibration alarm levels in “2.2 Technical data” on page 19 shall be set.

The vibration monitor shall include a safety, self check function to be performed at initiation of ”Start mode”, ”Running mode” and ”Stop mode”. That means that if any part of the complete Unbalance Sensor System fails, an alarm shall be given and action must be taken.

Signal Processing in ”Start mode”:

- If vibrations exceed the second alarm level, the separator shall be stopped automatically according to ”Safety stop” procedure. Vibrations of this magnitude might generate severe damages, and the cause must be eliminated immediately.
- For bowl speeds in the span 600 to 1000 r/min vibration monitoring must be blocked. This is to eliminate alarm triggering from (normal) vibrations when the speed passes the critical speed.
- If the self check system triggers, an alarm shall be given and an automatic stop according to ”Safety stop” procedure should be initiated.

Signal Processing in ”Running mode”:

- If vibrations exceed the first alarm level, an alarm shall be given. Vibrations of this magnitude will reduce the expected life time of the bearings and should therefore be eliminated.
- If vibrations exceed the second alarm level, the separator shall be stopped automatically according to ”Safety stop” procedure. Vibrations of this magnitude might generate severe damages, and the cause must be eliminated immediately.
- Vibration monitoring shall be blocked for 5 seconds from initiation of a discharge. Unwanted alarms are in this way eliminated as high vibrations during discharge are normal.

Signal Processing in ”Stop mode”:

- If the self check system triggers, an alarm shall be given, and an automatic stop according to ”Safety stop” procedure should be initiated.

3.2.4 Recommendations (informative)

760 Cover interlocking switch

The separator is equipped with an interlocking switch to detect if the cover is mounted.

Signal processing during ”Stand still”:

- The circuit is closed when the cover of the separator is mounted.
- The interlocking switch should be connected in such a way that starting of the motor (”Start mode”) is prevented when the separator cover is not mounted.

Signal processing in ”Running mode”:

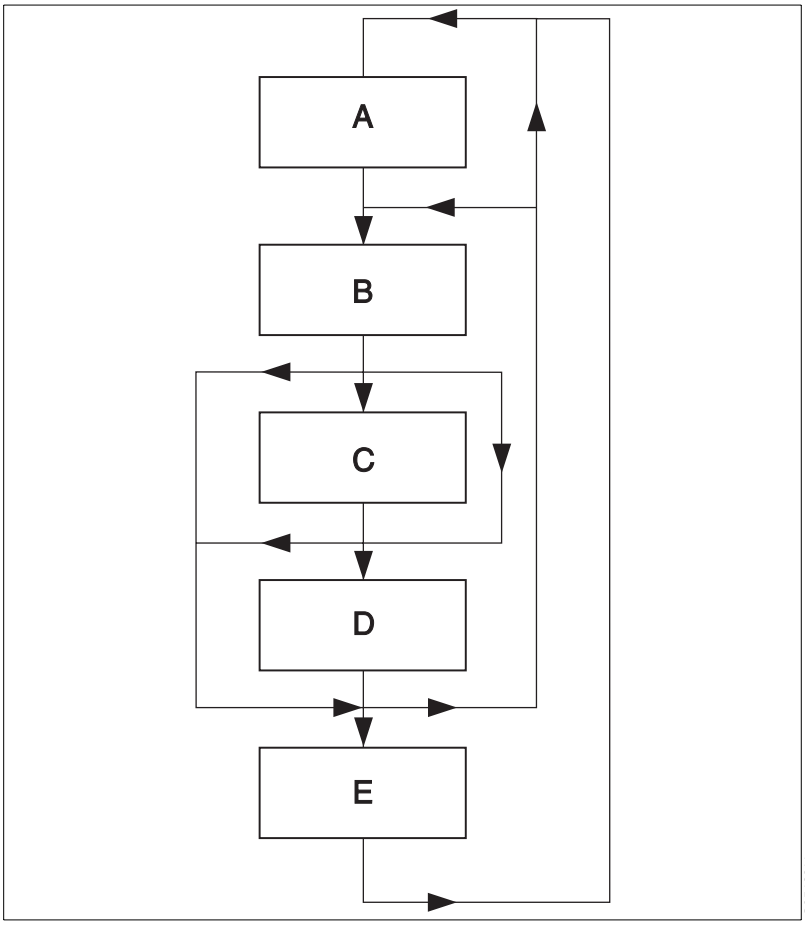
- If the circuit is broken, an alarm should be given. This is to minimise the risk of having access to moving parts.

Discharge system

Signal processing in ”Running mode”:

At indication of the absence of a discharge the operator or the control system must initiate a new discharge and corrective action must be taken. The occurrence of a discharge can for instance be monitored with the aid of a system for checking the rise of separator motor electrical current. Absence of a discharge may result in problems due to solidification of the sludge.

3.2.5 Function graph and running limitations



A. Stand still (Ready for start)
B. Starting mode
C. Running mode
D. Stop mode
E. Safety or emergency stop

4 Demand specification

Contents

4.1 Service water

Alfa Laval ref. 553406, rev. 5

Operating water is used in the separator for several different functions: e.g. to operate the discharge mechanism, to lubricate and cool mechanical seals, etc.

Poor quality of the operating water may with time cause erosion, corrosion and/or operating problem in the separator and must therefore be treated to meet certain demands.

The following requirements are of fundamental importance

1.1 Turbidity-free water, solids content <0,001% by volume.

Deposits must not be allowed to form in certain areas in the separator.

1.2 Max particle size 50 μm.

2. Total hardness less than 180 mg $CaCO_3$ per litre, which corresponds to 10 °dH or 12,5 °E.

Hard water may with time form deposits in the operating mechanism. The precipitation rate is accelerated with increased operating temperature and low discharge frequency. These effects become more severe the harder the water is.

3. Chloride content max 100 ppm NaCl (equivalent to 60 mg Cl/l).

Chloride ions contribute to corrosion on the separator surfaces in contact with the operating water, including the spindle. Corrosion is a process that is accelerated by increased separating temperature, low pH, and high chloride ion concentration.

A chloride concentration above 60 mg/l is not recommended.

4. pH>6

Increased acidity (lower pH) increases the risk for corrosion; this is accelerated by increased temperature and high chloride ion content.

NOTE

Alfa Laval accepts no liability for consequences arising from unsatisfactorily purified operating water supplied by the customer.

4.2 Compressed air

Alfa Laval ref. 553407, rev. 2

The supply of compressed air to separator discharge system, valve actuators, positioners, instruments etc. must be of such a quality that satisfactory function is ensured for a reasonable time.

To this end three conditions must be fulfilled:

1. Dirt in the form of solid particles down to a size below 10 micron (0,01 mm) must be removed from the air. This is preferably done by means of special filters or reducing valves provided with filters.
2. Oil is always transferred to the compressed air from oil-lubricated compressors and must be removed to the highest possible degree. It constitutes a serious contamination, which it is difficult to remove from the instruments. Special filters or oil separators must, therefore, be provided before the instruments. In small plants, oil-free compressors can be used as an alternative.
3. In the compressed-air system a condensation takes place at various rates, depending on the moisture content at the air inlet, the temperature before and after the compressor, partially lower temperature in any cold zone passed by the pipe (outdoor, cellar etc.) and the like.

   The air must thus be dried with regard to the lowest temperature existing after the drying device, so that condensate in the instruments is avoided. Note that the air will also be cooled through expansion after passing constrictions and nozzles in the instruments, with condensation as a result. In view of the above, the following must be observed:

   At the inlet to an instrument, the dew point of the compressed air should lie at least 10 °C below the lowest ambient temperature. This is usually obtained by using an absorption drier of suitable capacity. If the air contains much water, provide a primary separator before the filter.

Air filters should be placed so as to be easily surveyable and accessible in order to facilitate daily condition checks, and exchange of the filter cartridge.

NOTE

Alfa Laval accepts no liability for consequences arising from unsatisfactorily purified compressed air supplied by the customer.

5 Installation and first start

Contents

5.1 Preparations

1. Set up the machine (without frame hood and bowl) according to the installation instructions.
2. Flush the piping thoroughly to remove any residues such as chips, welding beads, etc.

NOTE

All piping must be disconnected from the separator.

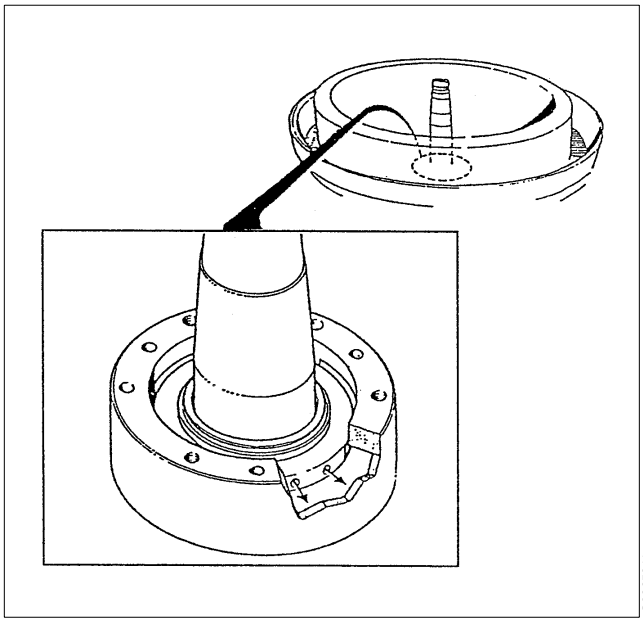
3. Check the operating water functions and operating water flow as below.

Checking the operating water flow.

When operating water is fed (**375***) water shall squirt out of the holes in weak jets.

During operation there will be no consumption of water when the pressure is lower than 50 kPa (0,5 bar).

At discharge water shall squirt out of the holes in powerful jets.



4. Check that the water flow-rates correspond to data in “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82 and “2.10 Connection list, BM / BB / HM / WM / RPX 818” on page 86:
   - Water for lubrication oil cooler **409***.
   - Water for discharge **375***.
   - Water for cooling frame parts **405***.

NOTE

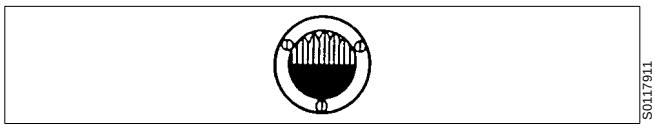
Outlet **464*** must be open. No restrictions allowed.

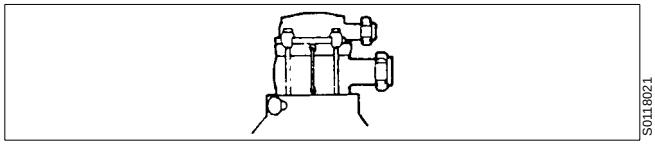
*) Numbers refer to “2.9 Connection list, all separators except BM / BB / HM / WM / RPX 818” on page 82 and “2.10 Connection list, BM / BB / HM / WM / RPX 818” on page 86.

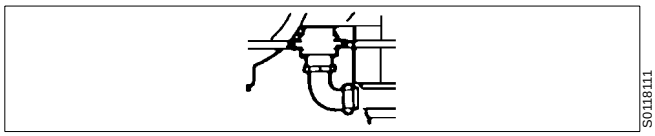
5.2 Before first start

- Pour about 13 litres lubricating oil of correct grade into the worm gear housing – see chapter “Lubricants” in the *Service & Maintenance Manual.*
- Check the oil (approx. half way up the sight glass). Be aware of that a very small quantity of oil may remain at the bottom edge of the sight glass even when the gear housing is emptied for oil.
- Assemble the bowl and the inlet and outlet parts as described in the *Service & Maintenance Manual.*
- Make sure that the frame hood bolts have been tightened.
- Make sure that the bolts for centring ring and outlets have been tightened to the correct torque. See the *Service & Maintenance Manual*.
- Make sure that the bolts for the inlet device have been tightened.
- Check that water and air are being supplied to the control panel.


S0117811


S0117911


S0118021


S0118111

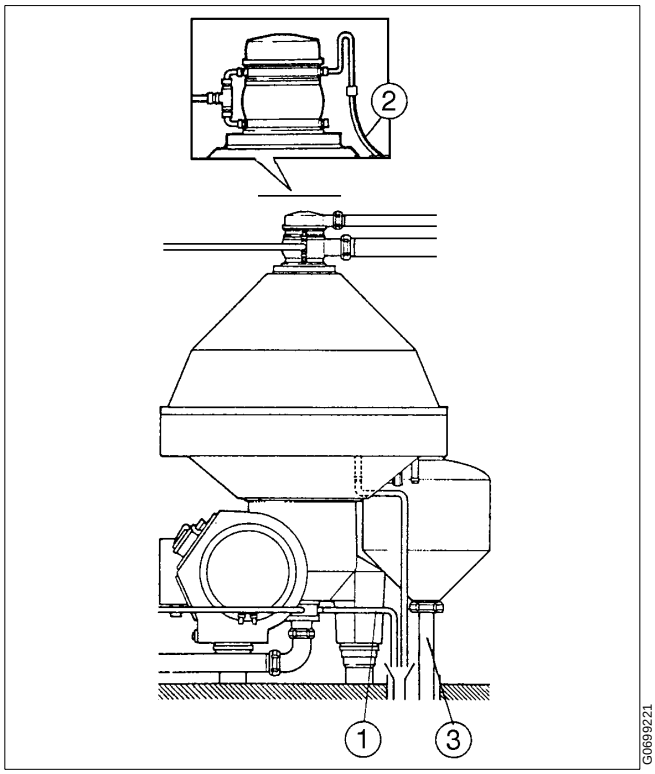
Make sure that cooling water is being supplied to the separator.

Check at

(1) – from inlet device seal

(2) – from outlet upper seals (twin phase separators)

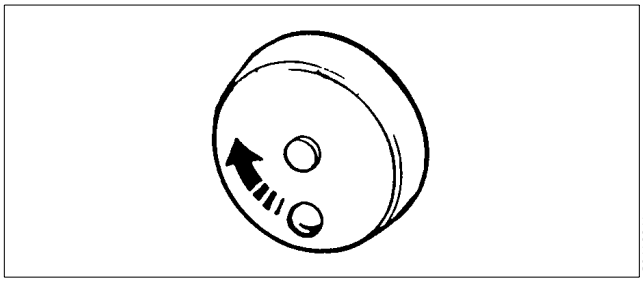
(3) – from outlet bottom seal (at operation).



G0699221

5.3 First start

- Start the machine
- Check the direction of rotation (see revolution counter).



Revolution counter

NOTE

At the switch-over to D the amperage will increase considerably, but will quickly drop towards the idling level provided that the motor is correctly connected. If the amperage remains at the high level, the motor has been wrongly connected. Stop the motor immediately.

- When the bowl has reached running speed, check the revolution counter reading. For speed particulars, see ‘‘2.2 Technical data” on page 19.

  The bowl is now closed (provided that make-up water has been supplied during the run-up period).
- Make sure that the valves in the outlets are open.

5.4 Operation

- With the bowl closed, supply water to the bowl (start the feed pump).
- Make sure that the separation inlet pressure is suitable and the throughput correct. Then check outlet pressures, see “Selection of outlet impeller” in *Operator’s Manual*.
- Shut off the cooling water to the axial seals.

NOTE

It is important to have liquid flow through the bowl.

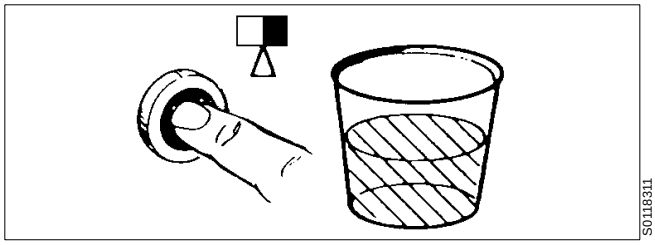
- Check that the bowl is tightly closed – no water in the cyclone outlet.
- Disconnect the pipes for cooling water to the outlet seals. Check for possible leakage from these. Major leaks must not occur. Minor leaks may temporarily be left uncorrected. Some seals need as a rule certain wear-in period.
- Connect the pipes for cooling water.
- Open the cooling water supply again.

5.4.1 Ejection process

WARNING

Liquid ejected at high velocity

Ensure that no sediment discharge takes place when opening cyclone cover. **Wear safety goggles**.



- Disconnect the pipe from the cyclone as well as the sediment cover flushing hose.
- Make the settings of the Operating Water Module to achieve the discharge volumes desired, see chapter “3.1.3 Requirements (normative)” on page 94.
- Initiate a large discharge. If the bowl opens, closes and the opens again (so-called double discharge), adjust the air pressure until you arrive at the volume desired. Finally adjust the needle valve to achieve a suitable small discharge.
- Secure the cyclone outlet pipe and the sediment cover flushing pipe.

5.4.2 Cleaning

- Carry out the cleaning programme. Check that washing solution is running out of the axial seals.

5.4.3 Separation

- Supply process liquid.
- Check the inlet pressure, see “Selection of outlet impeller” in *Operator’s Manual*.
- Adjust the outlet pressures, see “Selection of outlet impeller” in *Operator’s Manual*.

5.4.4 Operation

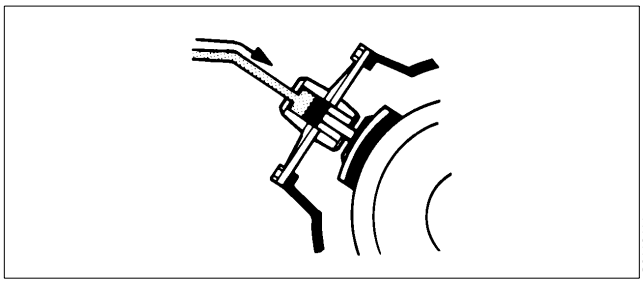
- Check the throughput. Make a final adjustment of inlet and outlet pressures.
- Make sure that no air is being sucked into the feed pipe via e.g.a balance vessel, if fitted. This should always be kept filled. The process liquid should flow evenly in the vessel without bubbling.

After separation is completed, carry out the cleaning programme. Dismantle the bowl and check the cleaning 3 – 4 days after the first operation with product.

5.5 Stopping

The control system actuates the brake when stopping the separator.

Cooling water to the axial seals and air to the brake will be turned off automatically after the bowl has stopped.



DANGER

Entrapment hazard

Make sure that rotating parts have come to a **complete standstill** before starting **any** dismantling work.

The revolution counter indicates separator rotation.

5.6 Selection of outlet impeller (twin phase separators)

5.6.1 Permissible inlet and outlet pressures

MRPX 614	
Inlet	Recommended inlet pressure: 200 – 400 kPa (2 – 4 bar). Min 200 kPa (2 bar). Max 600 kPa (6 bar).
Outlet	Applies to light and heavy phases. Recommended outlet pressure: 300 – 600 kPa (3 – 6 bar). Max 700 kPa (7 bar).
Exception	For MRPX 614 HGV at throughput of up to 25 000 kg/h, the following applies: Recommended outlet pressure: Approx. 600 kPa (6 bar).

MRPX 714	
Inlet	Recommended inlet pressure: 200 – 400 kPa (2 – 4 bar). Min 200 kPa (2 bar). Max 600 kPa (6 bar).
Outlet	Applies to light and heavy phases. Recommended outlet pressure: 300 –700 kPa (3 – 7 bar). Max 700 kPa (7 bar).
Exception	For MRPX 714 HGV at throughput of up to 30 000 kg/h, the following applies: Recommended outlet pressure: Approx. 600 kPa (6 bar).

NOTE

An inlet or outlet pressure that is higher than necessary will lead to higher power consumption and a shorter life for the axial seals.

If a lower inlet pressure or a higher outlet pressure than those stated above is desirable in some particular case, this should be discussed with a supplier representative.

5.6.2 Flow / outlet pressure

Impeller diagram for MRPX 614

Flow – outlet pressure. Constant inlet pressure.

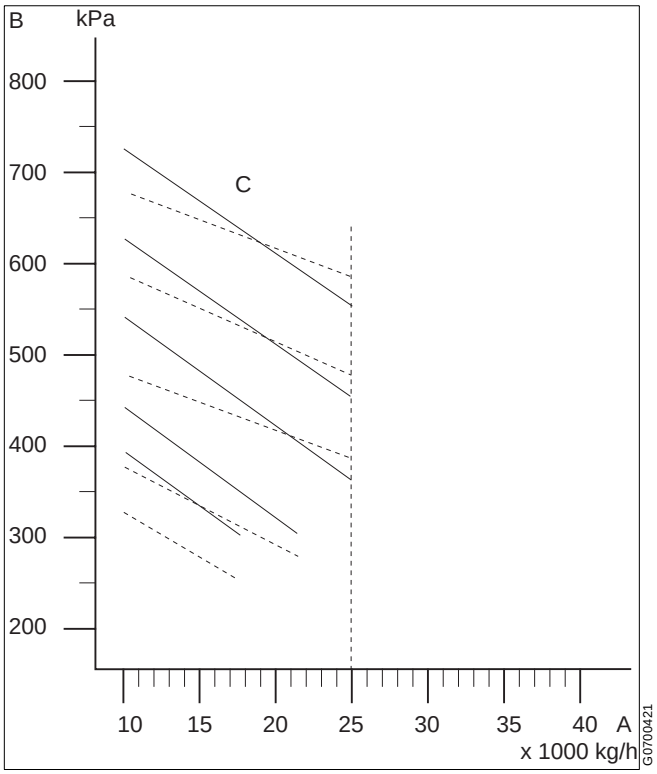
Impeller heavy phase = diameter 140.

Impeller light phase = diameter 120.

The curves have been obtained when operating with water and when 10% of the total flow was taken out as light phase.

– – – – – = light phase

——— = heavy phase



A. Inlet flow
B. Outlet pressure
C. Constant inlet pressure directly before the separator from below: 50, 100, 200, 300 and 400 kPa

Impeller diagram for MRPX 714

Flow – outlet pressure. Constant inlet pressure.

Impeller heavy phase = diameter 140.

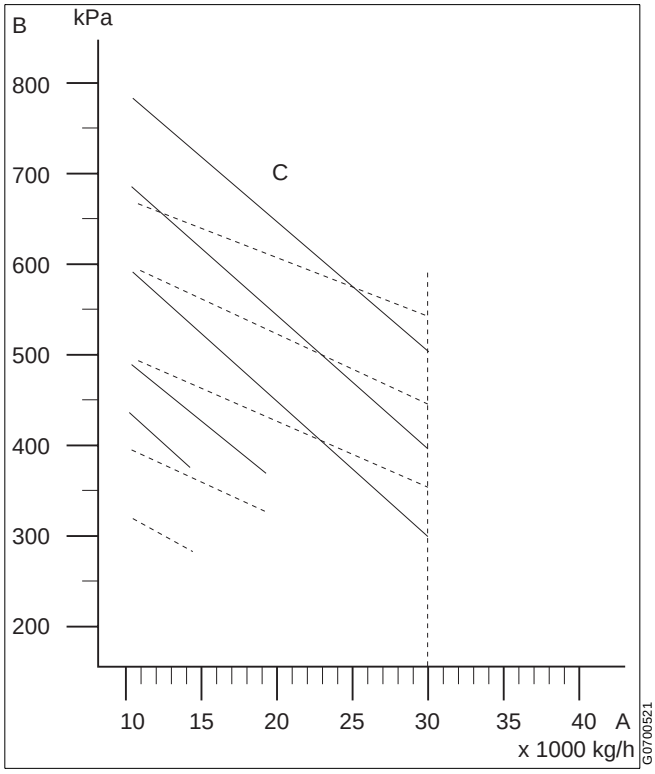
Impeller light phase = diameter 120.

The curves have been obtained when operating with water and when 10% of the total flow was taken out as light phase.

– – – – – = light phase

——— = heavy phase

Selection of outlet impeller



A. Inlet flow
B. Outlet pressure
C. Constant inlet pressure directly ahead of the separator from below: 50, 100, 200, 300 and 400 kPa

5.6.3 Permissible inlet and outlet pressures, B MRPX 618

Inlet	Recommended inlet pressure: 200 – 400 kPa (2 – 4 bar). Min 200 kPa (2 bar). Max. 600 kPa (6 bar).
Outlet	Applies to light and heavy phases. Recommended outlet pressure: 300 – 600 kPa (3 – 6 bar). Max. 600 kPa (6 bar).
Exception	For B MRPX 618 HGV at a throughput of up to 40 000 kg/h, the following applies: Recommended outlet pressure: Approx. 600 kPa (6 bar), which is also the max. value.

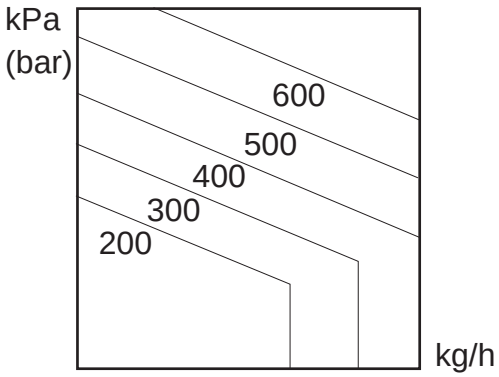
NOTE

An inlet or outlet pressure that is higher than necessary will lead to higher power consumption and a shorter life for the axial seals.

If a lower inlet pressure or a higher outlet pressure than those stated above is desirable in some particular case, this should be discussed with a supplier representative.

Explanation of impeller diagrams that follow

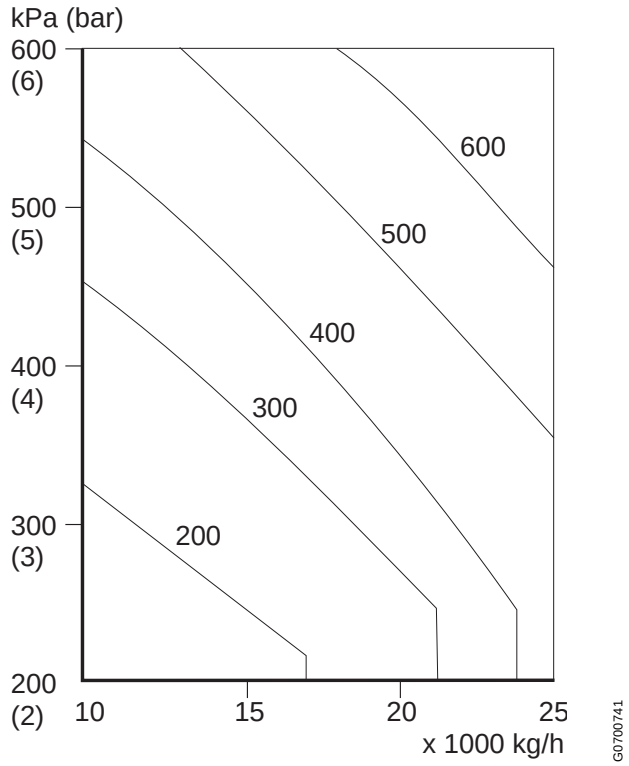
The figures 200, 300, 400, 500 and 600 indicate the inlet pressure directly in front of the separator.



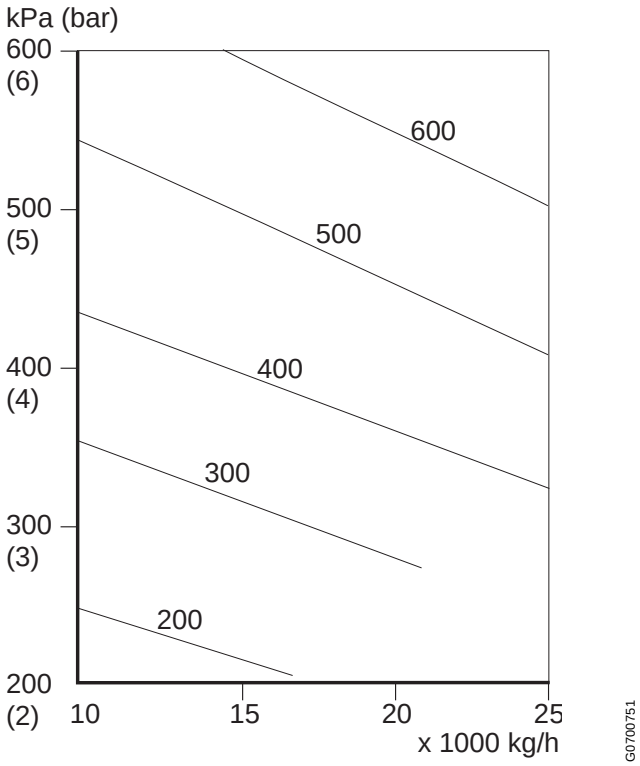
G0700621

The curves that follow have been obtained when operating with water at approx. 25 °C when 3% of the total flow (throughput) was being discharged through the light phase outlet.

Deviations of ± 50 kPa (0,5 bar) from the curves must be regarded as normal.



Impeller 120 mm diameter light phase



Impeller 80 mm diameter heavy phase

5.6.4 Permissible inlet and outlet pressures for C / H MRPX 518 / 618 / 718 and H MRPX 818

Inlet	Recommended inlet pressure: 200 – 400 kPa (2 – 4 bar). Min. 200 kPa (2 bar). Max. 600 kPa (6 bar).
Outlet	Applies to light and heavy phases. Recommended outlet pressure: 300 – 600 kPa (3 – 6 bar). Back pressure for light phase: 0 - 700 kPa. Outlet pressure for heavy phase: 0 - 600 kPa
Exception	For H MRPX 618 HGV at a throughput of up to 40 000 kg/h, the following applies: Recommended outlet pressure: Approx. 600 kPa (6 bar), which is also the max. value.

NOTE

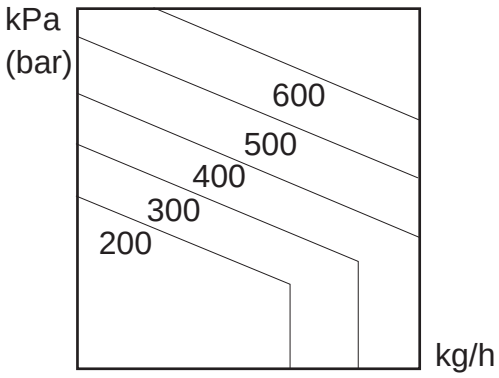
An inlet or outlet pressure that is higher than necessary will lead to higher power consumption and a shorter life for the axial seals.

If a lower inlet pressure or a higher outlet pressure than those stated above is desirable in some particular case, this should be discussed with a supplier representative.

Explanation of impeller diagrams that follow

The figures 200, 300, 400, 500 and 600 indicate the inlet pressure directly in front of the separator.

kPa (bar) indicates the outlet pressure for the heavy phase. The outlet pressure for the light phase is always higher than the outlet pressure for the heavy phase with the exception of the curves for C MRPX 518 HGV. With nominal throughput for H MRPX 518 HGV (25 000 kg/h) and H MRPX 618 HGV (30 000 kg/h), the outlet pressure for the light phase is approx. 100 kPa (1 bar) higher than the outlet pressure for the heavy phase.



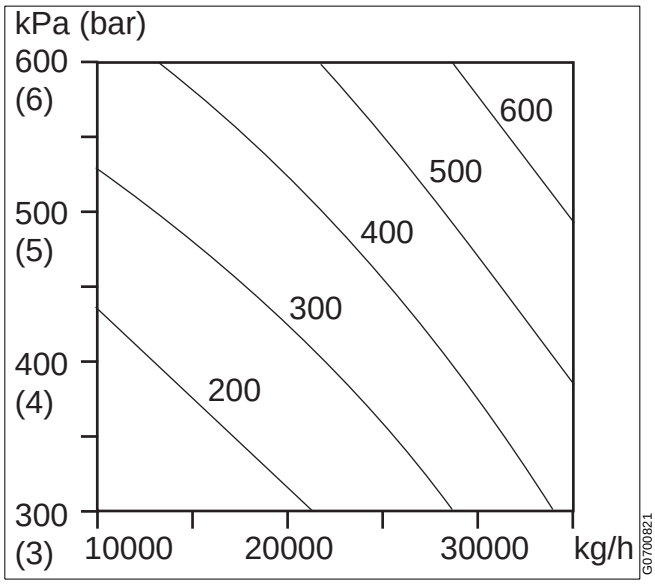
The curves that follow have been obtained when operating with water at approx. 25 °C when 10% of the total flow (throughput) was being discharged through the light phase outlet.

Deviations of ± 50 kPa (0,5 bar) from the curves must be regarded as normal.

C MRPX 518 HGV

Impeller: 60 mm diameter light phase, 140 mm diameter heavy phase.

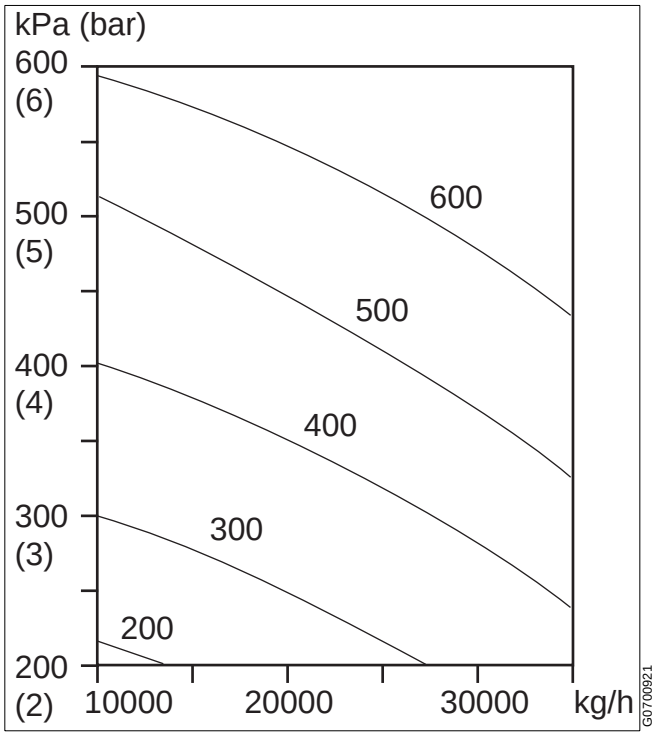
Note: This curve shows **heavy phase** pressure only. Corresponding light phase pressure is given in the curve below.



C MRPX 518 HGV

Impeller: 60 mm diameter light phase, 140 mm diameter heavy phase.

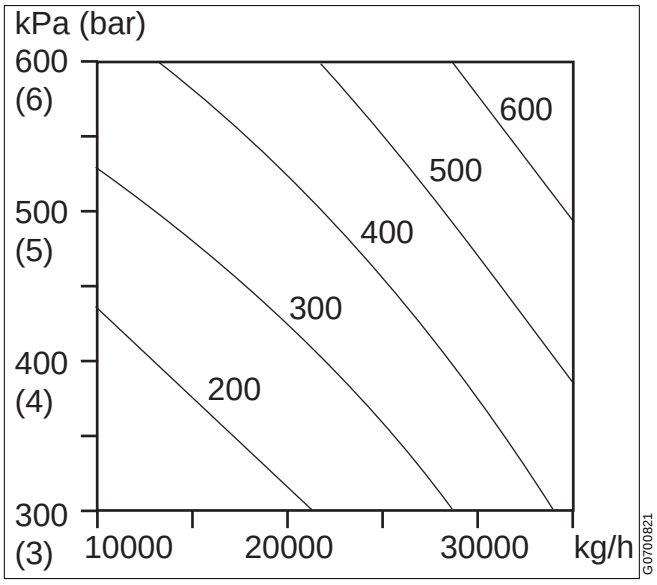
Note: This curve shows **light phase** pressure only.



H MRPX 518 HGV

Impeller: 120 mm diameter light phase, 140 mm diameter heavy phase.

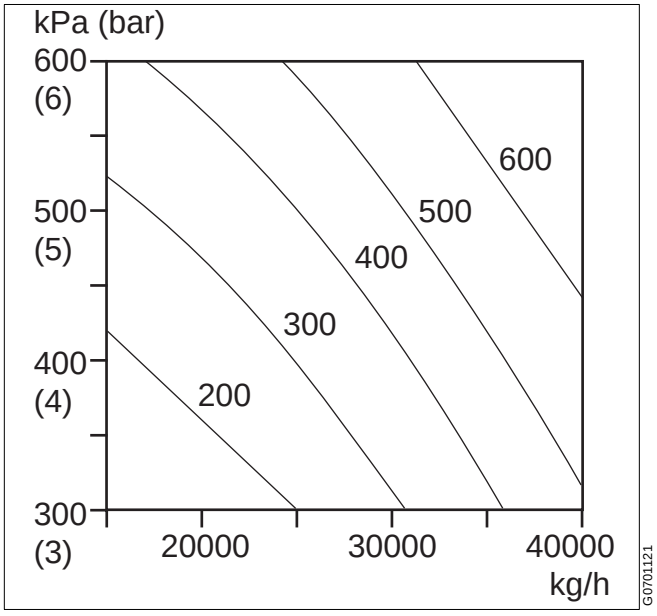
This combination of impellers is included in the delivery.



H MRPX 618 HGV

Impeller: 120 mm diameter light phase, 140 mm diameter heavy phase.

This combination of impellers is included in the delivery.



HMRPX 718 HGV

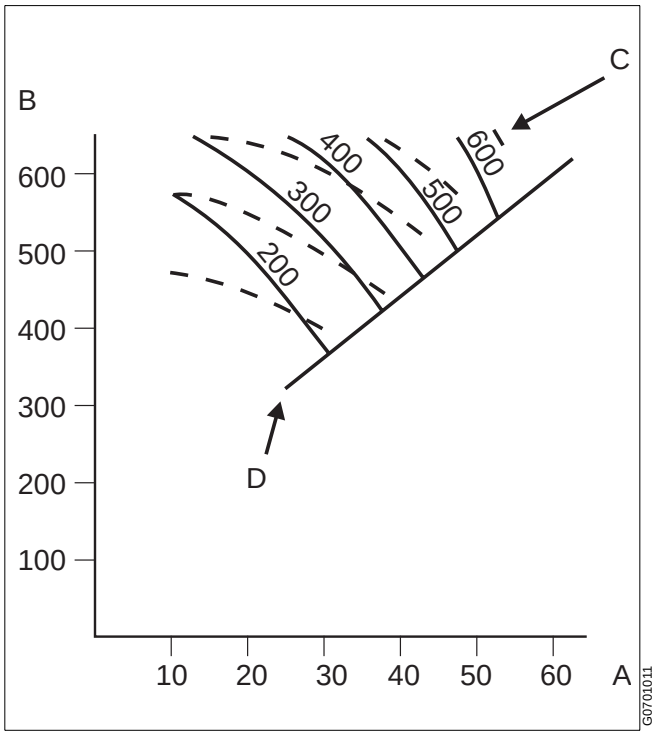
The curves that follow have been obtained when operating with water at approximately 25 °C when 10% of the total flow (throughput) was being discharged through the light phase outlet.

Deviations ±50 kPa (0,5 bar) from the curves must be regarded as normal.

– – – – – Light phase, impeller = Ø 120

——— Heavy phase, impeller = Ø 140

This combination of impellers is included in the delivery.

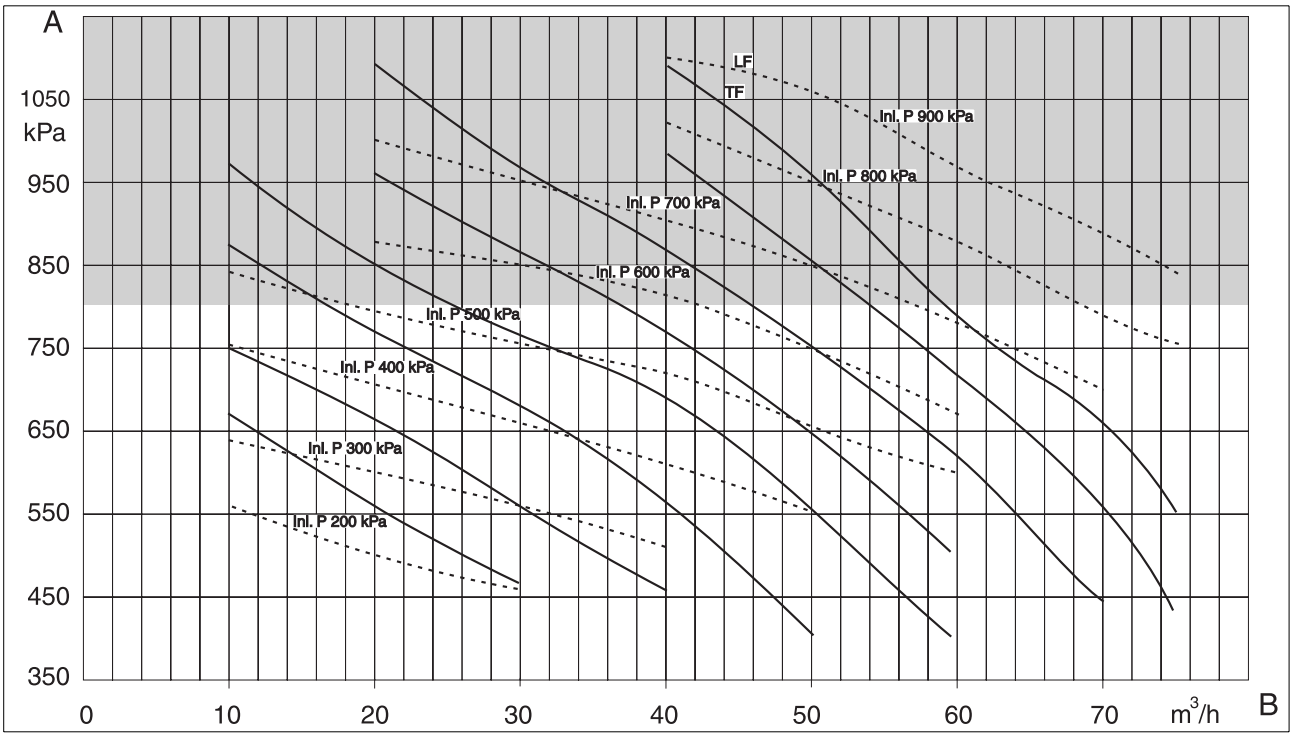


A Flow-rate x 1000 kg/h
B Backpressure kPa
C Constant inlet pressure, kPa
D Minimum inlet pressure to reach flowrate

MRPX 818 HGV

The curves that follow have been obtained when operating with water at approximately 25 °C when 10% of the total flow (throughput) was being discharged through the light phase outlet.

Deviations ±50 kPa (0,5 bar) from the curves must be regarded as normal.



Pump diagram for outlet 564481-01

A. Counter-pressure
B. Flow
"Inl. P" means Inlet pressure

– – – – – Light phase, impeller = Ø 120

——— Heavy phase, impeller = Ø 140

This combination of impellers is included in the delivery.

The separator should normally not be operated in the shadowed area and preferably in the flow range 30 - 70 m^3/h.