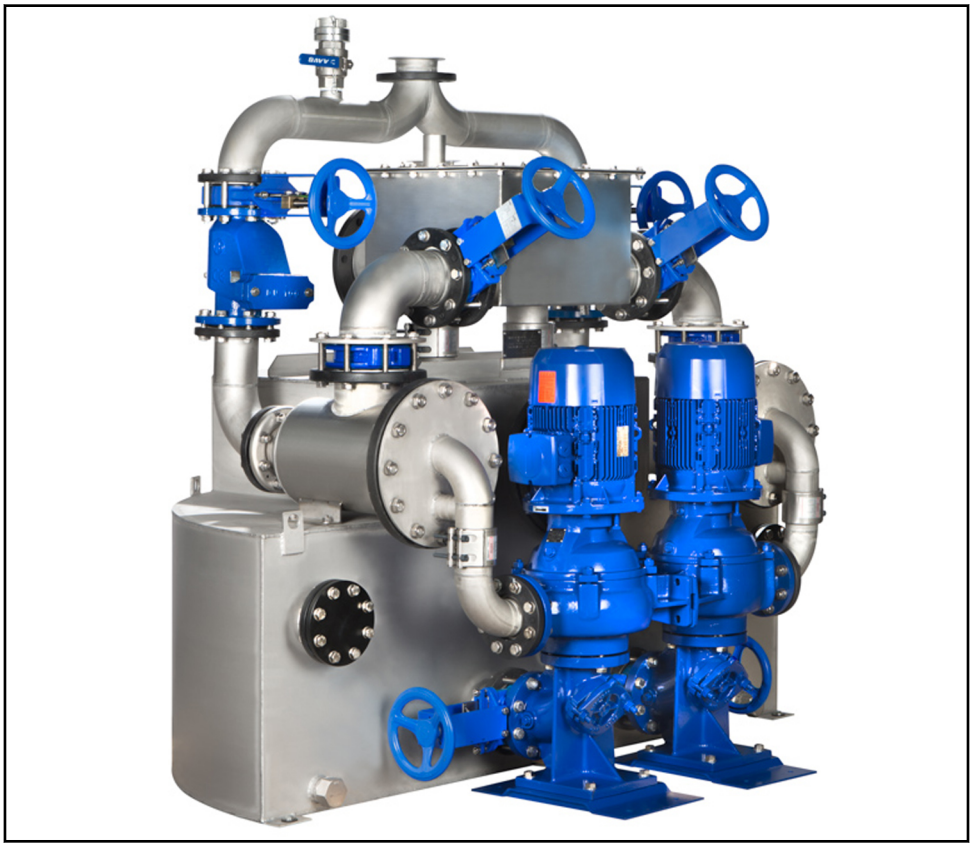
Pump Station

AmaDS³

Solids Separation System

Type Series Booklet



Legal information/Copyright

Type Series Booklet AmaDS³

Contents

Waste Water Pump Station

Solids Separation System

AmaDS³

Main applications

- Waste water disposal
- Waste water transport

Fluids handled

- Untreated waste water
- Contaminated water containing a high level of solids
- Grey water
- Rainwater (not containing abrasive substances)
- Clear water

On request:

- Aggressive fluids

Operating data

Operating properties

Characteristic		Value
Inflow rate	Q [m³/h]	≤ 200
Inflow pipe level	H [mm]	≤ 1900
Fluid temperature	T [°C]	≤ 40
Collecting tank volume	V [l]	≤ 4500

Mode of operation

Characteristic	
Depending on the motor selection	
Sewabloc	Continuous operation S1
Amarex KRT	Intermittent operation S3[1)]

On request:

- Combination of high inflow rates with small free passages and bypass systems
- Materials to customer's specification

Designation

Example:
AmaDS³ 03.10 / 2 / 03.10

Designation key

Code	Description	
AmaDS³	Type series	
03.10	Size of solids separator	
	02.10, 03, 04.0, **03.10**, 04.10, 04.11	
2	Number of pump sets	
03.10	Size and type of collecting tank, see Combinations table	
	01.10	Compact collecting tank
	01.11	
	02.10	
	03.05	Semi-circular collecting tank
	03.10	
	04.10	
	04.11	
	05.10	

Design details

- Ready-to-connect system
- One gas- and water-tight stainless steel tank (collecting tank)
- Two solids separators
- Two pump sets

Pump set

Design

- Volute casing pump
- Back pull-out design
- Single-stage

Impeller type

- Free-flow impeller
- Closed channel impeller

Bearings

- Grease-packed, zero-maintenance deep groove ball bearings (sealed for life) on pump and drive end

Shaft seal

- Two bi-directional mechanical seals in tandem arrangement, with liquid reservoir

Control system

- Control system in compliance with KSB's specification (⇨ Page 37)

1) 50 % to VDE

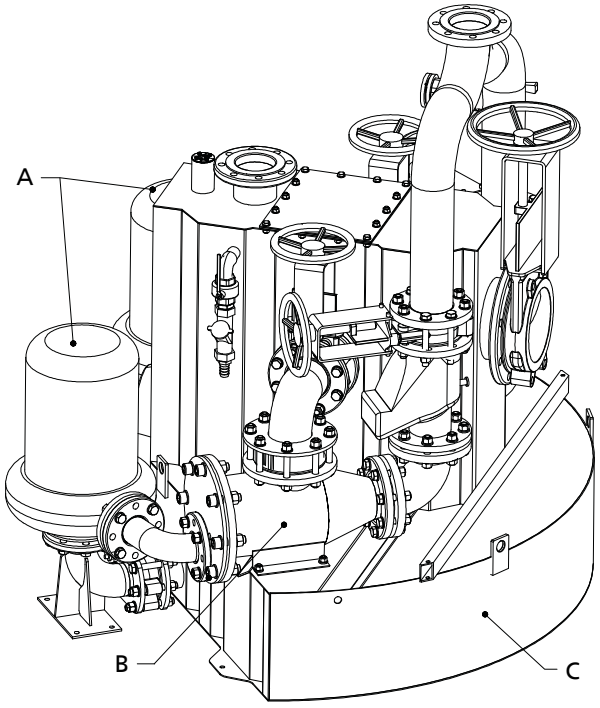
Designs/Installation types

Ready-to-connect waste water pump stations with solids separation system designed as a dual-pump station, equipped with 2 vertical volute casing pumps with directly flanged standardised IEC frame motor or 2 dry-installed submersible motor pumps, IP 68, with a gas- and water-tight stainless steel tank (collecting tank).

Combinations

Size	System design variants
AmaDS³ 02.10/2/01.10	 Compact collecting tank
AmaDS³ 02.10/2/01.11	
AmaDS³ 03.10/2/02.10	
AmaDS³ 03.10/2/03.05	 Semi-circular collecting tank
AmaDS³ 03.10/2/03.10	
AmaDS³ 03.10/2/04.10	
AmaDS³ 04.10/2/04.11	
AmaDS³ 04.11/2/05.10	

AmaDS³ 02.10 / 2 / 01.11



Design

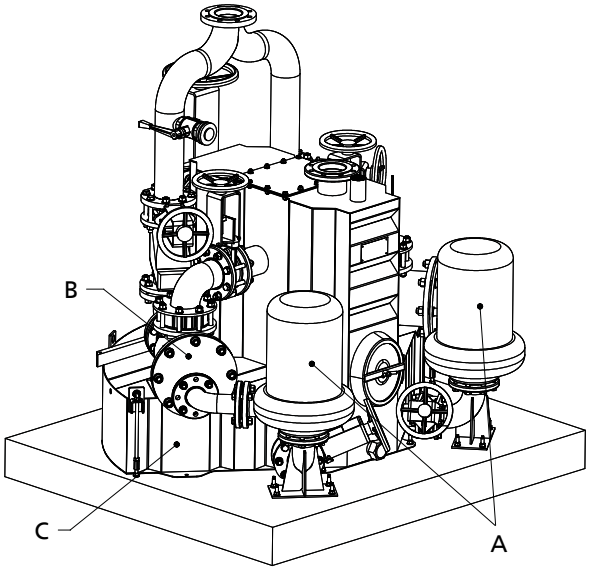
A	Pump sets
B	Solids separator
C	Collecting tank

The system consists of:

- Waste water pump station with integrated flow splitter and shut-off valves in the inflow lines to both the solids separators allowing separate shut-off
- Solids separators that can be individually shut off during operation
- Gas- and water-tight stainless steel tank (collecting tank)
- Swing check valves in the inflow lines
- Shut-off valves on the pumps' suction side
- Check valves
- Shut-off valves in the discharge line
- Centrifugal pumps with optimal impeller types, e.g. multi-channel impeller (K) or free-flow impeller (F), specially selected for the application
- Standardised IEC frame motors IP 55, IE3 motors or dry-installed submersible motors IP 68

The following combinations are not available for the AmaDS³ 02.10 / 2 / 01.10 module: "Shut-off valves in the inflow lines to the solids separators allowing separate shut-off", "Solids separators that can be individually shut off during operation" and "Shut-off valves on the pumps' suction side".

AmaDS³ 03.10 / 2 / 02.10



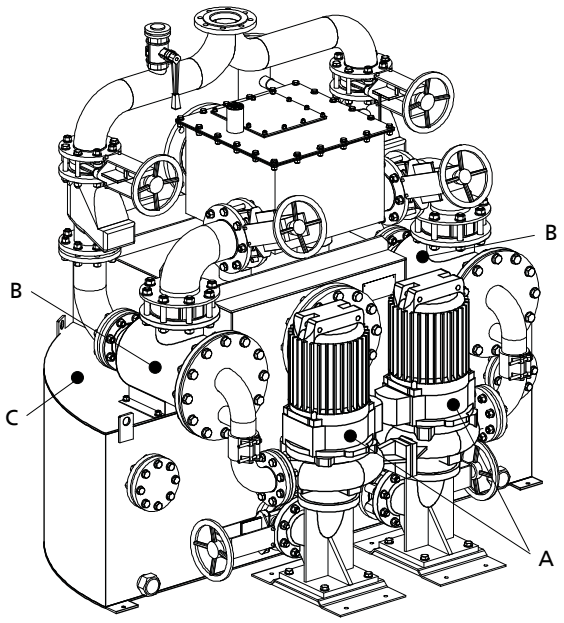
Compact design

A	Pump sets
B	Solids separator
C	Collecting tank

The system consists of:

- Waste water pump station with integrated flow splitter and shut-off valves in the inflow lines to both the solids separators allowing separate shut-off
- Solids separators that can be individually shut off during operation
- Gas- and water-tight stainless steel tank (collecting tank)
- Swing check valves in the inflow lines
- Shut-off valves on the pumps' suction side
- Check valves
- Shut-off valves in the discharge line
- Centrifugal pumps with optimal impeller types, e.g. multi-channel impeller (K) or free-flow impeller (F), specially selected for the application
- Standardised IEC frame motors, IP 55, or dry-installed submersible motors, IP 68

AmaDS³ 03.10 / 2 / 03.05, AmaDS³ 03.10 / 2 / 03.10, AmaDS³ 03.10 / 2 / 04.10, AmaDS³ 04.10 / 2 / 04.11 and AmaDS³ 04.11 / 2 / 05.10



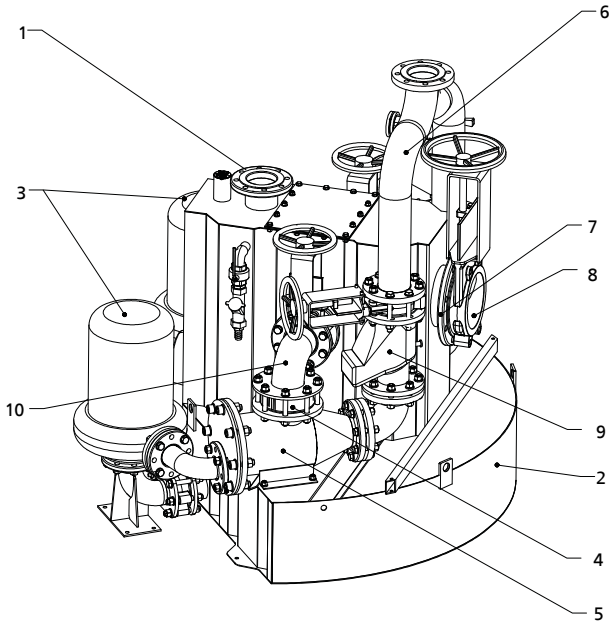
Design with semi-circular collecting tank

A	Pump sets
B	Solids separator
C	Collecting tank

The system consists of:

- Waste water pump station with flow splitter and shut-off valves in the inflow lines to both the solids separators allowing separate shut-off
- Solids separators that can be individually shut off during operation
- Gas- and water-tight stainless steel tank (collecting tank)
- Swing check valves in the inflow lines
- Shut-off valves on the pumps' suction side
- Check valves
- Shut-off valves in the discharge line
- Centrifugal pumps with optimal impeller types, e.g. multi-channel impeller (K) or free-flow impeller (F), specially selected for the application
- Standardised IEC frame motors, IP 55, or dry-installed submersible motors, IP 68

Configuration and function

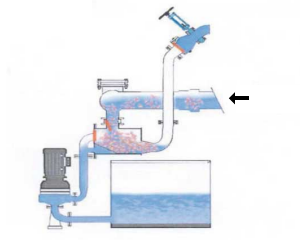


Configuration of the solids separation system

1	Flange for venting
2	Collecting tank
3	Pump set
4	Swing check valve for inflow at the solids separator
5	Solids separator
6	Y-pipe leading to discharge line
7	Flange for inflow
8	Gate valve for inflow (optional)
9	Swing check valve for discharge line
10	Suction elbow for solids separator

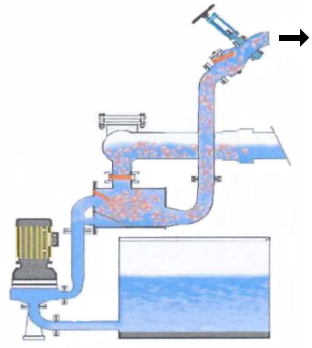
Function

The raw waste water flows through the (optional) gate valve for inflow (8) and the flange for inflow (7) into the solids separator (5), where the solids are separated from the liquid. The solids-free waste water flows through the pump set (3) into the collecting tank (2) where it is collected until a pre-set level is reached. The pump set (3) is started up via a control system. The pump set (3) transports the solids-free waste water from the collecting tank (2) to the discharge line (6). The pressure increase in the solids separator (5) causes the swing check valve (4) to close. By pumping the waste water through the solids separator (5) the solids are carried away with the waste water and pumped into the discharge line (6) while the solids separator (5) is flushed. As soon as a minimum level is reached in the collecting tank (2), the pump set (3) is stopped. The swing check valve (4) opens automatically and the inflow phase starts again. To prevent the raw waste water in the discharge line from flowing back the swing check valve (9) closes after every pumping process.



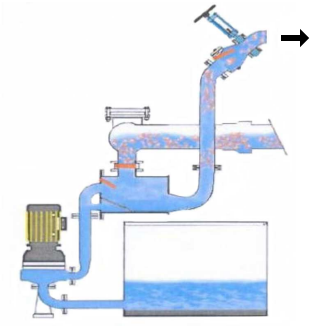
Inflow of fluid handled

Inflow phase
Upstream of the pumps, the solids are separated from the inflowing waste water and temporarily stored in the solids separators. Only pre-treated waste water flows through the pumps.



Start of pumping process

Pumping process
In this phase the pre-treated waste water is pumped through the solids separators in the opposite direction and carries the solids out of the separators and into the discharge line. The swing check valves (4) in the separator inflow are closed during this process. Through this process the solids separators and pumps are cleaned and ready for the next inflow phase.



End of pumping process

Materials

Table of materials

Component	Material
Solids separator	1.4571
Collecting tank / flow splitter	1.4301
Discharge line	1.4571
Suction line	1.4301
Knife gate valve [2)]	As per data sheet
Slide disc valve [2)]	As per data sheet
Ball check valve [2)]	As per data sheet
Swing check valve [2)]	As per data sheet

2) The valves used vary depending on the system design.

Product benefits

- **Economic efficiency**
  Pumps with smaller free passages are used as only mechanically treated waste water flows through the pump.
- **Operating reliability**
  The patented solids separation system works reliably and ensures clogging is prevented. The pump's interior is protected from coarse solids, resulting in reduced wear and fewer failures caused by clogging. Redundancy of all important components allows the pump to be repaired while the system is running, provided that shut-off gate valves have been installed.
- **Safe working conditions**
  The dry-installed system is closed and gas-tight, thus ensuring hygienic working conditions and safety for maintenance and repair.
- **Additional applications**
  As pumps with smaller free passages are employed, it is possible to operate pumped drainage systems with long discharge lines using a single pump station.
- **Ease of maintenance**
  The externally located solids separators are easy to access, considerably simplifying maintenance.

Selection information

Selection example

	What needs to be done?	Result (example)
1. Check and clarify the customer specifications.		
		▪ Maximum inflow rate: **10 l/s** ▪ Static head (H_{geo}) in the pump station: **3.39 m** ▪ Static head (H_{geo}) in the buried discharge line: **2.00 m** ▪ Length of the buried discharge line: **700 m** ▪ Valves in the buried discharge line: **1 × gate valve, 4 × 90° pipe bends, 1 × outlet** ▪ Dimensions and material of the buried discharge line: **inside diameter = 123 mm, outside diameter 140 × 8.3 mm, PE-HD, SDR 17** ▪ Pump selection with corresponding motor type: **Sewabloc, standardised IEC motor, IP 55, IE3, S1**
2. Determine the module type.		
	▪ Convert the customer specification for the maximum inflow rate from [l/s] to [m³/h].	10 l/s = 36 m³/h
	▪ Select the module from the corresponding table. (⇨ Page 11)	Module type **AmaDS³ 03.10 / 2 / 03.10**
3. Determine the pump flow rate.		
	▪ Calculate the flow rate – Pump flow rate = maximum inflow rate × factor of selected module type (⇨ Page 11)	Pump flow rate = 10 l/s × factor 1.1 = **11 l/s**
4. Determine the pump discharge head.		
	▪ Calculate the discharge head – Pump discharge head = H_{geo} in the pump station (customer specification) + H_v in the pump station, see table "System allowance for solids separation systems" (⇨ Page 11) + H_{geo} in the buried discharge line (customer specification) + H_v in the buried discharge line (⇨ Page 35) or customer specification) + H_v in the buried discharge line (for valves and pipe fittings) (⇨ Page 35) or customer specification) .	Pump discharge head = 3.39 m + 1.00 m + 2.00 m + 4.20 m + 0.35 m = **10.94 m**
5. Determine the operating point.		
	▪ Use the flow rate and the calculated head. **1. The flow velocity in the discharge line must be 0.8 m/s as a minimum.** **2. The inside diameter of the discharge line must equal 90 mm as a minimum.**	11 l/s versus 10.94 m Operating point: **11 l/s (rounded) versus 11 m**
.		
6. Select hydraulics code and motor version.		

	What needs to be done?	Result (example)
	▪ Select a characteristic curve matching the operating data. (⇨ Page 16) ▪ Take the power input required at the operating point from the corresponding curve. ▪ Select the motor version according to the customer specifications. **When selecting the drive add a power reserve of at least 15 % of the power input required at the operating point.**	Pump characteristic curve: **hydraulics code No. 12** Power: **3.00 kW** Module type **AmaDS³ 03.10 / 2 / 03.10** Pump type: **Sewabloc** This results in the following system codes: **03.10/2/03.10 I 12 I 100L04 I 3**
7. Select the control unit.		
	▪ Select a control unit from the corresponding tables. (⇨ Page 13)	▪ Pump type: Sewabloc ▪ System codes: 03.10/2/03.10 I 12 I 100L04 I 3 This results in the following version: **LevelControl Basic 2 - BS2 400 DUEQ 063 D0**
	▪ Check in the Variants table if the selected LevelControl Basic 2 control unit is available with module-specific pre-settings. (⇨ Page 15)	Ident. number of the control unit: **19 075 978**
Overall result		
	▪ Pump type: **Sewabloc** ▪ System codes: **03.10/2/03.10 I 12 I 100L04 I 3** ▪ Control unit: **BS2 400 DUEQ 063 D0** ▪ Ident. number of the control unit: **19 075 978** ▪ Codes: **BS2 400 DUEQ 063 D0 I 19 075 978 I 03.10/2/03.10**	
Additional information when using dry-installed Amarex KRT in IP68		
	▪ When selecting an Amarex KRT pump make sure that the systems are designed for S3 operation (intermittent operation). This means the maximum permissible inflow must always be smaller than the flow rate of one pump. ▪ **S3 operation without impact on the starting current** Operation involves a sequence of identical cycles consisting of run time at constant load and idle time. The starting current does not influence the motor temperature significantly. – Intermittent operation S3, 50 % – 10 minutes cycle time: The run time equals 5 minutes, followed by an idle time of 5 minutes. This equals a cycle time of 10 minutes. – The number of start-ups for both pumps together is limited to a total of 20. – For continuous inflow or for inflows expected over a prolonged period of time, observe the limits of the maximum permissible frequency of starts.	

Technical data

Selection based on operating data

Selection table

AmaDS³ module	Maximum inflow rate	Population equivalent[3)]	Inflow pipe level	Collecting tank volume	Size of inflow, DN	Size of discharge line, DN	Minimum sump diameter
	[m³/h]		[mm]	[l]	[mm]	[mm]	[mm]
02.10 / 2 / 01.10	6	300	550	180	200	100	1800
02.10 / 2 / 01.11	15	750	700	400	200	100	1800
03.10 / 2 / 02.10	25	1250	1000	700	200	100	1800
03.10 / 2 / 03.05	35	1750	1200	980	200	100	2000
03.10 / 2 / 03.10	65	3250	1200	1100	200	100	2000
03.10 / 2 / 04.10	90	4500	1400	1600	200	100	2000
04.10 / 2 / 04.11	130	6250	1600	2400	300	150	2500
04.11 / 2 / 05.10	200	9300	1900	4500	300	150	3000

System selection

Selection table

AmaDS³ module	Maximum inflow rate	System design	Maximum permissible temperature
	[m³/h]		[°C]
02.10 / 2 / 01.10	6	Compact	40
02.10 / 2 / 01.11	15	Compact	40
03.10 / 2 / 02.10	25	Compact	40
03.10 / 2 / 03.05	35	Semi-circular	40
03.10 / 2 / 03.10	65	Semi-circular	40
03.10 / 2 / 04.10	90	Semi-circular	40
04.10 / 2 / 04.11	130	Semi-circular	40
04.11 / 2 / 05.10	200	Semi-circular	40

Factor for pump flow rate calculation

Selection table

AmaDS³	Factor for pump flow rate calculation
02.10 / 2 / 01.10	1
02.10 / 2 / 01.11	1
03.10 / 2 / 02.10	1
03.10 / 2 / 03.05	1,1
03.10 / 2 / 03.10	1,1
03.10 / 2 / 04.10	1,1
04.10 / 2 / 04.11	1
04.11 / 2 / 05.10	1

System allowance for solids separation systems

Selection table

AmaDS³ module	H_V (required system allowance for solids separation systems)
	[m]
02.10 / 2 / 01.10	0,6
02.10 / 2 / 01.11	0,6
03.10 / 2 / 02.10	0,6
03.10 / 2 / 03.05	1,00
03.10 / 2 / 03.10	1,00
03.10 / 2 / 04.10	1,00
04.10 / 2 / 04.11	1,00
04.11 / 2 / 05.10	1,00

3) Reference value: PE for dry weather plus 100 % infiltration water

Selection according to the size of the minimum access opening required

Dimensions of completely assembled system incl. pumps (as-delivered condition)

AmaDS³ module	System width	System depth	System height
	[mm]	[mm]	[mm]
02.10 / 2 / 01.10	1661	1423	1520
02.10 / 2 / 01.11	1667	1441	1665
03.10 / 2 / 02.10	1694	1514	1976
03.10 / 2 / 03.05	1950	1250	1895
03.10 / 2 / 03.10	1950	1563	1895
03.10 / 2 / 04.10	1950	1563	2095
04.10 / 2 / 04.11	2350	1838	2411
04.11 / 2 / 05.10	2800	2536	2660

Dimensions of completely dismantled system, without pumps, tank only

AmaDS³ module	System width	System depth	System height[4)]
	[mm]	[mm]	[mm]
02.10 / 2 / 01.10	1210	1175	965
02.10 / 2 / 01.11	1700	1250	1165
03.10 / 2 / 02.10	1700	1250	1465
03.10 / 2 / 03.05	1950	830	1091
03.10 / 2 / 03.10	1950	1095	1091
03.10 / 2 / 04.10	1950	1095	1291
04.10 / 2 / 04.11	2350	1350	1490
04.11 / 2 / 05.10	2800	1492	1790

Free space for opening: approx. 5 cm around the circumference

4) To achieve this low height, it is necessary to remove the vent and fit a coupling.

Selection of module / hydraulics code (pump code) / pump / motor / control unit

Amarex KRT selection table

AmaDS³ module	Pump code	Characteristic curve	Amarex KRT size	Q [m³/h]	H [m]	Motor size[5]	P_2 [kW]	I [A]	LevelControl Basic 2 version
02.10 / 2 / 01.10	1	(⇨ Page 16)	K 65-252	20 - 47	4,5 - 1,5	44UKG[6]	4,0	8,1	BS2 400 SUEA 140 D0
02.10 / 2 / 01.11	2		K 65-252	20 - 57	9,5 - 6,0	44UKG[6]	4,0	8,1	BS2 400 SUEA 140 D0
03.10 / 2 / 02.10	3		K 65-252	20 - 64	14,0 - 6,0	44UKG[6]	4,0	8,1	BS2 400 SUEA 140 D0
	4		K 65-252	20 - 66	17,0 - 8,5	44UKG[6]	4,0	8,1	BS2 400 SUEA 140 D0
	5		K 65-252	20 - 73	20,0 - 10,5	54UKG[6]	5,5	10,7	BS2 400 SUEA 140 D0
	6	(⇨ Page 17)	K 65-252	20 - 70	22,0 - 12,0	122U5G	7,5	16,0	BS2 400 SUEA 180 D0
	7		K 65-252	20 - 32	42,0 - 40,0	172U5G	10,0	20,8	BS2 400 SUEA 230 D0
			K 65-252	20 - 76	42,0 - 26,0	252U5G	15,0	28,3	BS2 400 SUEA 400 D0
	8		K 65-252	20 - 50	54,0 - 46,0	252U5G	15,0	28,3	BS2 400 SUEA 400 D0
03.10 / 2 / 03.05	22	(⇨ Page 21)	F 80-250	20 - 120	11,0 - 2,0	74U5G	4,0	9,8	BS2 400 SUEA 140 D0
03.10 / 2 / 03.10	23		F 80-250	20 - 50	16,0 - 14,0	74U5G	4,0	9,8	BS2 400 SUEA 140 D0
03.10 / 2 / 04.10			F 80-250	20 - 145	16,0 - 5,0	114U5G	7,0	15,8	BS2 400 SUEA 180 D0
	24		F 80-250	20 - 75	20,5 - 17,0	114U5G	7,0	15,8	BS2 400 SUEA 180 D0
			F 80-250	20 - 190	20,5 - 8,0	164U5G	10,0	23,9	BS2 400 SUEA 400 D0
	25		F 80-250	20 - 47	25,5 - 24,0	114U5G	7,0	15,8	BS2 400 SUEA 180 D0
			F 80-250	20 - 83	25,5 - 22,0	164U5G	10,0	23,9	BS2 400 SUEA 400 D0
	26	(⇨ Page 22)	F 80-250	20 - 75	26,2 - 16,8	172U5G	10,0	20,8	BS2 400 SUEA 230 D0
	27		F 80-250	20 - 50	31,5 - 27,0	172U5G	10,0	20,8	BS2 400 SUEA 230 D0
			F 80-250	20 - 118	31,5 - 14,5	252U5G	15,0	28,3	BS2 400 SUEA 400 D0
	28		F 80-250	20 - 27	36,5 - 35,8	175U5G	10,0	20,8	BS2 400 SUEA 230 D0
			F 80-250	20 - 82	36,5 - 27,0	252U5G	15,0	28,3	BS2 400 SUEA 400 D0
	29		F 80-250	20 - 38	46,0 - 44,0	252U5G	15,0	28,3	BS2 400 SUEA 400 D0
04.10 / 2 / 04.11	30	(⇨ Page 23)	F 100-250	20 - 120	10,0 - 4,0	74U5G	4,0	9,8	BS2 400 SUEA 140 D0
			F 100-250	20 - 150	10,0 - 2,2	114U5G	7,0	15,8	BS2 400 SUEA 180 D0
	31		F 100-250	20 - 175	14,0 - 3,1	114U5G	7,0	15,8	BS2 400 SUEA 180 D0
	32		F 100-250	20 - 85	17,3 - 14,0	114U5G	7,0	15,8	BS2 400 SUEA 180 D0
			F 100-250	20 - 200	17,3 - 5,0	164U5G	10,0	23,9	BS2 400 SUEA 400 D0
	33		F 100-250	20 - 200	21,8 - 8,5	214U5G	12,5	25,1	BS2 400 SUEA 400 D0
	34		F 100-250	20 - 105	23,2 - 19,8	214U5G	12,5	25,1	BS2 400 SUEA 400 D0
04.11 / 2 / 05.10	30	(⇨ Page 23)	F 100-250	20 - 120	10,0 - 4,0	74U5G	4,0	9,8	[7]
			F 100-250	20 - 150	10,0 - 2,2	114U5G	7,0	15,8	[7]
	31		F 100-250	20 - 175	14,0 - 3,1	114U5G	7,0	15,8	[7]
	32		F 100-250	20 - 85	17,3 - 14,0	114U5G	7,0	15,8	[7]
			F 100-250	20 - 200	17,3 - 5,0	164U5G	10,0	23,9	[7]
	33		F 100-250	20 - 200	21,8 - 8,5	214U5G	12,5	25,1	[7]
	34		F 100-250	20 - 105	23,2 - 19,8	214U5G	12,5	25,1	[7]

The Q and H values in the table indicate the possible operating range of the corresponding pump hydraulic system. The name plate of the pump indicates the hydraulics code (pump code) as well as the best efficiency point (Q/H).

Sewabloc selection table

AmaDS³ module	Pump code	Characteristic curve	Sewabloc size	Q [m³/h]	H [m]	Motor size	P_2 [kW]	I [A]	LevelControl Basic 2 version
02.10 / 2 / 01.10	1	(⇨ Page 16)	K 65-252	20 - 47	4,5 - 1,5	100L04	2,2	4,9	BS2 400 DUEQ 063 D0
02.10 / 2 / 01.11	2		K 65-252	20 - 57	9,5 - 6,0	100L04	2,2	4,9	BS2 400 DUEQ 063 D0
03.10 / 2 / 02.10	3		K 65-252	20 - 64	14,0 - 6,0	100L04	3,0	6,2	BS2 400 DUEQ 063 D0

5) With 10 m power cable as standard
6) Also available in operating mode S1.
7) On request

AmaDS³ module	Pump code	Characteristic curve	Sewabloc size	Q [m³/h]	H [m]	Motor size	P_2 [kW]	I [A]	LevelControl Basic 2 version
	4		K 65-252	20 - 66	17,0 - 8,5	112M04	4,0	8,6	BS2 400 DUEQ 100 D0
	5		K 65-252	20 - 73	20,0 - 10,5	132S04	5,5	11,0	BS2 400 SUEA 140 D0
	6	(⇨ Page 17)	K 65-252	20 - 70	22,0 - 12,0	132S02	7,5	14,6	BS2 400 SUEA 180 D0
	7		K 65-252	20 - 50	42,0 - 35,0	160M02	11,0	22,0	BS2 400 SUEA 230 D0
			K 65-252	20 - 76	42,0 - 26,0	160M02	15,0	29,4	BS2 400 SUEA 400 D0
	8		K 65-252	20 - 82	54,0 - 36,0	160L02	18,5	35,6	BS2 400 SUEA 400 D0
	9		K 65-252	20 - 88	62,0 - 42,0	180M02	22,0	41,2	BS2 400 SUEA 630 D0
03.10 / 2 / 03.05 03.10 / 2 / 03.10 03.10 / 2 / 04.10	10	(⇨ Page 18)	F 80-250	20 - 75	10,2 - 5,5	100L04	3,0	6,2	BS2 400 DUEQ 063 D0
			F 80-250	20 - 120	10,2 - 1,5	112M04	4,0	8,6	BS2 400 DUEQ 100 D0
	11		F 80-250	20 - 60	11,4 - 8,5	100L04	3,0	6,2	BS2 400 DUEQ 063 D0
			F 80-250	20 - 125	11,4 - 2,5	112M04	4,0	8,6	BS2 400 DUEQ 100 D0
	12		F 80-250	20 - 45	11,0 - 9,6	100L04	3,0	6,2	BS2 400 DUEQ 063 D0
			F 80-250	20 - 80	12,5 - 7,8	112M04	4,0	8,6	BS2 400 DUEQ 100 D0
	13		F 80-250	20 - 40	13,8 - 12,5	100L04	3,0	6,2	BS2 400 DUEQ 063 D0
			F 80-250	20 - 70	13,8 - 10,0	112M04	4,4	8,6	BS2 400 DUEQ 100 D0
			F 80-250	20 - 140	13,8 - 4,0	132S04	5,5	11,0	BS2 400 SUEA 140 D0
	14	(⇨ Page 19)	F 80-315	20 - 115	14,8 - 10,5	160M04	11,0	22,8	BS2 400 SUEA 230 D0
	15		F 80-315	20 - 126	16,8 - 12,5	160M04	11,0	22,8	BS2 400 SUEA 230 D0
	16		F 80-315	20 - 135	19,0 - 14,0	160M04	11,0	22,8	BS2 400 SUEA 230 D0
	17		F 80-315	20 - 110	21,5 - 17,5	160M04	11,0	22,8	BS2 400 SUEA 230 D0
	18	(⇨ Page 20)	F 80-315	20 - 60	26,0 - 22,0	160M02	11,0	22,0	BS2 400 SUEA 230 D0
			F 80-315	20 - 140	26,0 - 6,0	160M02	15,0	29,4	BS2 400 SUEA 400 D0
	19		F 80-315	20 - 31	36,0 - 34,5	160M02	11,0	22,0	BS2 400 SUEA 230 D0
			F 80-315	20 - 60	36,0 - 31,0	160M02	15,0	29,4	BS2 400 SUEA 400 D0
			F 80-315	20 - 115	36,0 - 22,0	160L02	18,5	35,6	BS2 400 SUEA 400 D0
	20		F 80-315	20 - 35	45,0 - 44,0	160M02	15,0	29,4	BS2 400 SUEA 400 D0
			F 80-315	20 - 55	45,0 - 42,0	160L02	18,5	35,6	BS2 400 SUEA 400 D0
			F 80-315	20 - 80	45,0 - 38,5	180M02	22,0	41,2	BS2 400 SUEA 630 D0
			F 80-315	20 - 160	45,0 - 24,0	200L02	30,0	56,5	BS2 400 SUEA 630 D0
	21		F 80-315	20 - 28	55,8 - 54,8	160L02	18,5	35,6	BS2 400 SUEA 400 D0
			F 80-315	20 - 50	55,8 - 53,0	180M02	22,0	41,2	BS2 400 SUEA 630 D0
			F 80-315	20 - 110	55,8 - 45,0	200L02	30,0	56,5	BS2 400 SUEA 630 D0
04.10 / 2 / 04.11	30	(⇨ Page 23)	F 100-250	20 - 120	10,0 - 4,0	112M04	4,0	8,6	BS2 400 DUEQ 100 D0
			F 100-250	20 - 150	10,0 - 2,2	132S04	5,5	11,0	BS2 400 SUEA 140 D0
	31		F 100-250	20 - 60	14,0 - 12,3	132S04	5,5	11,0	BS2 400 SUEA 140 D0
			F 100-250	20 - 175	14,0 - 3,1	132M04	7,5	14,0	BS2 400 SUEA 180 D0
	32		F 100-250	20 - 94	17,3 - 13,5	132M04	7,5	14,0	BS2 400 SUEA 180 D0
04.11 / 2 / 05.10	30	(⇨ Page 23)	F 100-250	20 - 120	10,0 - 4,0	112M04	4,0	8,6	8)
			F 100-250	20 - 150	10,0 - 2,2	132S04	5,5	11,0	8)
	31		F 100-250	20 - 60	14,0 - 12,3	132S04	5,5	11,0	8)
			F 100-250	20 - 175	14,0 - 3,1	132M04	7,5	14,0	8)
	32		F 100-250	20 - 94	17,3 - 13,5	132M04	7,5	14,0	8)

The Q and H values in the table indicate the possible operating range of the corresponding pump hydraulic system. The name plate of the pump indicates the hydraulics code (pump code) as well as the best efficiency point (Q/H).

8) On request

Selection of the LevelControl Basic 2 control unit

Standard design:

- Ammeter for installation at the front
- Sheet steel housing
- IP 54
- Rechargeable battery

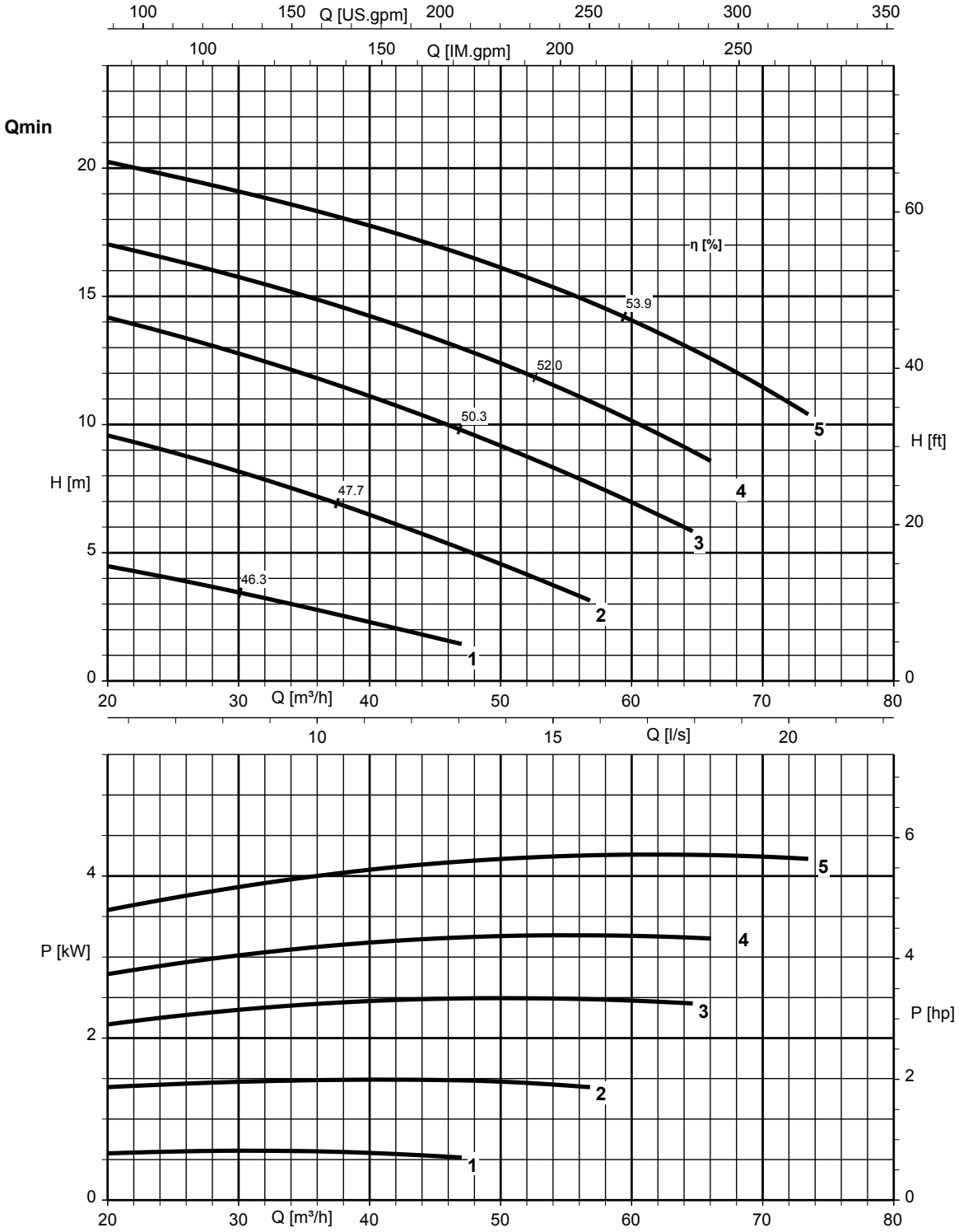
Overview of the LevelControl Basic 2 control unit

AmaDS³ module	LevelControl Basic 2 version	LevelControl Basic 2 ident. number	LevelControl Basic 2 dimensions [mm]
02.10 / 2 / 01.10 02.10 / 2 / 01.11 03.10 / 2 / 02.10 03.10 / 2 / 03.05 03.10 / 2 / 03.10 03.10 / 2 / 04.10	BS2 400 DUEQ 063 D0	19 075 978	760 × 600 × 210
	BS2 400 DUEQ 100 D0	19 075 979	760 × 600 × 210
	BS2 400 DUEA 100 D0	19 075 980	600 × 400 × 200
	BS2 400 SUEA 140 D0	19 075 981	760 × 600 × 210
	BS2 400 SUEA 180 D0	19 075 982	1200 × 800 × 300
	BS2 400 SUEA 230 D0	19 075 983	1200 × 800 × 300
	BS2 400 SUEA 400 D0	19 075 984	1200 × 800 × 300
	BS2 400 SUEA 630 D0	19 075 985	1200 × 800 × 300
04.10 / 2 / 04.11	BS2 400 DUEQ 100 D0	19 075 979	760 × 600 × 210
	BS2 400 DUEA 100 D0	19 075 980	600 × 400 × 200
	BS2 400 SUEA 140 D0	19 075 981	760 × 600 × 210
	BS2 400 SUEA 180 D0	19 075 982	1200 800 300
	BS2 400 SUEA 230 D0	19 075 983	1200 × 800 × 300
	BS2 400 SUEA 400 D0	19 075 984	1200 × 800 × 300
04.11 / 2 / 05.10	9)	-	-
	9)	-	-
	9)	-	-
	9)	-	-
	9)	-	-

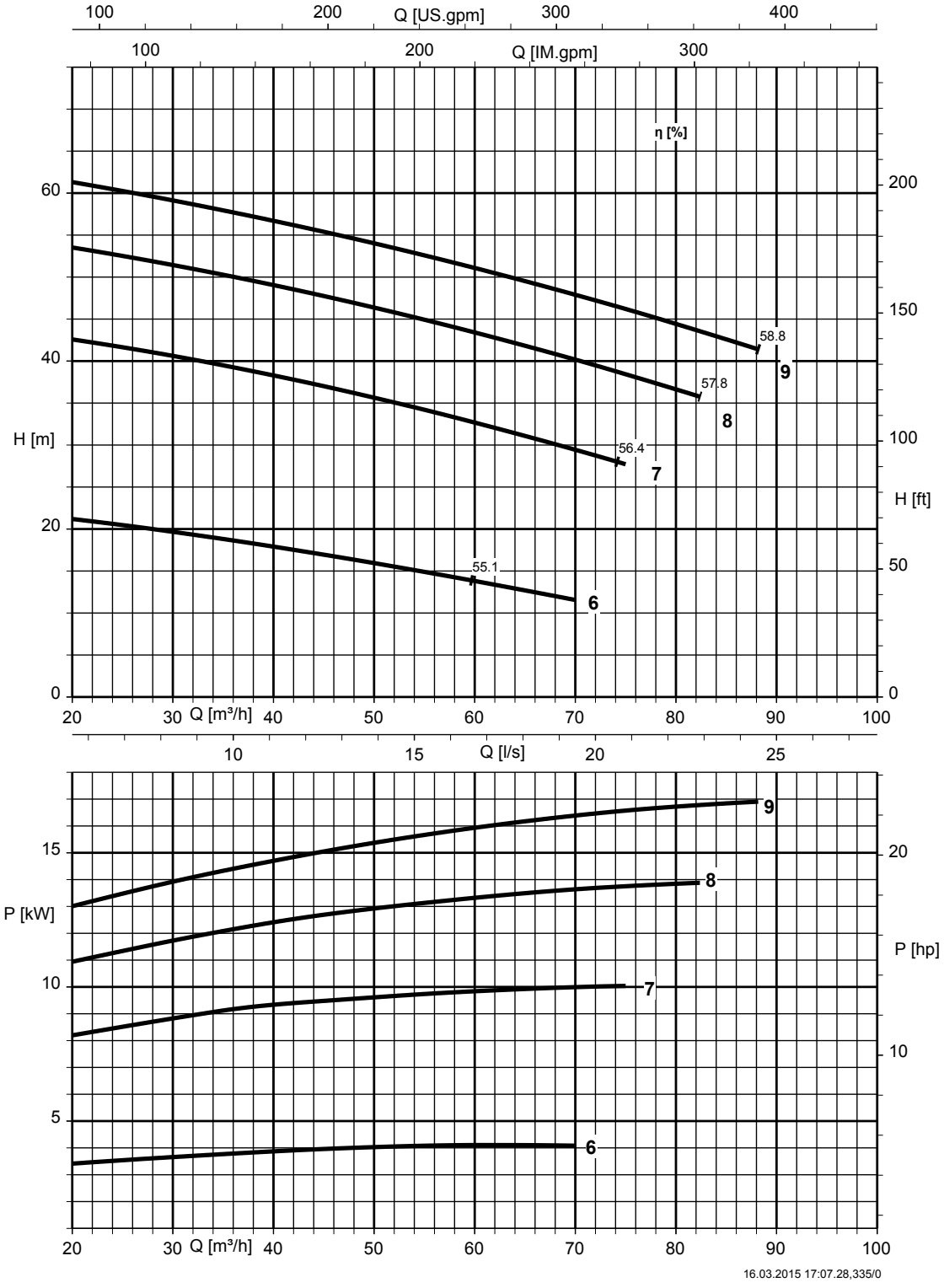
9) On request

Characteristic curves

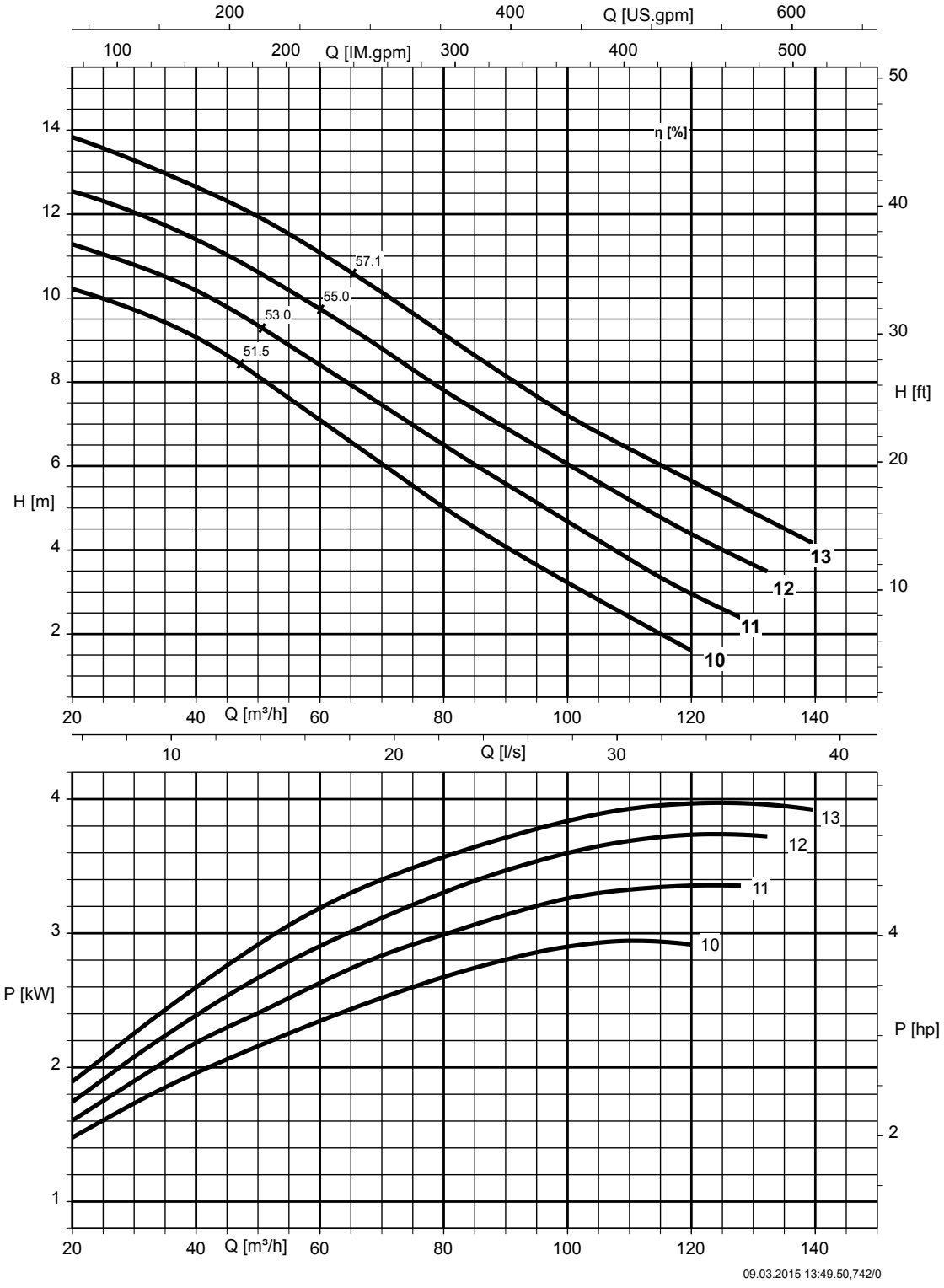
AmaDS³, hydraulics codes 1 to 5



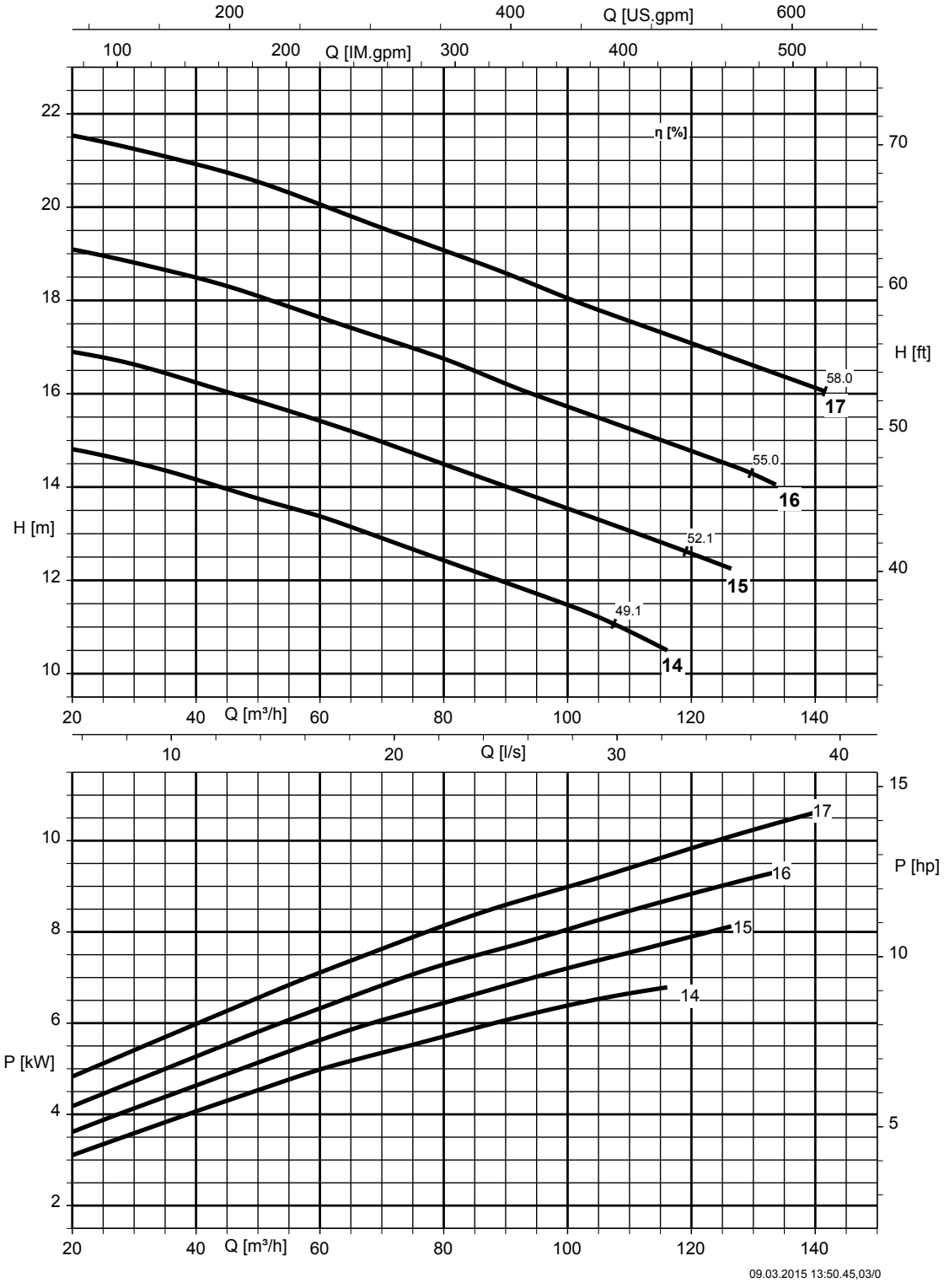
AmaDS³, hydraulics codes 6 to 9



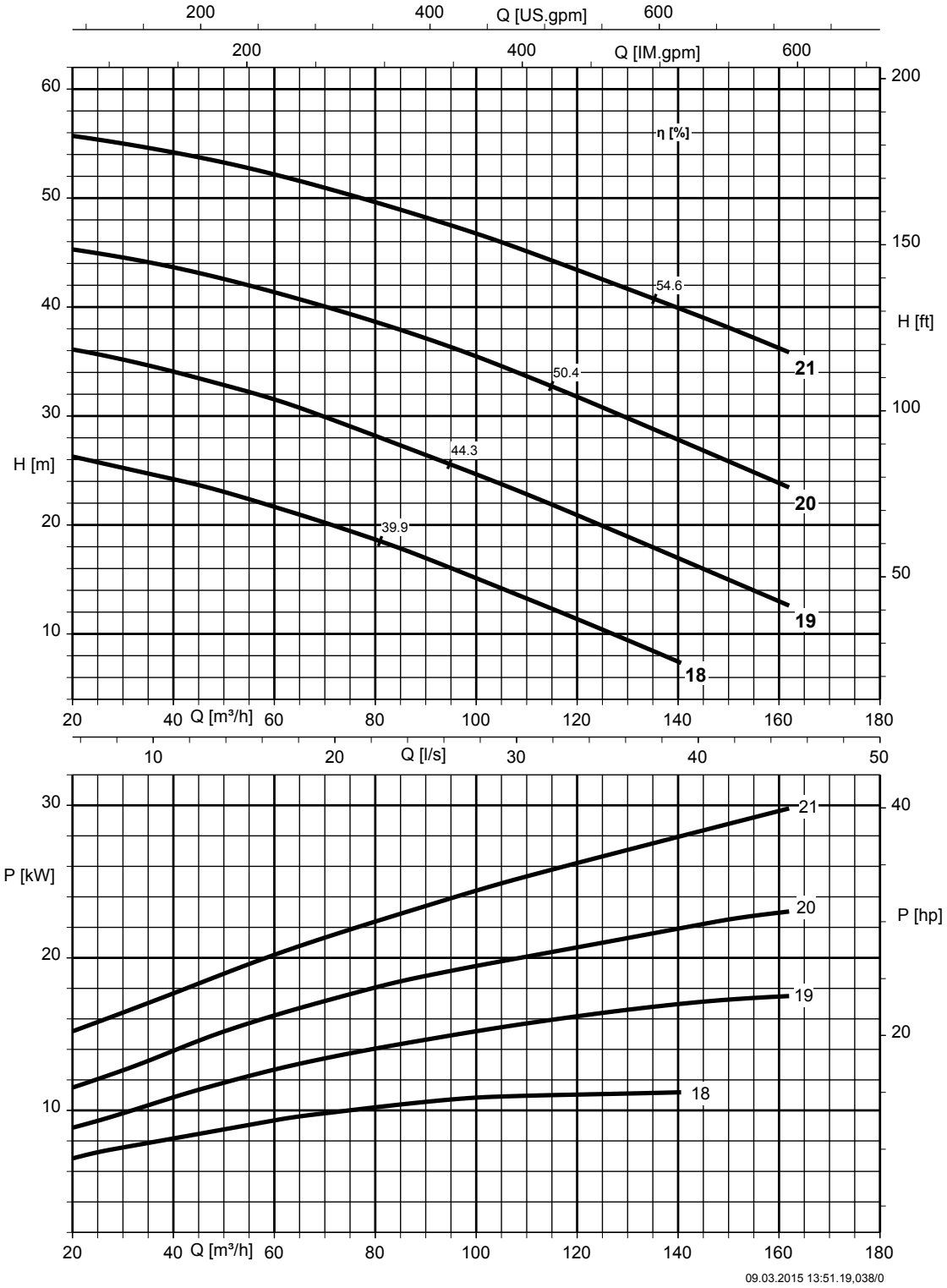
AmaDS³, hydraulics codes 10 to 13



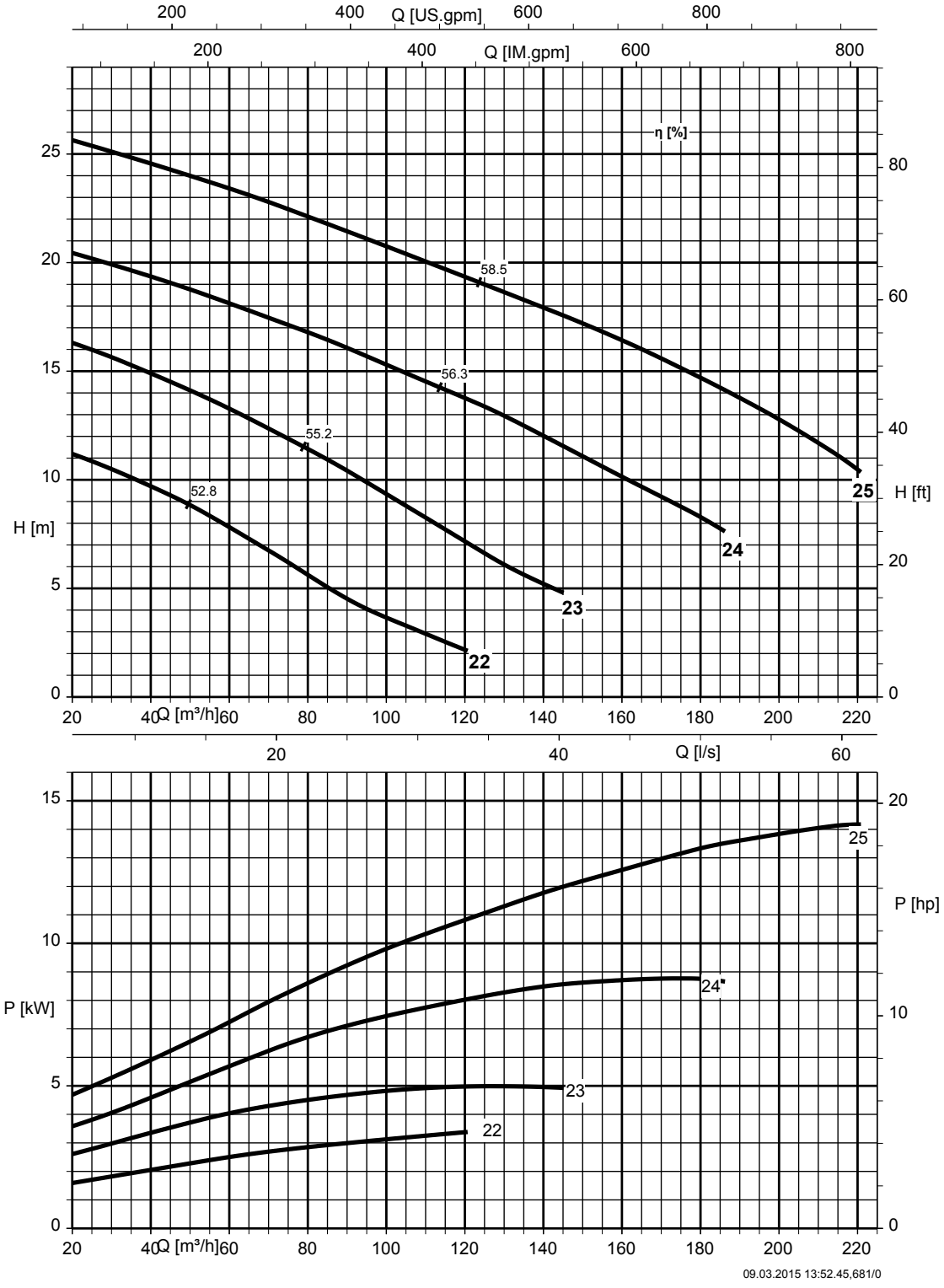
AmaDS³, hydraulics codes 14 to 17



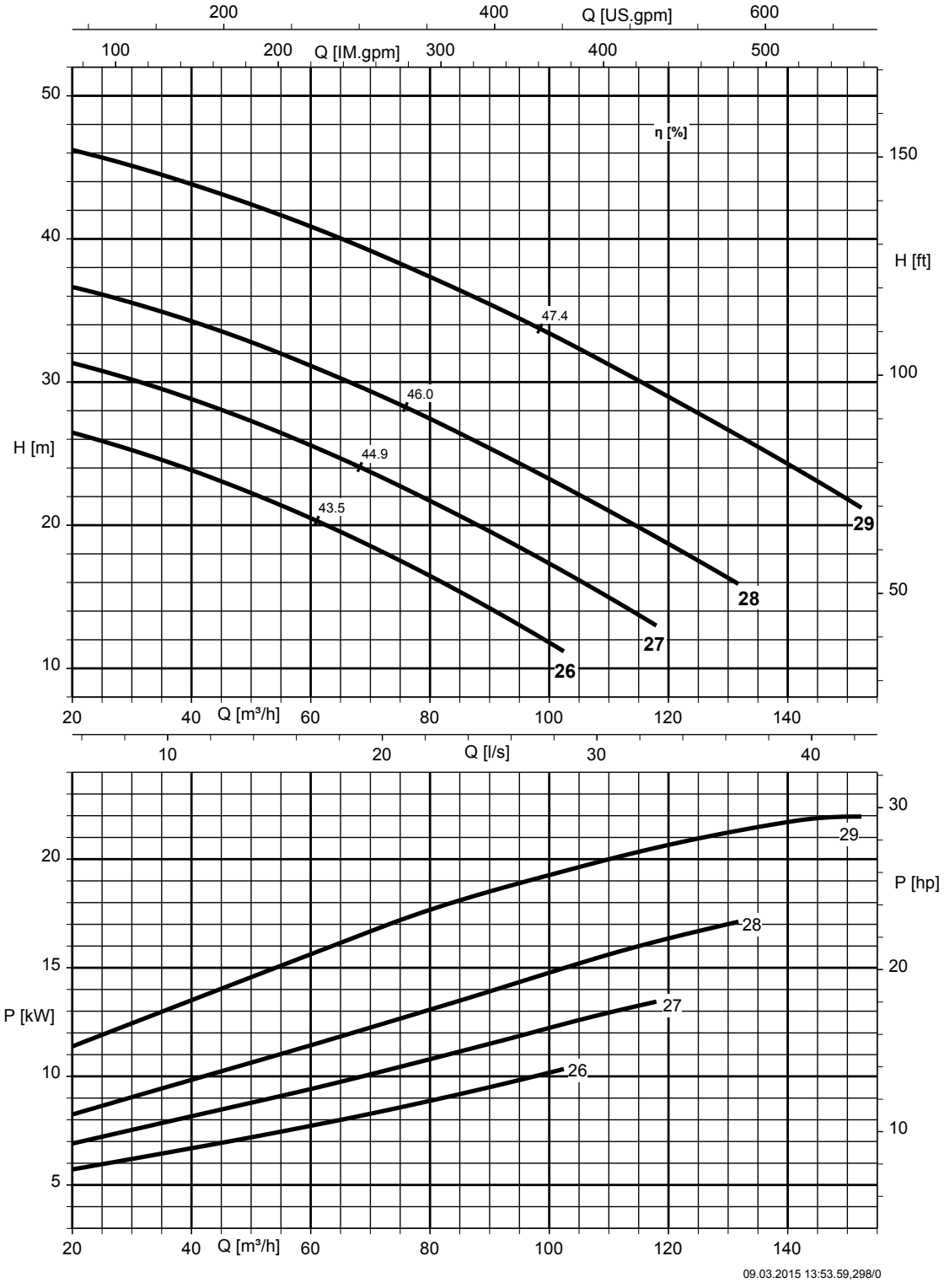
AmaDS³, hydraulics codes 18 to 21



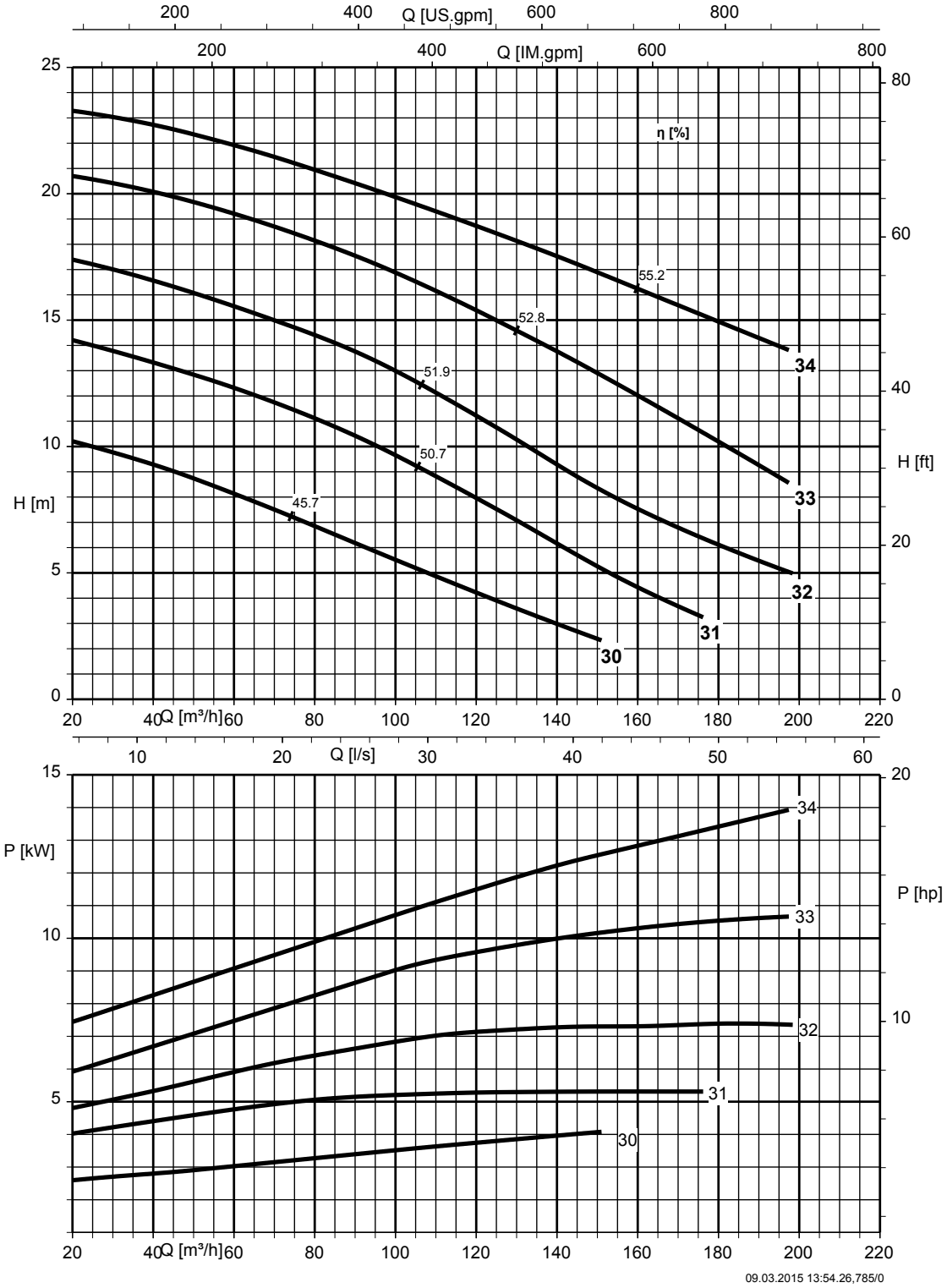
AmaDS³, hydraulics codes 22 to 25



AmaDS³, hydraulics codes 26 to 29

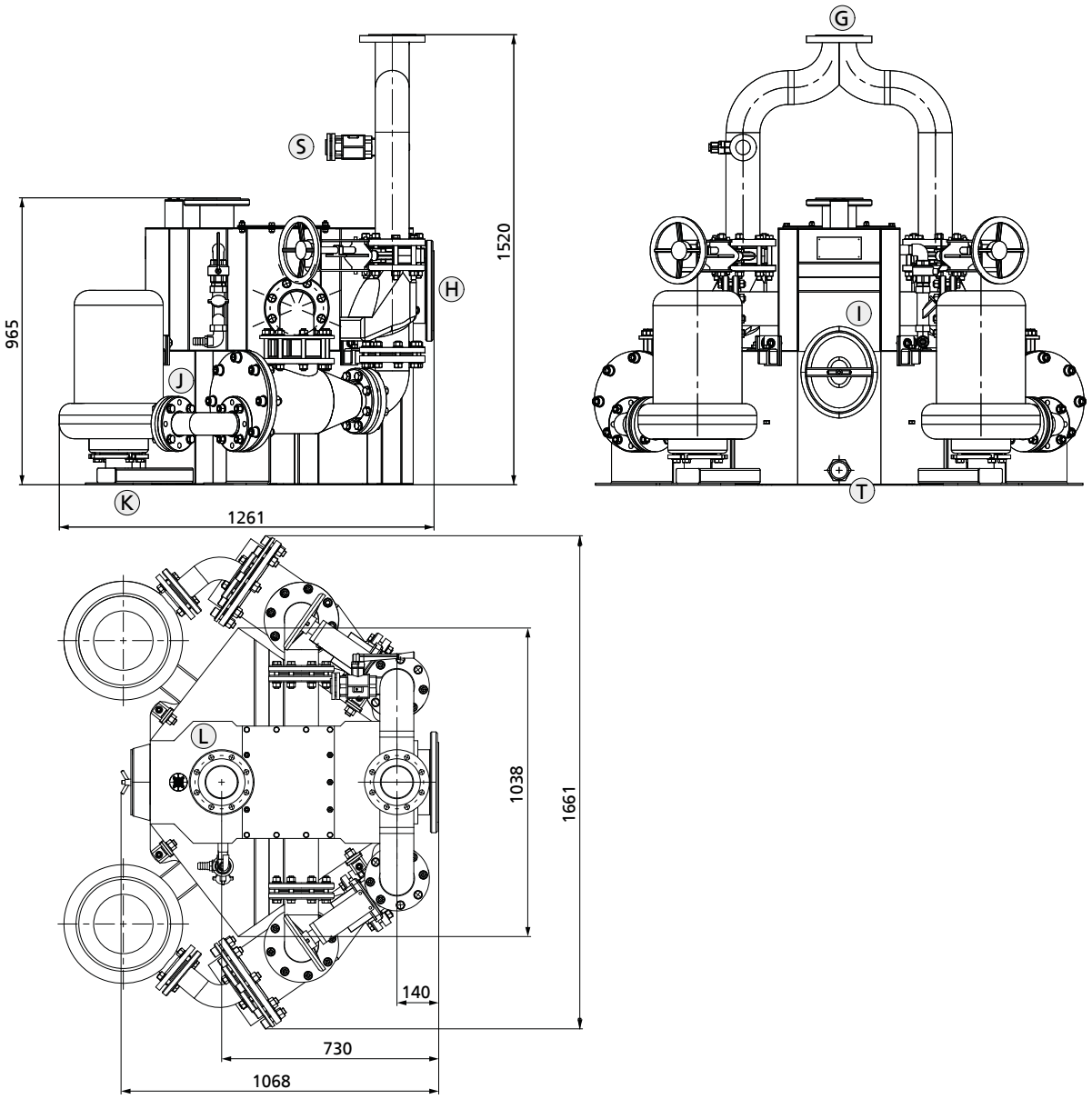


AmaDS³, hydraulics codes 30 to 34



Dimensions

Dimensions AmaDS³ 02.10 / 2 / 01.10

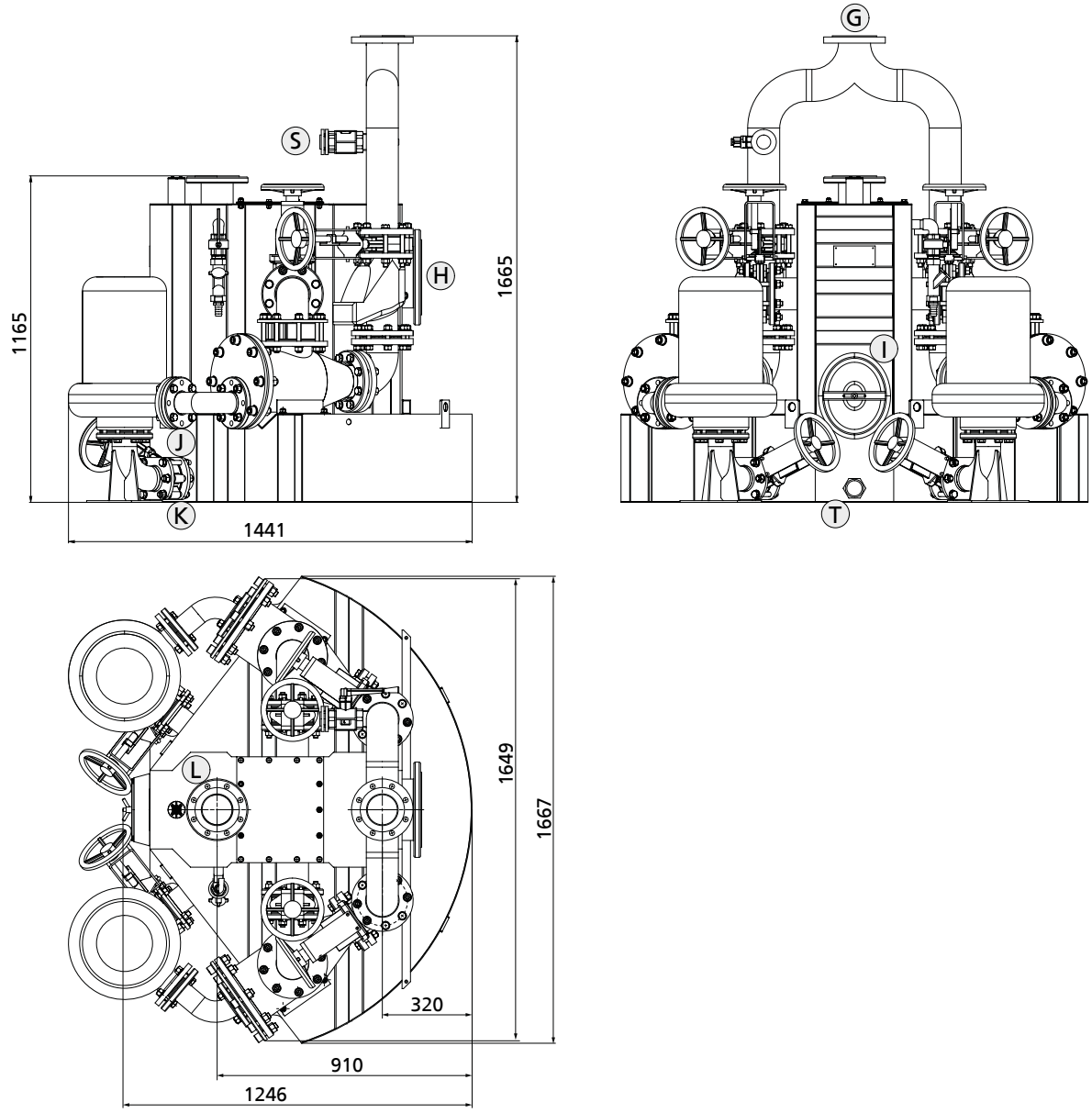


Dimensions, solids separation system (example) [mm]

Key

Marking	Description	AmaDS³ 02.10 / 2 / 01.10	Unit
	Weight of system, without pump sets	475	kg
G	Discharge line connection	DN 100	mm
H	Inflow line connection	DN 200	mm
I	Collecting tank inspection hole	Integrated	-
J	Pump set discharge nozzle	DN 50	mm
K	Pump set suction nozzle	DN 65	mm
L	Vent line	DN 100	mm
T	Tank drain	G 2	-
S	Flushing connection	Storz 50-C	-
	Inflow pipe level (pipe invert)	**550**	**mm**

Dimensions AmaDS³ 02.10 / 2 / 01.11

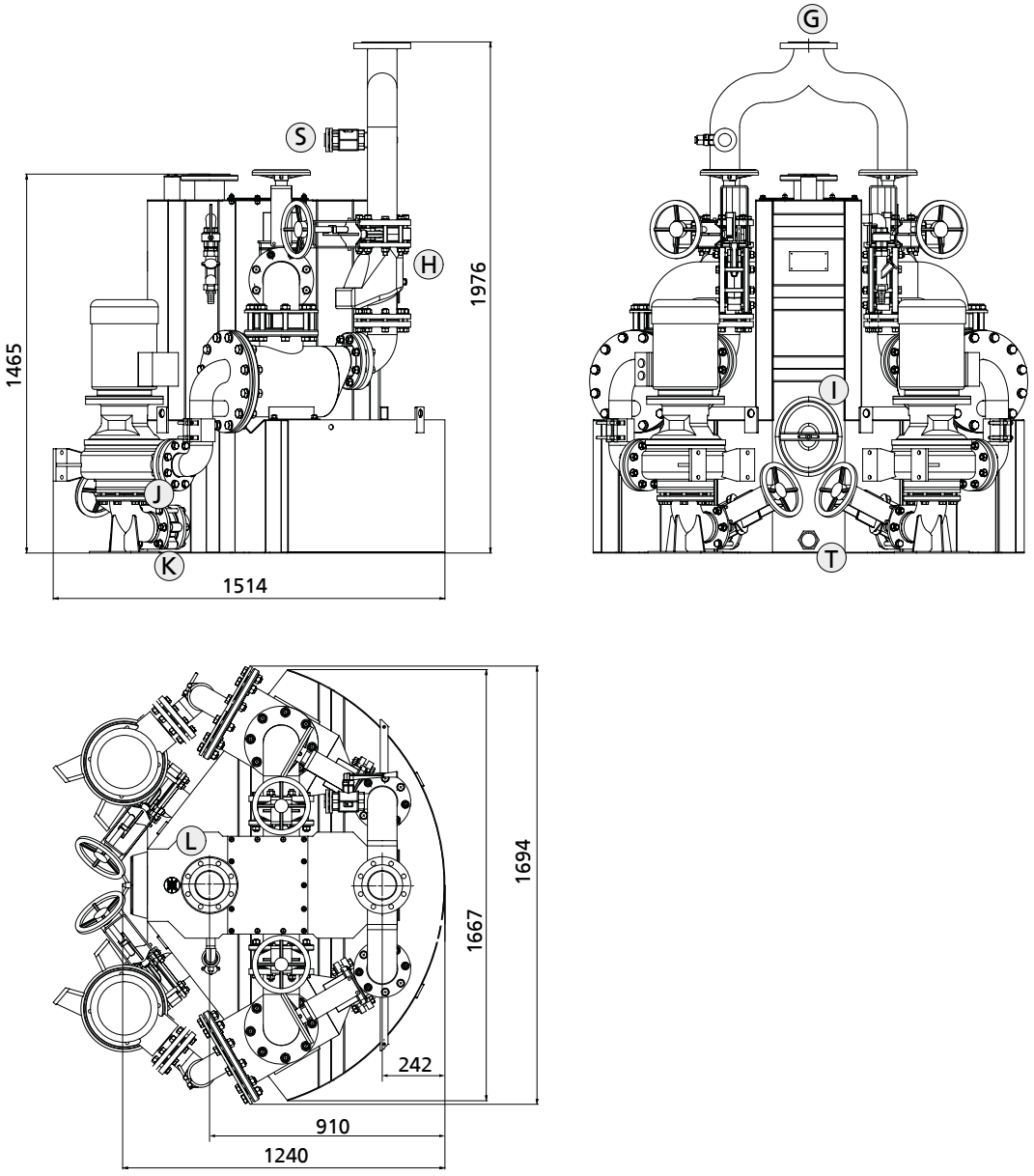


Dimensions, solids separation system (example) [mm]

Key

Marking	Description	AmaDS³ 02.10 / 2 / 01.11	Unit
	Weight of system, without pump sets	650	kg
G	Discharge line connection	DN 100	mm
H	Inflow line connection	DN 200	mm
I	Collecting tank inspection hole	Integrated	-
J	Pump set discharge nozzle	DN 65	mm
K	Pump set suction nozzle	DN 80	mm
L	Vent line	DN 100	mm
T	Tank drain	G 2	-
S	Flushing connection	Storz 52-C	-
	Inflow pipe level (pipe invert)	**700**	**mm**

Dimensions AmaDS³ 03.10 / 2 / 02.10

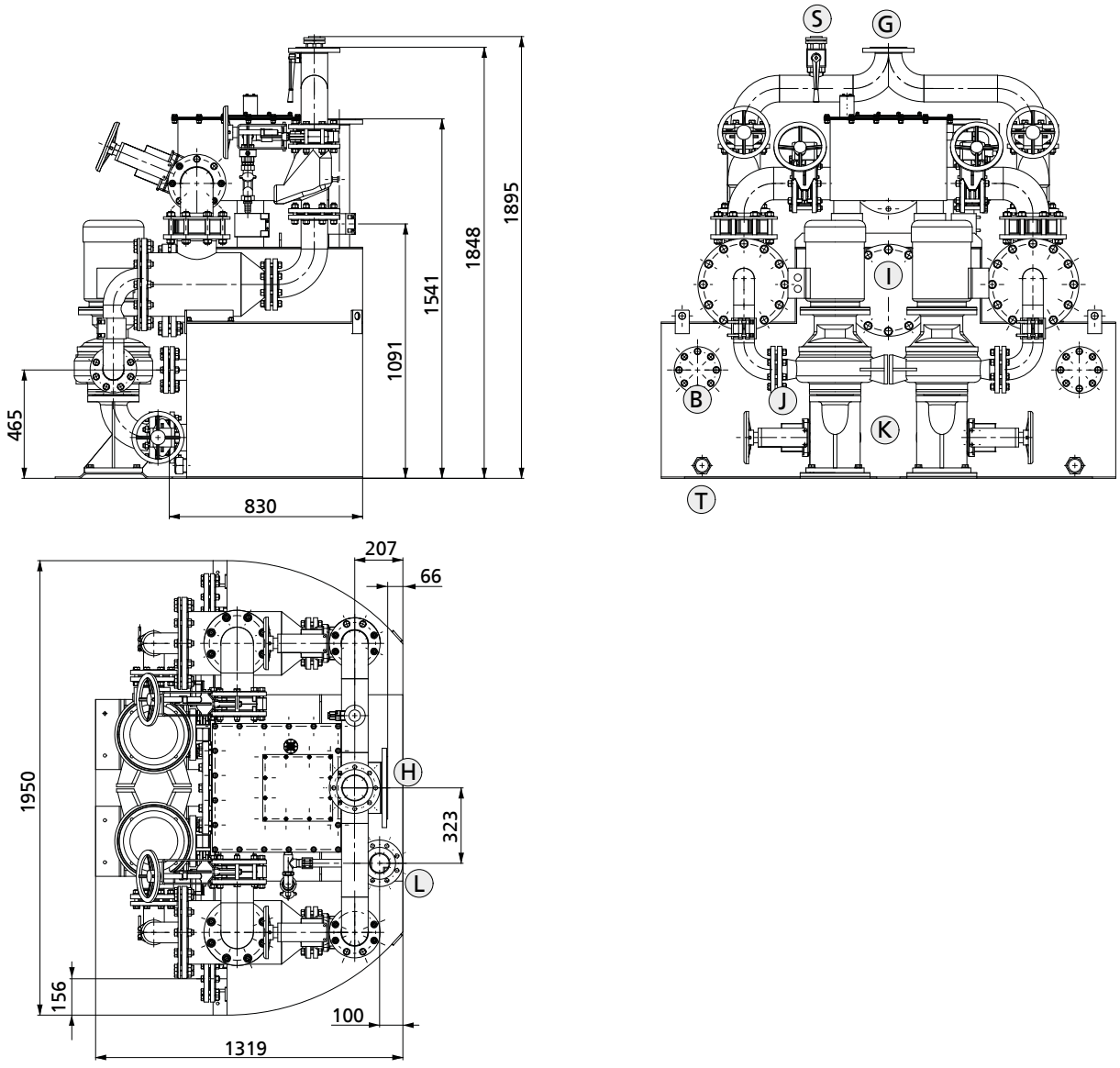


Dimensions, solids separation system (example) [mm]

Key

Marking	Description	AmaDS³ 03.10 / 2 / 02.10	Unit
	Weight of system, without pump sets	750	kg
G	Discharge line connection	DN 100	mm
H	Inflow line connection	DN 200	mm
I	Collecting tank inspection hole	Integrated	-
J	Pump set discharge nozzle	DN 65	mm
K	Pump set suction nozzle	DN 80	mm
L	Vent line	DN 100	mm
T	Tank drain	G 2	-
S	Flushing connection	Storz 52-C	-
	Inflow pipe level (pipe invert)	**1000**	**mm**

Dimensions AmaDS³ 03.10 / 2 / 03.05

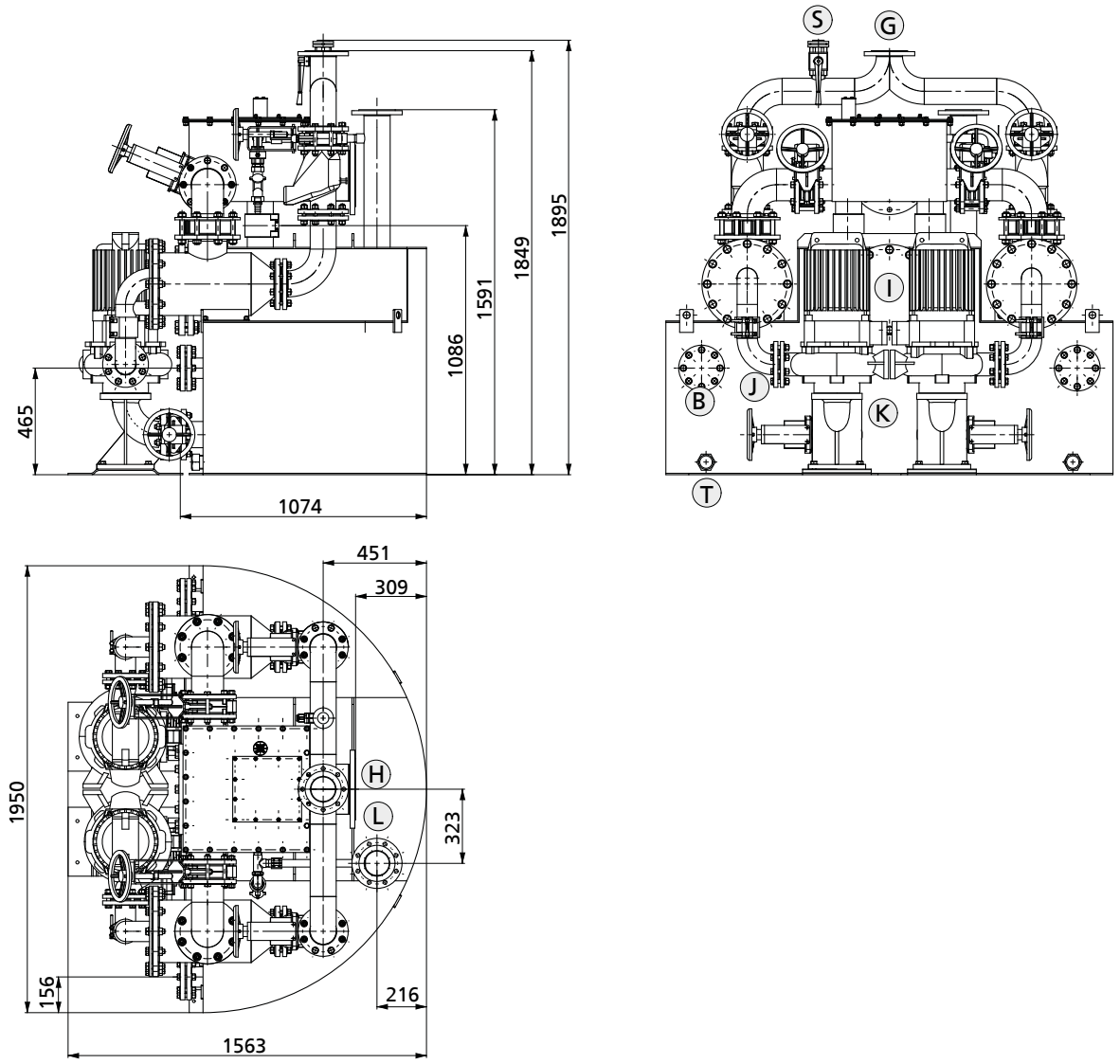


Dimensions, solids separation system (example) [mm]

Key

Marking	Description	AmaDS³ 3:10 / 2 / 3:05		Unit
	Weight of system, without pump sets	890		kg
G	Discharge line connection	DN 100		mm
H	Inflow line connection	DN 200		mm
I	Collecting tank inspection hole	DN 250		mm
J	Pump set discharge nozzle	DN 65	DN 80	mm
K	Pump set suction nozzle	DN 80	DN 100	mm
L	Vent line	DN 80		mm
T	Tank drain	G 2		-
S	Flushing connection	Storz 52-C		-
B	Tank opening	DN 80		mm
	Inflow pipe level (pipe invert)	**1200**		**mm**

Dimensions AmaDS³ 03.10 / 2 / 03.10

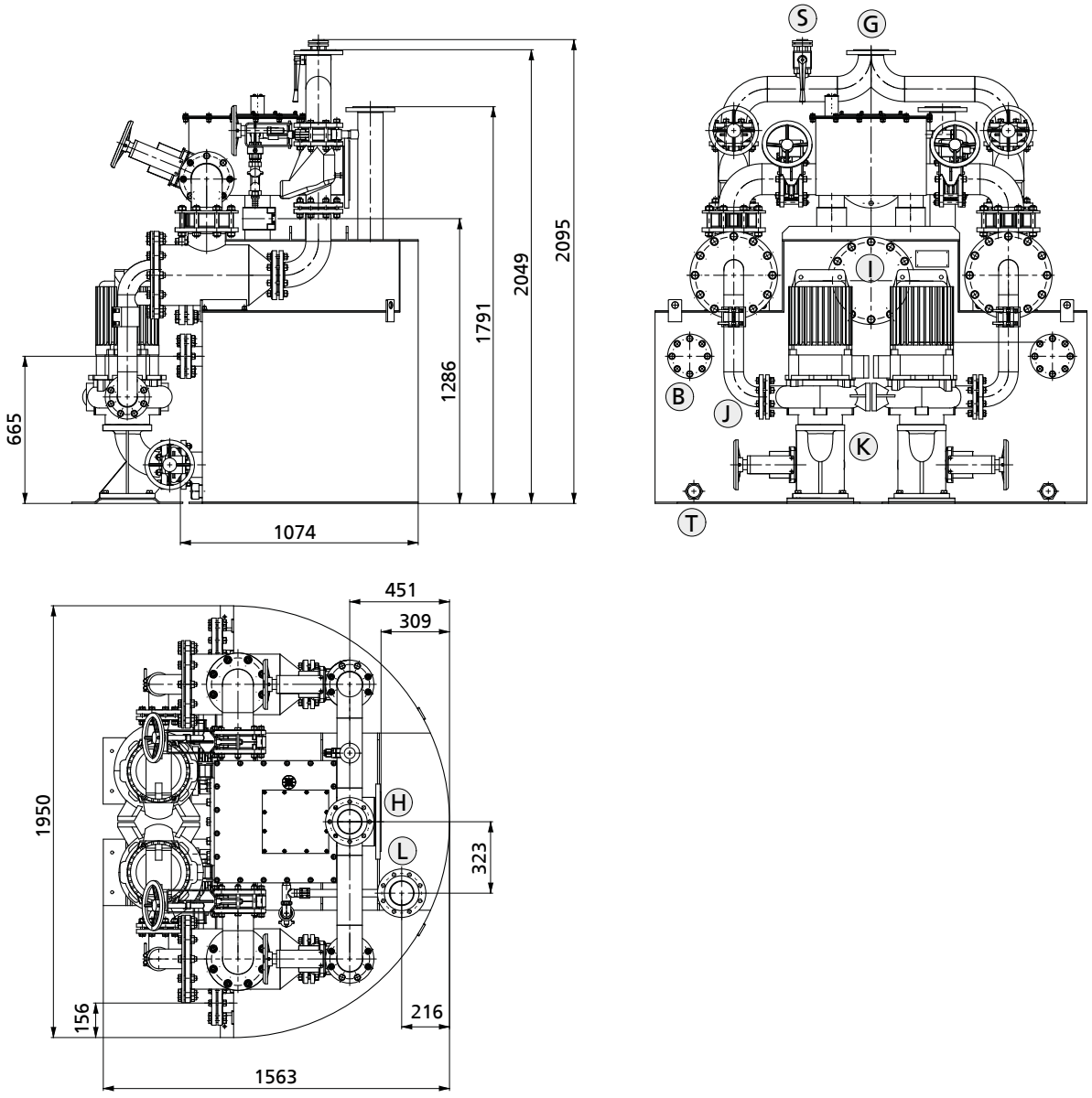


Dimensions, solids separation system (example) [mm]

Key

Marking	Description	AmaDS³ 3:10 / 2 / 3:10		Unit
	Weight of system, without pump sets	950		kg
G	Discharge line connection	DN 100		mm
H	Inflow line connection	DN 200		mm
I	Collecting tank inspection hole	DN 250		mm
J	Pump set discharge nozzle	DN 65	DN 80	mm
K	Pump set suction nozzle	DN 80	DN 100	mm
L	Vent line	DN 100		mm
T	Tank drain	G 2		-
S	Flushing connection	Storz 52-C		-
B	Tank opening	DN 80		mm
	Inflow pipe level (pipe invert)	**1200**		**mm**

Dimensions AmaDS³ 03.10 / 2 / 04.10

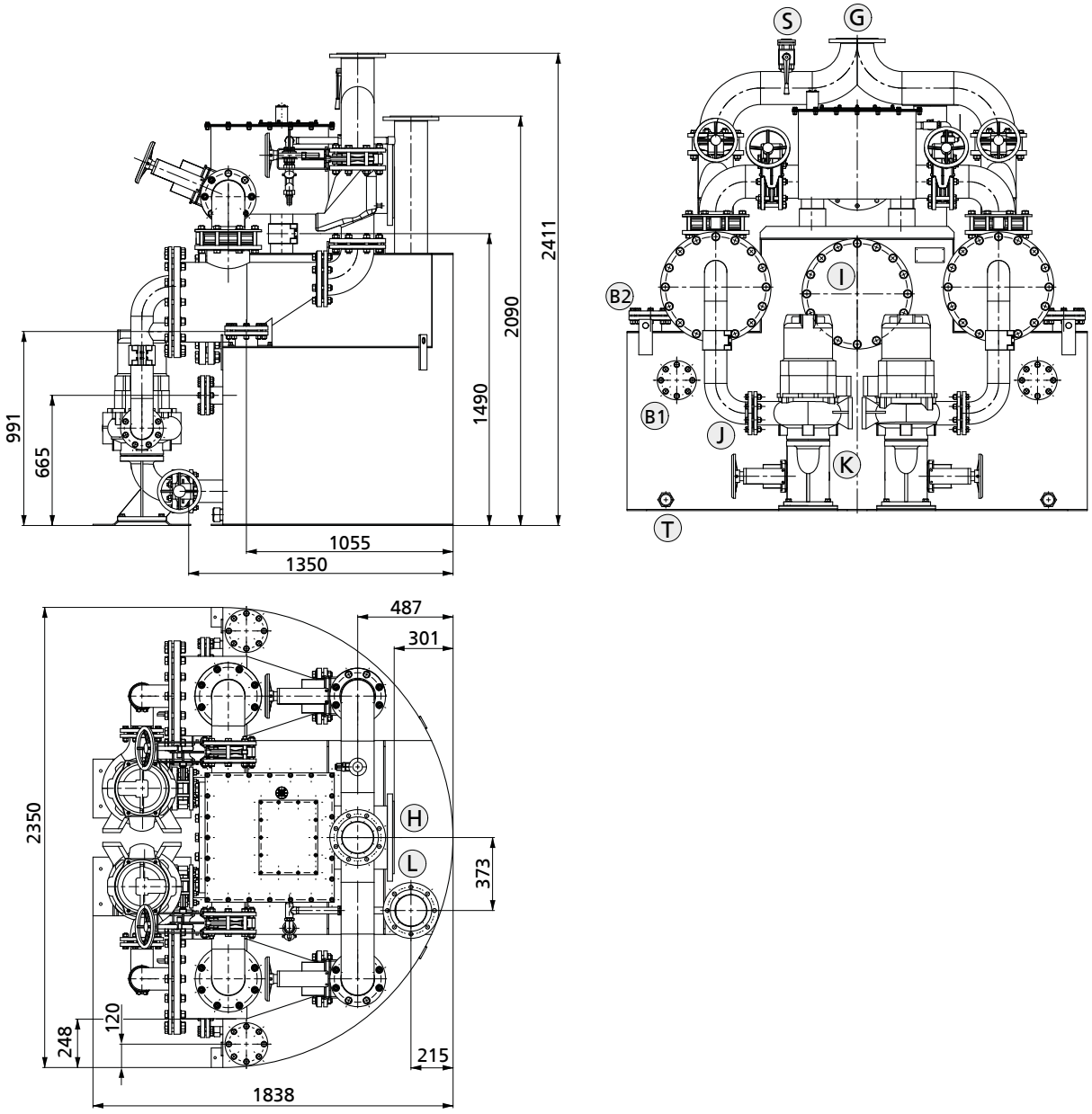


Dimensions, solids separation system (example) [mm]

Key

Marking	Description	AmaDS³ 3:10 / 2 / 4:10		Unit
	Weight of system, without pump sets	980		kg
G	Discharge line connection	DN 100		mm
H	Inflow line connection	DN 200		mm
I	Collecting tank inspection hole	DN 250		mm
J	Pump set discharge nozzle	DN 65	DN 80	mm
K	Pump set suction nozzle	DN 80	DN 100	mm
L	Vent line	DN 100		mm
T	Tank drain	G 2		-
S	Flushing connection	Storz 52-C		-
B	Tank opening	DN 80		mm
	Inflow pipe level (pipe invert)	**1400**		**mm**

Dimensions AmaDS³ 04.10 / 2 / 04.11

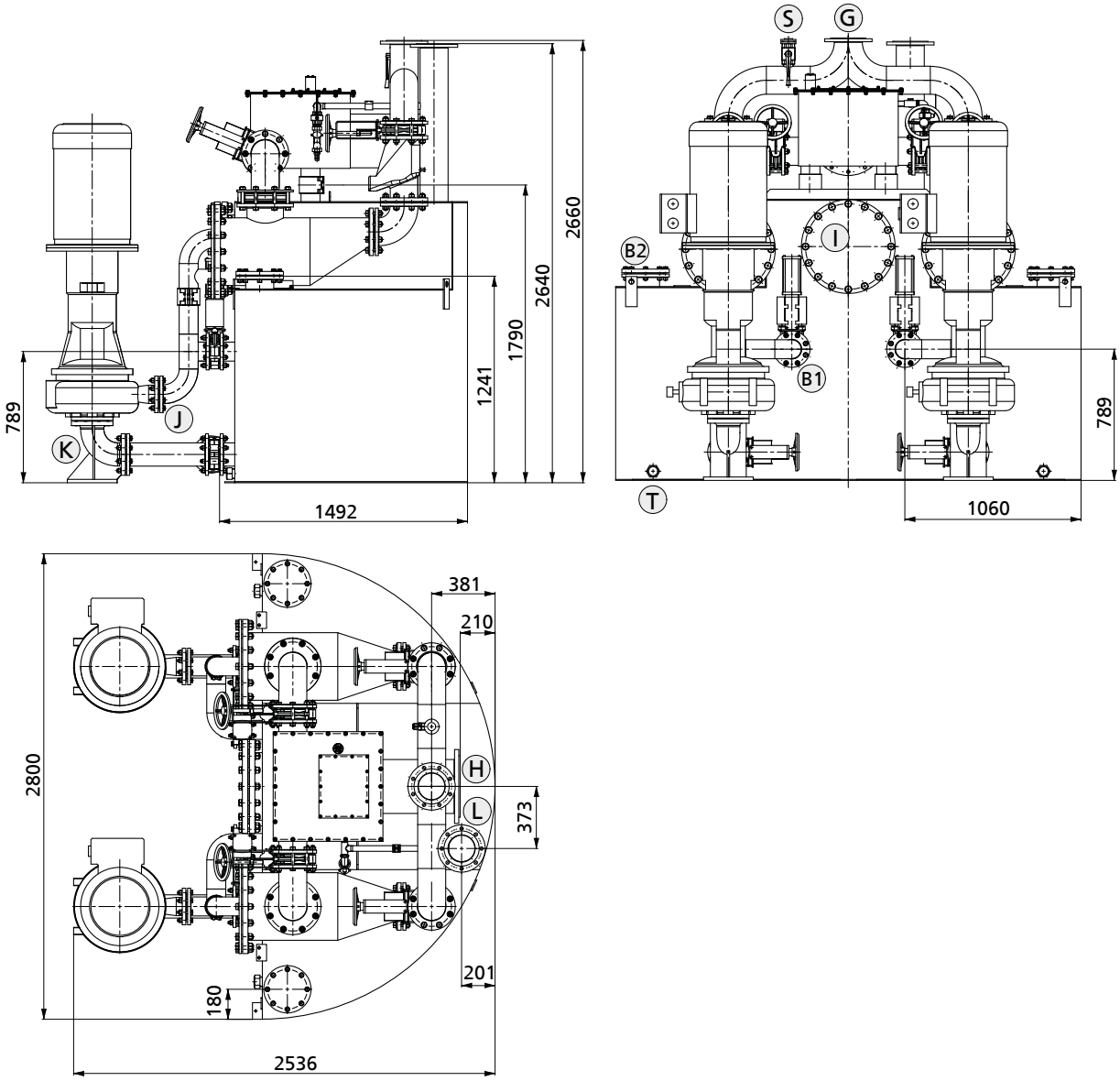


Dimensions, solids separation system (example) [mm]

Key

Marking	Description	AmaDS³ 4:10 / 2 / 4:11	Unit
	Weight of system, without pump sets	1550	kg
G	Discharge line connection	DN 150	mm
H	Inflow line connection	DN 300	mm
I	Collecting tank inspection hole	DN 400	mm
J	Pump set discharge nozzle	DN 80 / DN 100	mm
K	Pump set suction nozzle	DN 100	mm
L	Vent line	DN 150	mm
T	Tank drain	G 2	-
S	Flushing connection	Storz 52-C	-
B1	Tank opening	DN 80	mm
B2	Tank opening	DN 100	mm
	Inflow pipe level (pipe invert)	**1600**	**mm**

Dimensions AmaDS³ 04.11 / 2 / 05.10



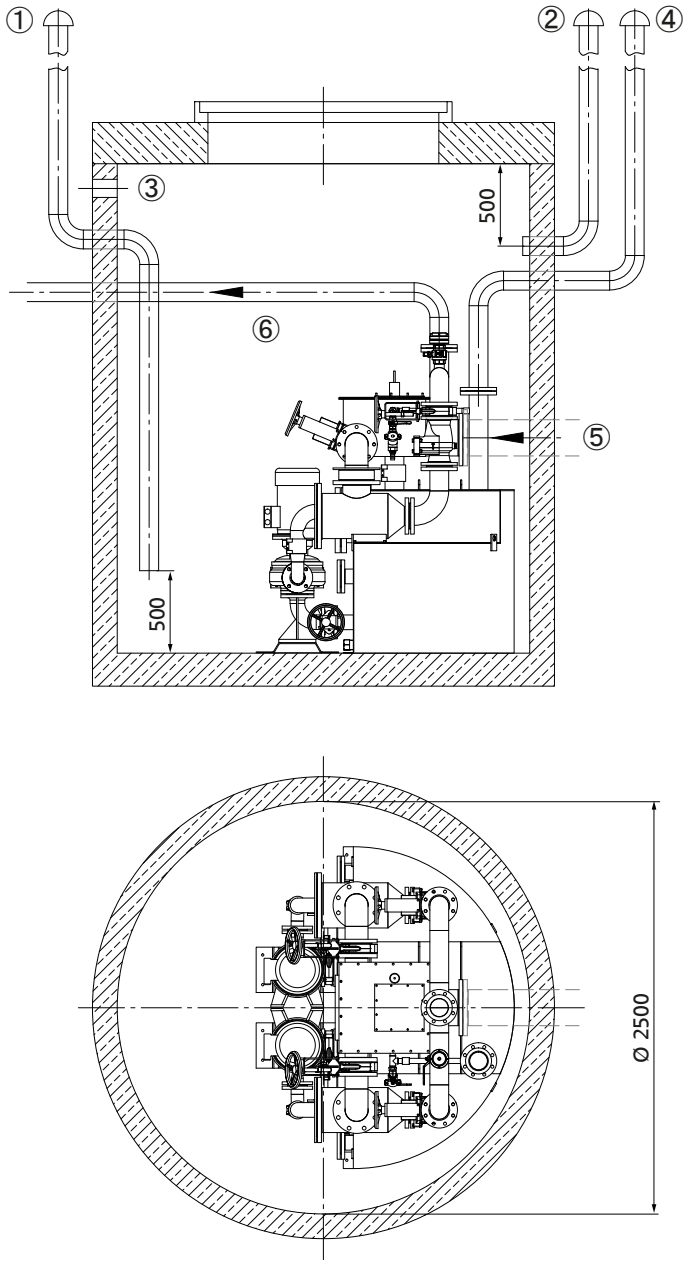
Dimensions, solids separation system (example) [mm]

Key

Marking	Description	AmaDS³ 4:11 / 2 / 5:10	Unit
	Weight of system, without pump sets	1900	kg
G	Discharge line connection	DN 150	mm
H	Inflow line connection	DN 300	mm
I	Collecting tank inspection hole	DN 400	mm
J	Pump set discharge nozzle	DN 100	mm
K	Pump set suction nozzle	DN 100 | DN 125 | DN 150	mm
L	Vent line	DN 150	mm
T	Tank drain	G 2	-
S	Flushing connection	Storz 52-C	-
B1	Tank opening	DN 100	mm
B2	Tank opening	DN 150	mm
	Inflow pipe level (pipe invert)	**1900**	**mm**

Planning information

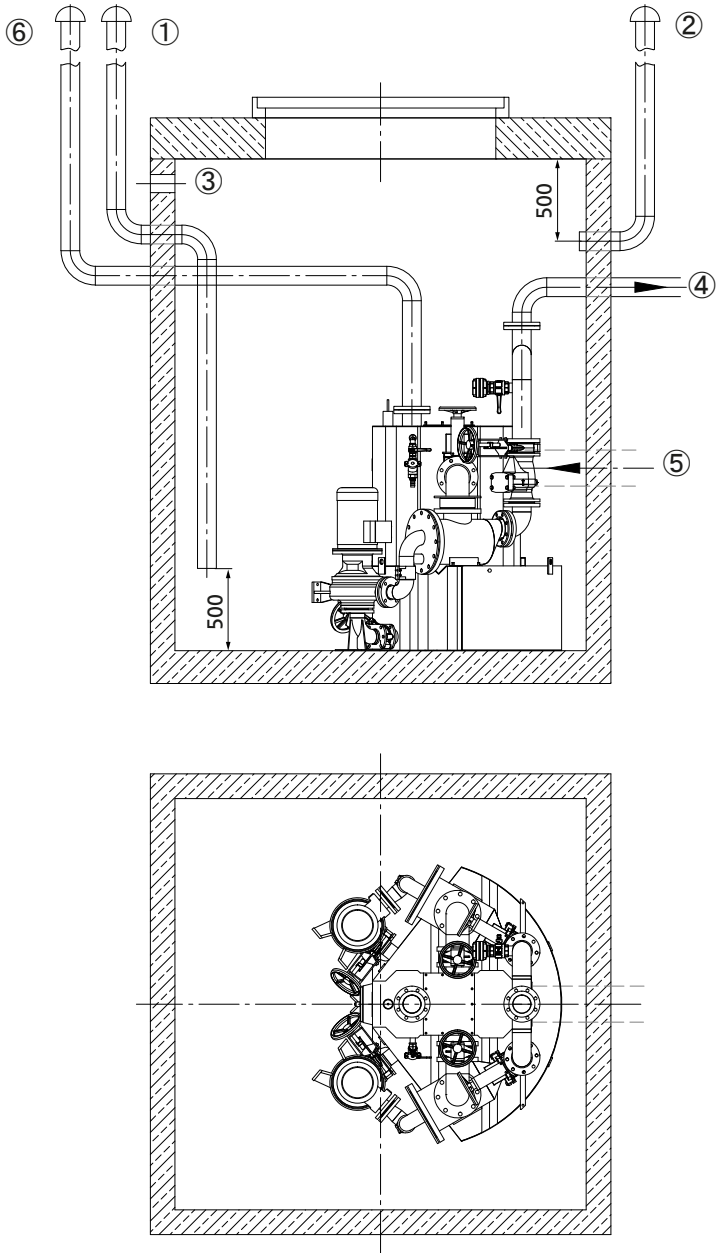
Example: AmaDS³ 03.10 / 2 / 03.10 installed in a circular sump



Installation example: circular concrete sump, dimensions specified in mm

①	Sump aeration	④	Tank vent, DN 100
②	Sump vent	⑤	Inflow, DN 200
③	KG110 electric cable	⑥	Discharge line, DN 100

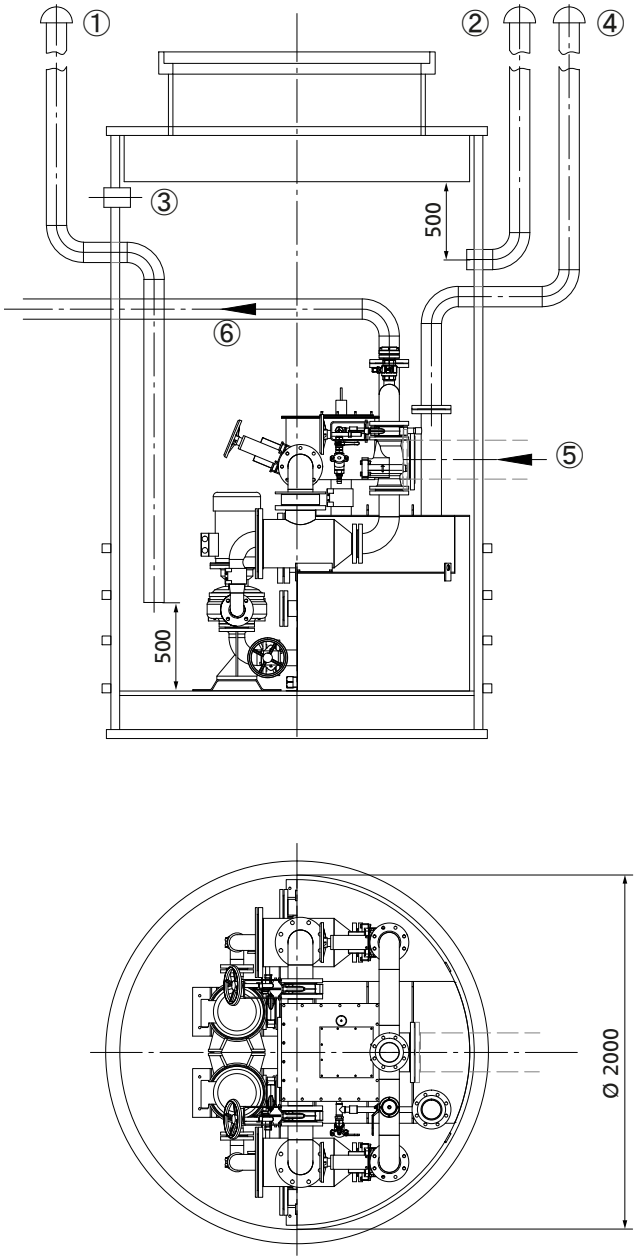
Example: AmaDS³ 03.10 / 2 / 03.10 installed in an angular sump



Installation example: angular concrete sump, dimensions specified in mm

①	Sump aeration	④	Discharge line, DN 100
②	Sump vent	⑤	Inflow, DN 200
③	KG110 electric cable	⑥	Tank vent, DN 100

Example: AmaDS³ 03.10 / 2 / 03.10 installed in a polypropylene sump



Installation example: polypropylene sump, dimensions specified in mm

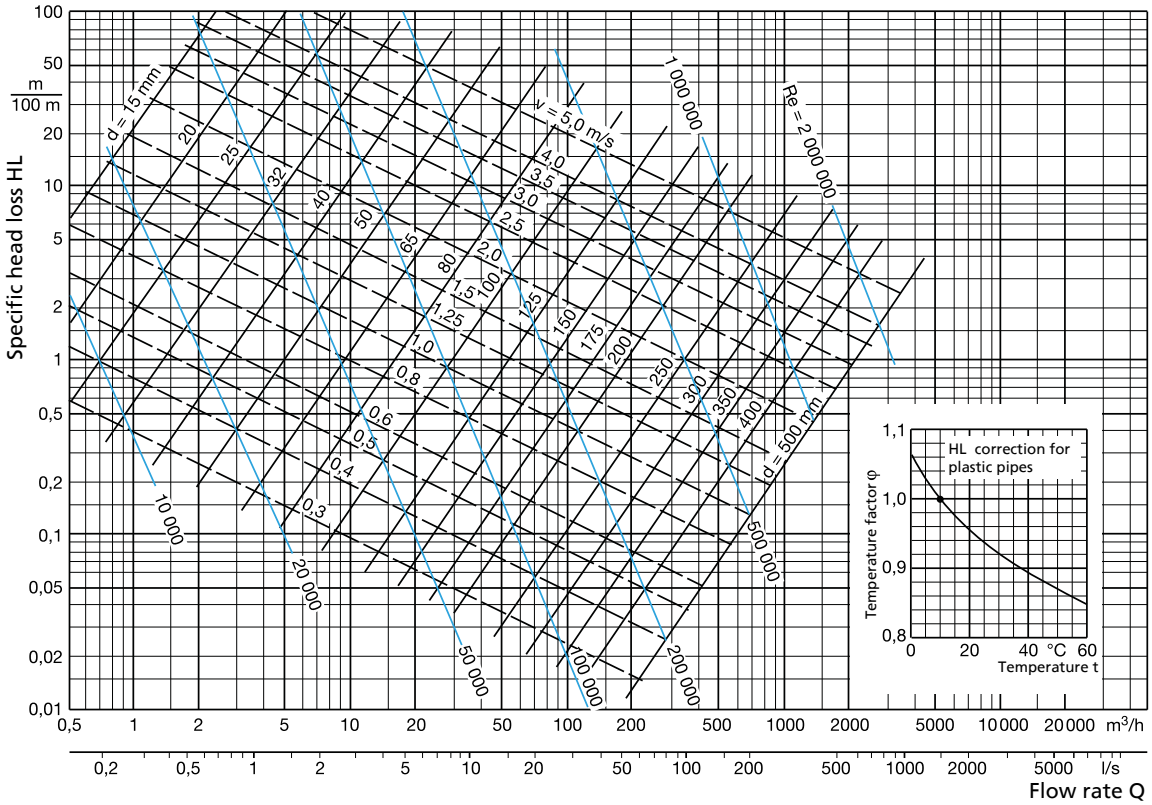
①	Sump aeration	④	Tank vent, DN 100
②	Sump vent	⑤	Inflow, DN 200
③	KG110 electric cable	⑥	Discharge line, DN 100

Overview of losses in piping, valves and fittings

Loss coefficient ζ for valves and fittings

Component	Loss coefficient ζ
Gate valve	0,5
Check valve	2,2
Bend 90°	0,5
Bend 45°	0,3
Outlet	1,0
Tee, 45°, line flow with flow combination	0,3
Tee, 90°, line flow with flow combination	0,5
Tee, 45°, branch flow with flow combination	0,6
Tee, 90°, branch flow with flow combination	1,0
Tee, 90°, counter-flow	1,3
Expansion of cross-section	0,3

Illustration of head losses for plastic and blank-drawn metal pipes



Head losses H_v for low-friction pipes (k = 0)
(For plastic pipes at t ≠ 10 °C multiply by temperature factor φ).

The "k value" used has to be corrected for the specific material. Observe the directives applicable in the corresponding region.
Example: The ATV / DWA guideline for transporting waste water in discharge lines specifies a "k value" of 0.25 mm.

Recommended spare parts stock for 2 years' operation to DIN 24296

Amarex KRT

Quantity of spare parts for recommended spare parts stock[10)]

Part No.	Description	Number of pump sets (including stand-by pumps)						
		2	3	4	5	6 and 7	8 and 9	10 and more
80-1	Motor unit	-	-	-	1	1	2	30 %
834	Cable gland	1	1	2	2	2	3	40 %
818	Rotor	-	-	-	1	1	2	30 %
230	Impeller	1	1	1	2	2	3	30 %
502	Casing wear ring	2	2	2	3	3	4	50 %
433.01	Mechanical seal, drive end	2	3	4	5	6	7	90 %
433.02	Mechanical seal, pump end	2	3	4	5	6	7	90 %
321.01 / 322	Rolling element bearing, drive end	1	1	2	2	3	4	50 %
320 / 321.02	Rolling element bearing, pump end	1	1	2	2	3	4	50 %
99-9	Set of sealing elements for the motor	4	6	8	8	9	10	100 %
99-9	Set of sealing elements for the hydraulic system	4	6	8	8	9	10	100 %

Sewabloc / Sewatec

Quantity of spare parts for recommended spare parts stock

Part No.	Description	Number of pumps (including stand-by pumps)							
		1	2	3	4	5	6	8	10 and more
163	Discharge cover	1	2	2	2	3	3	4	50 %
210	Shaft	1	1	1	2	2	2	3	30 %
230	Impeller	1	1	1	2	2	2	3	30 %
321.01/02	Rolling element bearing (set)	1	1	1	2	2	3	4	50 %
330	Bearing bracket, complete	-	-	-	-	-	-	1	2 pcs.
433.01/02	Mechanical seal, complete (set)	1	2	3	4	4	4	6	90 %
502.01	Casing wear ring	1	2	2	2	3	3	4	50 %
135	Wear plate	1	2	2	2	3	3	4	50 %
	Sealing elements (set)	2	4	6	8	8	9	12	150 %

Keeping a stock of wear and replacement parts is recommended also during the warranty period.

10) For two years of continuous operation or 17,800 operating hours

Requirements to be met by other manufacturers' control systems

Requirements to be met by other manufacturers' control systems suitable for use with the AmaDS³ solids separation system:

Functions:

- Tank drainage
- Automatic pump changeover at every start and in the case of a pump fault
- ATEX mode (with integrated dry running protection)
- Inflow-dependent starting
- Runtime limitation with forced changeover, 0 - 600 seconds
- Adjustable cut-in delay period, 0 - 300 seconds
- Adjustable after-run time, 0 - 300 seconds
- Liquid level-dependent stopping
- Connection for optional redundant emergency level control system
- Flushing cycle (functional check)
- Remote acknowledgement, external faults

Monitoring:

- Integrated alarm buzzer, 85 dB(A)
- Mains-independent rechargeable battery with charging unit for powering the electronics and the level control system (optional)
- High water alert with adjustable delay period, 0 - 600 seconds
- Motor protection: overcurrent and short-circuit protection
- General fault message (volt-free changeover contact)
- Phase failure monitoring
- Monitoring of rotary field (power supply)
- Voltage monitoring
- Sensor fault / broken wire detection
- External alarm input
- Service interval monitoring (optional)

Information displayed:

- Tank water level indication
- Traffic light LEDs signalling: operational availability, warning and alert (green/yellow/red)
- Process symbol with LEDs for pump operation/fault and high water
- Operation and status information per pump
- Operating hours per pump
- Mains voltage
- Rotary field recognition of mains power supply
- Pump starts per pump, manual-0-automatic switch per pump
- Operating panel
- Service interface: mini-USB (RS 232)

Variant:

- Control of two pumps
- Signalling module for transmitting alerts (optional)
- Signalling module for transmitting the fill level (analog) 4 - 20 mA (optional)
- Connection for level sensor 4 - 20 mA, analog
- Connection/supply to level sensor in potentially explosive atmospheres via intrinsic safety barrier (optional)
- Connection for redundant digital emergency level control system (optional)
- Motor protection via bimetal switch (1 x)/PTC relay (1 x)
- Master switch
- Sheet steel housing

Due to the system's design, parallel operation of 2 pumps is not advisable and provisions must be made to avoid it in automatic mode.

Inputs and outputs:

Digital inputs:

- 12...25.2 V DC or 230 V AC
- Motor protection via bimetal switch, 24 V DC
- Motor protection via PTC relay
- 1 x external alarm input, 24 V DC
- 1 x remote acknowledgement, 24 V DC

Digital outputs:

- 1 x volt-free signalling output, changeover contact, max. 230 V DC / 1 A
- 1 x signalling output, 12 V DC, max. 200 mA

Analog inputs:

- 4 - 20 mA (two-wire and three-wire) input resistor ≤ 300 Ohm

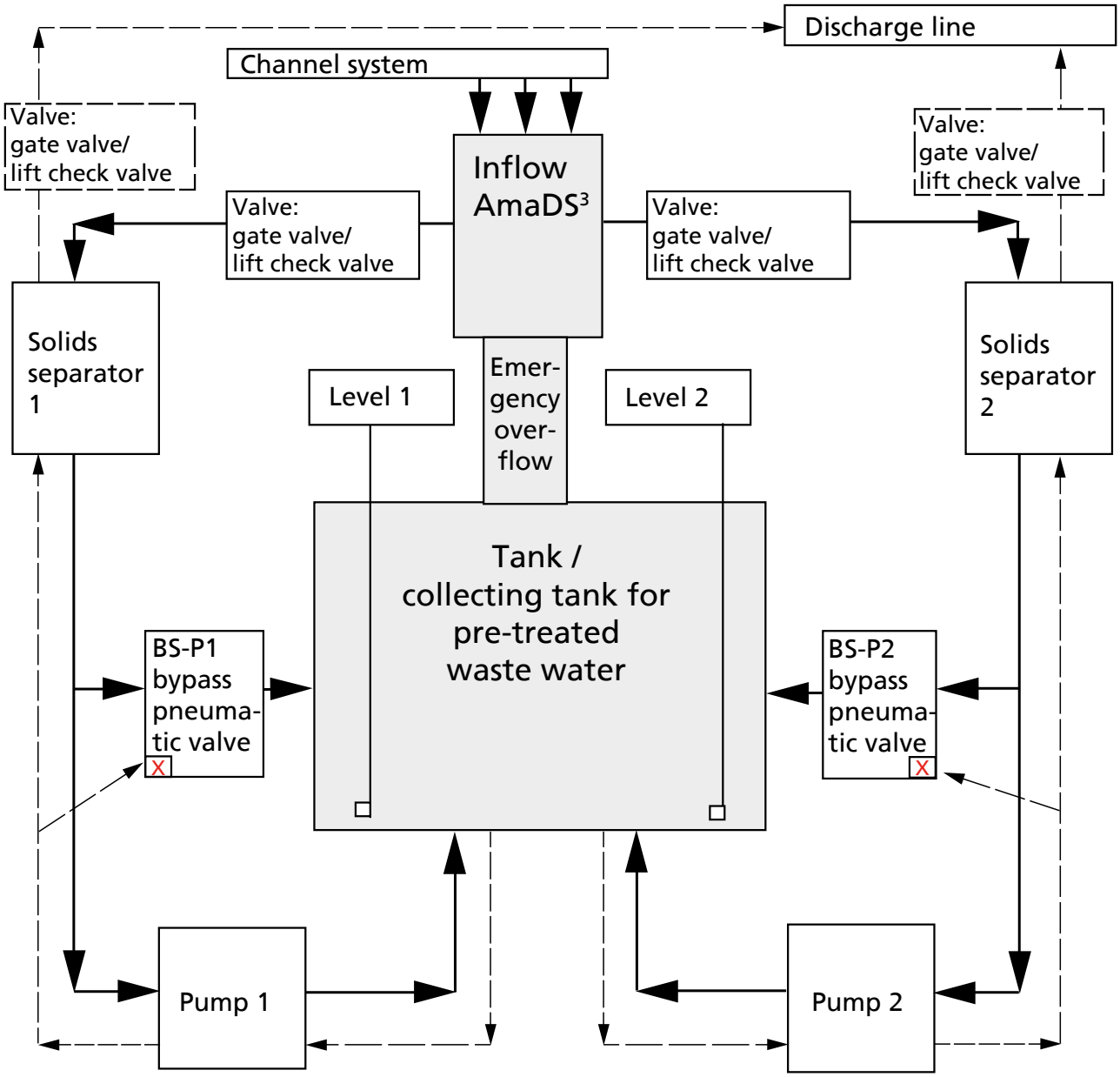
Operating data:

Operating data

	Values to be observed:
Nominal operating voltage:	3 x 400 V (L1-L2-L3-N-PE)
Mains frequency:	50 / 60 Hz
Nominal insulation voltage:	500 V AC
Starting method:	DOL/star-delta
Transmitter supply:	24 V +/- 10 %, max. impedance 200 mA DC
Temperature range:	
▪ Operation	-10 to +50 °C
▪ Storage	0 to 70 °C
Enclosure	IP 54

Electronic planning

- Detailed information for the use of a PLC-based electronic control system – if the customer does not use KSB's control system – will be submitted on request.
- Detailed information for the use of the AmaDS³ solids separation system with a pneumatically operated, bypass line installed gate valve as special accessory will be submitted on request.
- Detailed information for the use of the AmaDS³ solids separation system as a controlled-discharge pump station will be submitted on request.



Function chart

Arrows with uninterrupted line:	Inflow phase, pump is not running
Arrows with dashed line:	Operating phase, pump is running

Control functions:

- P1/P2 ON and OFF
- BS-P1 / BS-P2 ("X") CLOSED in operating phase and OPEN in inflow phase

Enquiry sheet

To:

KSB Aktiengesellschaft

Turmstraße 92

06110 Halle/Saale (Germany)

Tel.: +49 345 4826-0

Fax: +49 345 4826-4699

From:

Company name	
Contact person	
Street/number	
Post/zip code, city	
Country	
Telephone number	
Fax number	
E-mail	

Project name

Maximum inflow rate[11)]

Q [m³/h]	
Q [l/s]	

Inflow rate via upstream pump stations:

Q [m³/h]	
Q [l/s]	

Nominal diameter of inflow line:

DN [mm]	

Dimension between pipe invert and sump floor:

[mm]	

Use of AmaDS³ as:

☐ Stormwater retention tank
☐ Storage sewer
☐ Controlled-discharge pump station

Relief sump available upstream of AmaDS³?

☐ Yes
☐ No

Maximum possible inlet pressure AmaDS³ is exposed to in the event of a backflow in the intake channel (max. 5 m)

[m]	

Sketch of intake system has been provided?

☐ Yes
☐ No

Required flow rate:

Q [m³/h]	
Q [l/s]	

Nominal diameter of the discharge line:

DN [mm]	

Longitudinal section of discharge line has been provided?

☐ Yes
☐ No

Manometric head:

[m]	

Static head:

[m]	

Length of discharge line:

[m]	

Operation of AmaDS³ with compressed-air purging system?

☐ Yes
☐ No

Requirements to be met by the control system/integration of the system into the customer's process control system?

☐ Yes
☐ No

Control system is provided by the customer?

☐ Yes
☐ No

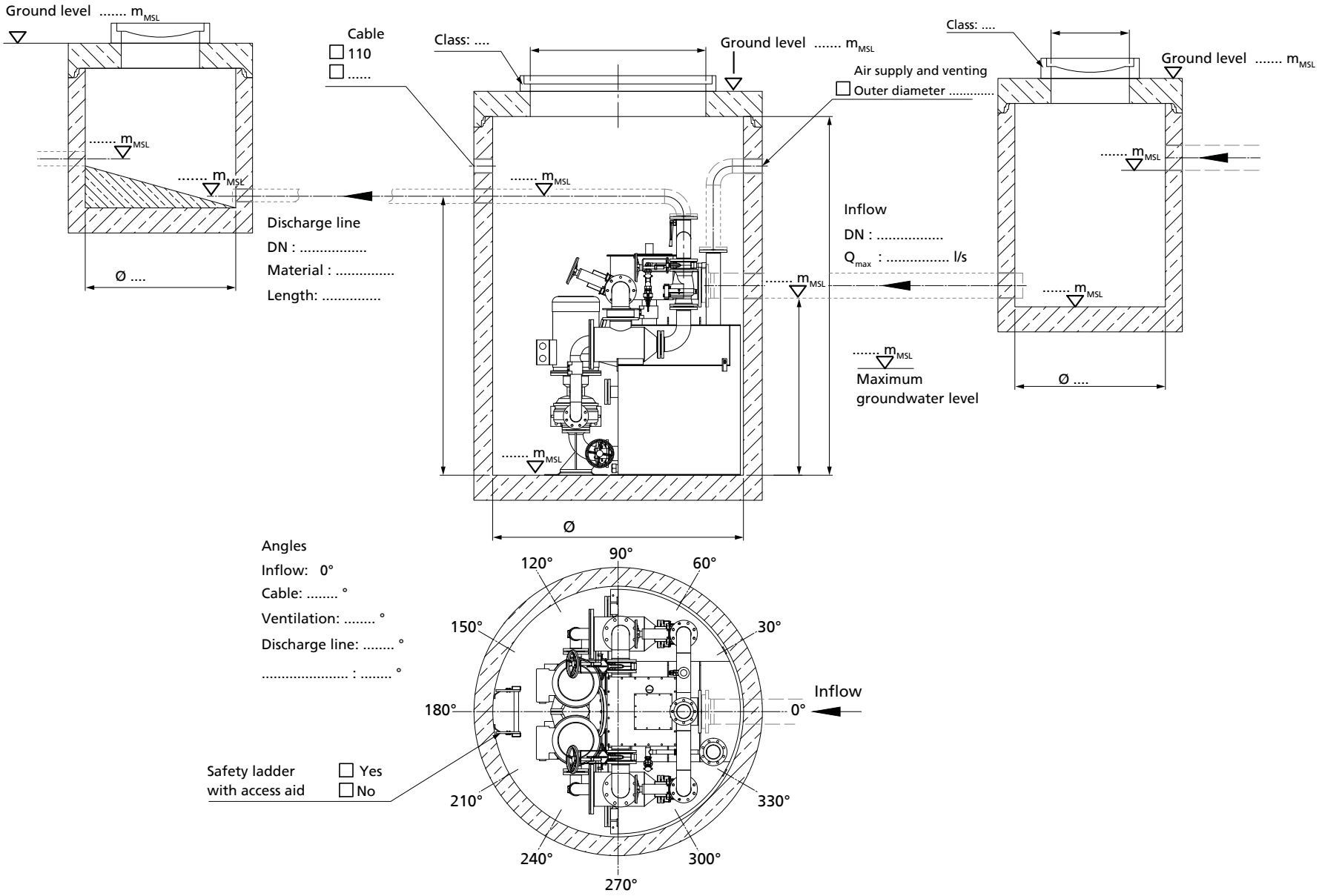
AmaDS³ control concept for customer-supplied control systems has been provided to the customer?

☐ Yes
☐ No

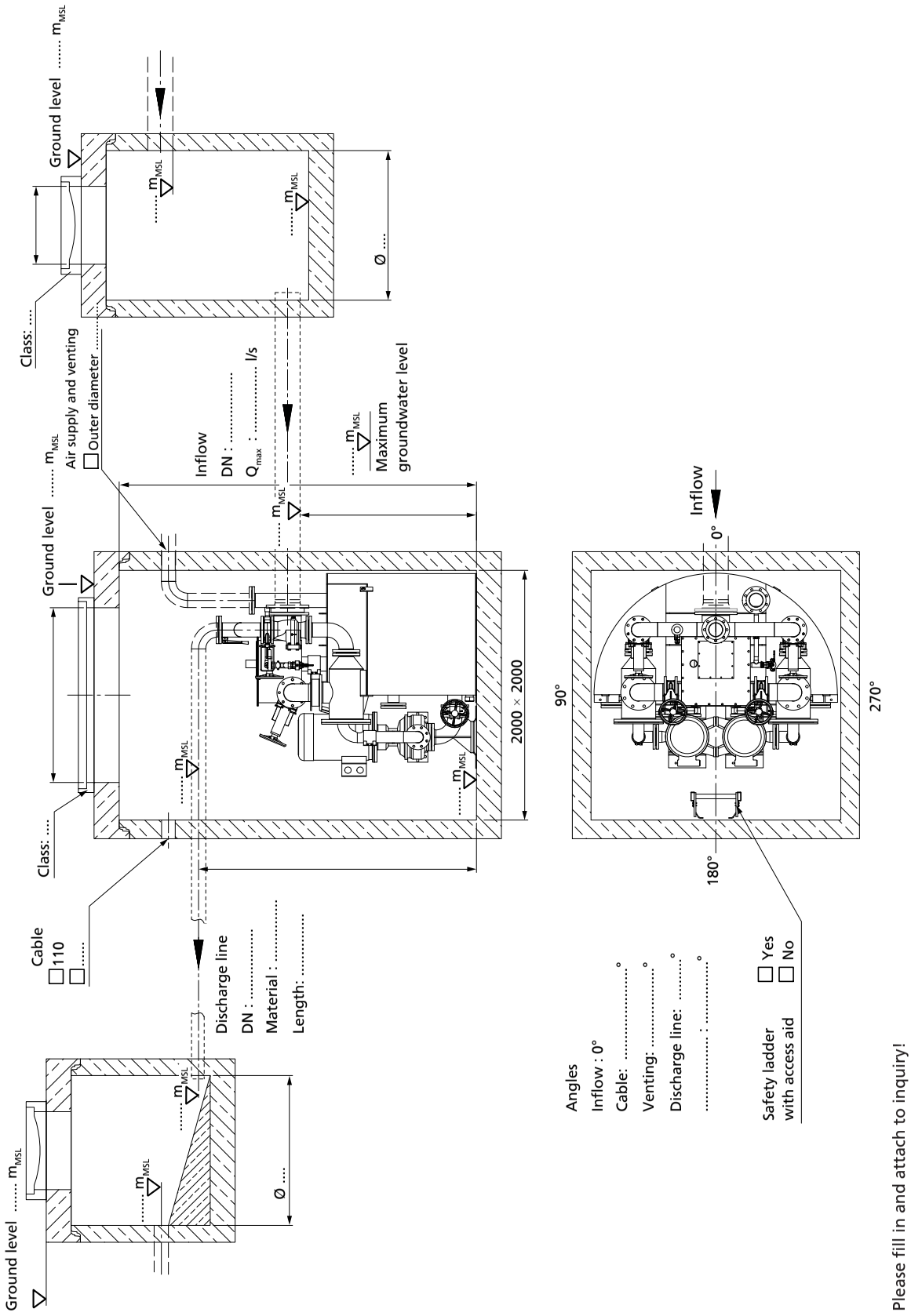
Other:

11) Reference value: PE for dry weather plus 100 % infiltration water

Quotation example



Please fill in and attach to inquiry!


Ground level ..... m_{MSL}
m_{MSL}
m_{MSL}
Ø ....
Class: ....
Air supply and venting
Outer diameter .....
Inflow
DN : .....
Q_{max} : ..... l/s
m_{MSL}
Maximum groundwater level
Ground level ..... m_{MSL}
m_{MSL}
m_{MSL}
m_{MSL}
2000 × 2000
Class: ....
Cable
☐ 110 ☐ .....
Discharge line
DN : .....
Material : .....
Length: .....
Ground level ..... m_{MSL}
m_{MSL}
m_{MSL}
Ø ....
Inflow
0°
90°
270°
180°
Angles
Inflow : 0°
Cable: ..... °
Venting: ..... °
Discharge line: ..... °
..... : ..... °
Safety ladder with access aid
☐ Yes
☐ No
Please fill in and attach to inquiry!

20.01.2016

2581.5/03-EN

KSB Aktiengesellschaft
P.O. Box 200743 • 06008 Halle (Saale) • Turmstraße 92 • 06110 Halle (Germany)
Tel. +49 345 4826-0 • Fax +49 345 4826-4699
www.ksb.com