

**Pump control systems
with infinitely variable speed adjustment
via 1 or 2 frequency converters
for max. 8 pumps**

Fields of Application

- Heating/venting/air-conditioning systems
- Water supply systems
- Drainage systems

Operating Data/Technical Information

For asynchronous motors with **motor ratings**
from **0.75 to 200 kW**
for up to **8 pumps**

and **1 or 2 frequency converters**

4-wire system

Universal ELCBs for all types of current (suitable for frequency converter) ≥ 300 mA on option

Mains voltage 3–400 V, 50 Hz

Other voltages on request

Max. voltage variations $\pm 6/-10$ % nach IEC 38

Rated short-circuit cut-out capacity ≤ 7.5 kW $I_{CN} = 4$ kA
 > 7.5 kW $I_{CN} = 50$ kA

Ambient temperature 0 to $+40$ °C max.

According to VDE 0160, 5.2.1.1, the average temperature over 24 hours must be at least 5 °C lower.

Control Modes

- p Pressure [bar]
- Δp Differential pressure [bar]
- Q Capacity [m^3/h]
- h Level [m]
- T Temperature
- ΔT Differential temperature
- T/f(Δp) Temperature, governed by differential pressure [$^{\circ}C$]
- $\Delta T/f(\Delta p)$ Differential temperature, governed by differential pressure [K]
- $\Delta p/f(T_A)$ Differential pressure, controlled by ambient temperature [bar]
- $\Delta p/f(Q)$ Differential pressure controlled by capacity function (standard: one pump in operation; on request with several pumps) [bar]
- Non-control operation, signal by external controller, only pump(s) with frequency converter, no peak load pumps
- Additive set-value increase with linear or square evaluation
- External set value

Designation

hyatronic mb 3 - 185 / 2 / A / 54

Type series _____

Number of pumps (1 - 8) _____

Power (in kW x 10) _____

1 / 2 frequency converters _____

EMC class A/B _____

Type of enclosure IP 54 / 42 / 00 _____

Function

The hyatronic mb control system can be used for pumps with asynchronous motors independent of make or type. Hyatronic mb allows open-loop and closed-loop control as well as monitoring of hydraulic systems.

Closed-loop control: The transmitters installed in the system supply the actual data to the control system, which continuously compares the actual and the set value and corrects any deviations that may occur.

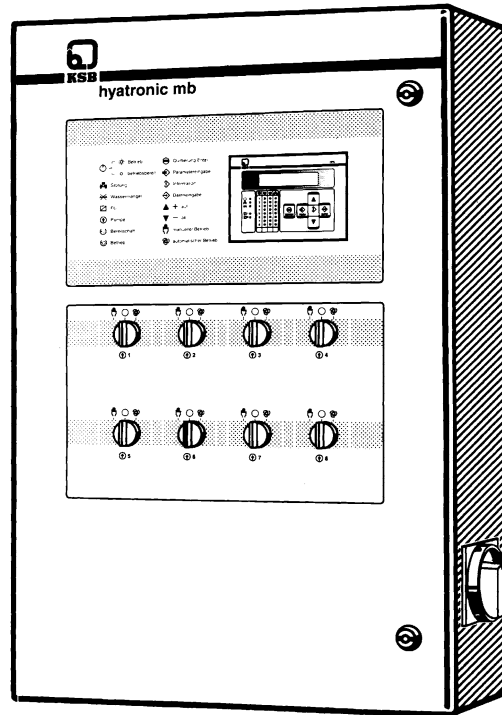
Open-loop control: The control system comprises process-inherent functions such as pump start-up or shutdown, pump changeover and stand-by. Depending on the process status, these functions are carried out automatically.

Functional check run: Pumps that have been out of service for the maximum permissible period of time, which can be set at discretion, are started up at defined intervals.

Monitoring: The electronic control system automatically monitors the system components. In case of malfunctions, the process is maintained as far as possible and faults or failures are indicated and recorded.

Modes of Operation

- Control with or without internally released load-dependent start-up of up to 7 stand-by pump(s) in case of peak load (number of pumps can be chosen)
- Externally released changeover to a second parameter set or set value
- Pump changeover at any chosen moment, released via an internal real-time clock with date indication or by an external signal
- External control of operating status
- Emergency operation without control system (manual operation)
- Automatic start-up after mains failure or lack of water (can be set)
- Fault message and recording, even in case of manual operation
- Equal distribution of pump operating hours



- Control panel with plain language LCD and status indicator board showing the operating status of the system and the pumps
- Selector switch for each pump (manual-0-automatic)
- Master switch

Wall-mounted variant

Plain language LCD

- actual and set values of the controlled variable, speed
- fault indications
- control parameters
- operating hours counter (per pump, per frequency converter and system)
- fault history including date and hour
- event memory including date and hour
- information menu

Search run direction, up

Information menu for 10 individual values

Parameter call-in for data entry

Search run direction, down

LED indication of the system's operating status

LED indication of the pumps' operating status

Enter / fault cancellation

Parameter number call-in

- | | | | | |
|--|--|---------------------|--|---------------------|
| | | Operation | | Cancellation/enter |
| | | Ready for operation | | Parameter entry |
| | | Fault | | Information |
| | | Lack of water | | Data entry |
| | | Frequency converter | | + Up |
| | | Pump | | - Down |
| | | Stand-by | | Manual operation |
| | | Operation | | Automatic operation |

Operation and Indication

① Control Unit

The microprocessor carries out all closed-loop and open-loop control, monitoring and indication functions; it is designed for digital data transmission via 2 serial interfaces. Remote general fault and operation indications via volt-free contacts (interface to central control station) as a standard. Operation and fault indication per pump on option. Independently of the number of pumps, **one or two pumps** are operated with infinitely variable speed control via frequency converter.

② Selector Switch

enables the operator to set each pump to the following operating status types:

Automatic chooses the following operating conditions for the pump concerned depending on the requirements:

- controlled base load operation
- peak load operation directly on the mains
- stand-by operation under plant part load conditions
- pump changeover for equally distributed operating hours
- start-up of a stand-by pump if an on-duty pump fails

Off Pump is switched off, not available for automatic operation

Manual Pump is operated directly on the mains, not available for automatic operation, but monitored

③ Master Switch (emergency switch-off)

for start-up and shutdown of the system (emergency switch-off under load)

④ Control Cabinet

designed for wall or floor installation depending on power rating/number of pumps, including power unit ready for connection (fuses, contactors, excess-current trip, winding temperature monitoring connection (thermal overload contact, PTC resistor) and terminals) with integrated frequency converters for infinitely variable speed control

⑤ Plain Language Display (illuminated)

- 2 lines, each with 20 signs
- back-lit

Basic Equipment

Housing and Internals

The design is according to VDE 0660, part 500/EN 60 439 part 1, VDE 0113/DIN EN 60 204, DIN VDE 0470/IEC 70/VBG 4; EN 50 081 and EN 50 082.

Make and components to our choice.

- Sheet steel cabinet housing RAL 7032, for indoor installation (if IP 00 provided on site), for type of enclosure see tables on pages 9 pp
- Master switch (power circuit breaker), lockable (if IP 00 provided on site)
- Control cabinet ventilation system (if IP 00 provided on site)
- One frequency converter
- Control transformer 230 V AC, 18 V AC
- Modular unit with KSB microprocessor control unit with universal digital PI controller (fitted in the door of the control cabinet)
- Selector switch for mode of operation per pump (fitted in the door)
- 1 motor protection switch per motor or motor protection relay and fuses
- 1 contactor combination per motor
- Terminal strips for connection to mains, motor, signal transmitter
- Cable inlets and outlets from below

Functions and Indications of the Control Unit

- 2 parameter sets, each with 2 set values
- Externally released parameter set change
- Internally released set value change via integrated real-time clock (time and date)
- Internally and/or externally controlled pump changeover
- Restriction of the max. permissible number of pumps (i.e. emergency operation, peak load operation)
- Equal distribution of operating hours for all pumps (shutdown dependent on the pump's operating hours, start-up dependent on the pump's standstill time)
- Functional check run of the system (real time, duration and waiting time between pump operation can be adjusted individually (mains operation))
- Life-zero monitoring of the measurement signals; in case of failure: indication, general fault indication and shutdown of the system (programmable)
- Changeover in case of failure of the pump unit to another pump (if provided for)
- Changeover in case of failure of the frequency converter: the pumps are connected to the mains or a second frequency converter
- Overcurrent monitoring of the units
- External set value definition possible
- PC interface RS 232/485
- Pipe rupture recognition (by the software): if, after a programmed period of time, the set value of the system is not reached, the system can be shut down automatically
- Minimum and maximum speeds of the controlled pumps can be set
- Offset of control unit ramp end can be adjusted; thus set value will be reached earlier
- Optimization of the control unit characteristic curve due to square function and allocation of a supplementary point of support

Indication

- Back-lit two-line display
- Language selection: international setting English plus a national language (German, French, Italian, Spanish etc.)
- Parameterization of the control unit via display and keys (PC parameterization kit HPC for RS 232/485 interfaces on option)
- Menu-driven display
- Individually configured information menu with 10 parameters
- Indication of the operating parameters (set/actual speed) in the summary menu
- Plain language description of the parameters and messages
- Status indicator board showing the system and the pump status

- Indication of the operating hours of the complete system, of each pump and each frequency converter
- Data memory: recording of all malfunctions (100) and events (100), including date and hour

Analog Inputs (Multifunctional Inputs)

3 analog inputs, can be set on voltage or current via DIL switch

- Voltage: $R_U = 10 \text{ k}\Omega$
- Current: $R_I = 250 \Omega$

Internal 24 V DC transmitter supply max. 300 mA for all 3 transmitters

Digital Inputs

Internal 24 V DV supply

- Manual-ON-OFF (system)
- Remote cancellation (reset of the general fault indication relay)
- Parameter set change
- Externally released pump changeover
- Inlet monitoring (lack of water, paddle switch, flow control device etc.)
- Limitation of peak load pumps

Digital Outputs

Relay outputs 250 V AC, 2.5 A

- General fault indication as changeover contact
- General operation indication as changeover contact

Interfaces

RS 232/485, D-Sub 9 female

Safety Concept for the Complete System

Monitoring the pumps and the hydraulic system

- Overcurrent monitoring
- Integral motor protection by means of PTC thermistors or bimetal switches in case of automatic operation, monitoring and indication in case of manual operation
- Dry-running protection

Reactions in case of failure

- Changeover to the stand-by pump in case of failure of the pump unit in operation
- Changeover in case of failure of a frequency converter: changeover of the motors to mains operation or shutdown of all pumps, changeover to a second frequency converter (if fitted)
- Life-zero measurement signal monitoring (4-20 mA) or (2-10 V). In case of failure of the measurement signal: message for the relevant analog input fault contact or plant shutdown (parameters can be set).

Protection measures to avoid malfunctions/failures

- Pump changeover
- Functional check run

Variants on Request

- Other voltages
- Higher performance data
- Additional messages to the central control station
- Higher-grade type of enclosure
- Soft starter
- Other components
- Modem link in preparation

Supplementary Equipment (Options)

Indication and operation (equipment fitted in the door)

- Ammeter per pump
- Voltmeter with phase converter for the entire system.

Messages to the control station via terminal strips

- Volt-free, max. 250 V AC, max. 8 A

Control cabinet equipment

- 2 frequency converters
- Multi-coupler for analog inputs: (recommended for cable lengths of 100 m and above) and/or
 - signal transmission to the control station,
 - cable cross-section of min. 1.5 mm², shielded,
 - auxiliary energy for transmitter 24 V DC external (required for cables > 100 m)

Planning Information

Special VDE and EVU directives as well as local regulations must be respected.

Measurement and control cables

Actual value transmitter, 3-wire system	3 x 0.75 mm ²	shielded	max. 100 m, see Supplementary Accessories
Actual value transmitter, 2-wire system	2 x 0.75 mm ²	shielded	max. 100 m, see Supplementary Accessories
PTC thermistor or bimetal switch per motor	2 x 0.75 mm ²	shielded	
Cables to the control station, digital (24 V DC) x 0.75 mm ²	shielded	
Cables to the control station, digital (230 V DC) x 0.75 mm ²		
Cables to the control station, analog (0/2-10 V or 0/4-20 mA) x 0.75 mm ²	shielded	max. 100 m, see Supplementary Accessories

Connection Requirements: 3-400 V / 50 Hz

hyatronic mb	Max. rated motor current in A	Total rated apparent power in kVA (control cabinet supply) Number of pumps										Example motor cables 1) in mm ² for 30 m	Starting method	Max. achievable interference suppression class for ordered variant	
		1	2	3	4	5	6	7	8	Variant 1 A	Variant 1 B				
7	2.4	1.7	3.4	5.1	6.8	8.5	10.2	11.9	13.6	4x1.5	unshielded	direct	Variant 1 A	Variant 1 B	
11	2.8	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	4x1.5	unshielded	direct	Variant 1 A	Variant 1 B	
15	4.0	2.8	5.6	8.4	11.2	14.0	16.8	19.6	22.4	4x1.5	unshielded	direct	Variant 1 A	Variant 1 B	
22	5.6	3.9	7.8	11.7	15.6	19.5	23.4	27.3	31.2	4x1.5	unshielded	direct	Variant 1 A	Variant 1 B	
30	7.3	5.1	10.2	15.3	20.4	25.5	30.6	35.7	40.8	4x1.5	unshielded	direct	Variant 1 A	Variant 1 B	
40	9.7	6.8	13.6	20.4	27.2	34.0	40.8	47.6	54.4	4x1.5	unshielded	direct	Variant 1 A	Variant 1 B	
55	13	9.1	18.2	27.3	36.4	45.5	54.6	63.7	72.8	2x4x1.5	shielded	YΔ	Variant 1 A	Variant 1 B	
75	16	11.2	22.4	33.6	44.8	56.0	67.2	78.4	89.6	2x4x1.5	shielded	YΔ	Variant 1 A	Variant 1 B	
110	24	16.7	33.4	50.1	66.8	83.5	100.1	116.9	133.6	2x4x2.5	shielded	YΔ	Variant 1 A	Variant 1 B	
150	32	22.2	44.4	66.6	88.8	111.0	133.2	155.4	177.6	2x4x4	shielded	YΔ	Variant 1 A	Variant 1 B	
185	36	25.0	50.0	75.0	100.0	125.0	150.0	175.0	200.0	2x4x4	shielded	YΔ	Variant 1 A	Variant 1 B	
220	44	30.5	61.0	91.5	122.0	152.5	183.0	213.5	244.0	2x4x6	shielded	YΔ	Variant 1 A	Variant 1 B	
300	61	42.3	84.6	126.9	169.2	211.5	253.8	296.1	338.4	2x4x10	shielded	YΔ	Variant 1 A	Variant 1 B	
370	73	50.6	101.2	151.8	202.4	253.0	303.6	354.2	404.8	2x4x16	shielded	YΔ	Variant 1 A	Variant 1 B	
450	88	61.0	122.0	183.0	244.0	305.0	366.0	427.0	488.0	2x4x16	shielded	YΔ	Variant 1 A	Variant 1 B	
550	105	72.8	145.6	218.4	291.2	364.0	436.8	509.6	582.4	2x4x25	shielded	YΔ	Variant 1 A	Variant 1 B	
750	139	96.4	192.8	289.2	385.6	482.0	578.4	674.8	771.2	2x4x35	shielded	YΔ	Variant 1 A	Variant 1 B	
900	168	116.4	232.8	349.2	465.6	582.0	698.4	814.8	931.2	2x4x50	shielded	YΔ	Variant 1 A	Variant 1 B	
1110	205	142.1	284.2	426.3	568.4	710.5	852.6	994.7	1136.8	on request		YΔ	Variant 1 A	Variant 1 B	
1320	243	168.4	336.8	505.2	673.6	842.0	1010.4	1178.8	1347.2	on request		YΔ	Variant 1 A	Variant 1 B	
1600	288	199.6	399.2	598.8	798.4	998.0	1197.6	1397.2	1596.8	on request		YΔ	Variant 1 A	Variant 1 B	
2000	368	255.0	510.0	765.0	1020.0	1275.0	1530.0	1785.0	2040.0	on request		YΔ	Variant 1 A	Variant 1 B	

1) Selection of the minimum cross-section, see Supplement 1 to DIN VDE 0100 part 430; current-carrying capacity of cables and conductors with PVC insulation, installation mode B2 for ambient temperatures of 30 °C

Earth Leakage Circuit Breaker (ELCB)

ELCBs switch off electrical apparatus within 0.2 seconds if, due to an insulation fault, a dangerous contact voltage is created. ELCBs are designed for different rated leakage currents.

Variants with tripping currents of 30 mA also protect human beings.

In case of higher tripping currents, protection against fire caused by leakage currents is predominant.

Apparatus with rectifier circuits (i.e. frequency converters) where, in case of fault, direct leakage currents may occur must not be installed after ELCBs. A direct leakage current might affect or even totally destroy the protective effect of the ELCB. Furthermore, interference suppression filters fitted in these apparatus might cause random triggering caused by capacitive discharge currents against PE.

Control units equipped with such devices should always precede the ELCB in the mains supply line (protection by earthed neutral or earthed conductor). In some cases, modern universal ELCBs for all types of current (type B) can be used (Siemens, ABB).

The required protective measure depends on the local conditions and must be taken into account in the planning phase.

Mains-dependent Protective Measures

Mains-dependent protective measures make use of the non-fused earthed conductor. The non-fused earthed contactor (PE) is connected to the inactive bodies of electrical apparatus. Non-fused earthed contactors and PEN conductors are marked green-yellow.

In case of fault, mains-dependent protective measures effect switch-off via preceding overcurrent protection devices and/or a fault message in the IT net.

Planning Information for IP 00 Variants

Leakage power (IP 00); for determination of the ventilator power (heat dissipation)

The leakage power is calculated on the basis of the individual values stated in the table below and by means of the following formula:

$$P_{V \text{ total mbx}} = m \cdot P_{V \text{ FU}} + n \cdot P_{V \text{ motor}} + P_{V \text{ control}} + P_{V \text{ transformateur}} \text{ [W]}$$

m = number of frequency converters (1 or 2)

n = number of pumps or motors (1 to 8)

hyatronic mb	$P_{V \text{ FC}}$ [W]	$P_{V \text{ motor}}$ [W]	$P_{V \text{ control}}$ [W]	$P_{V \text{ trafo}}$ [W]	hyatronic mb	$P_{V \text{ FC}}$ [W]	$P_{V \text{ motor}}$ [W]	$P_{V \text{ control}}$ [W]	$P_{V \text{ trafo}}$ [W]
7	60	5	10	15	220	880	24	10	20
11	65	5	10	15	300	1400	30	10	30
15	80	5	10	15	370	1900	36	10	30
22	115	5	10	15	450	2200	40	10	30
30	155	5	10	15	550	1100	48	10	30
40	200	7	10	15	750	1500	60	10	50
55	280	16	10	15	900	1900	72	10	50
75	300	16	10	20	1110	2300	85	10	50
110	425	20	10	20	1320	3100	100	10	70
150	580	20	10	20	1600	3700	120	10	70
185	880	24	10	20	2000	4500	145	10	70



For compliance with the interference suppression class, measures must be in line with the EMC regulations.

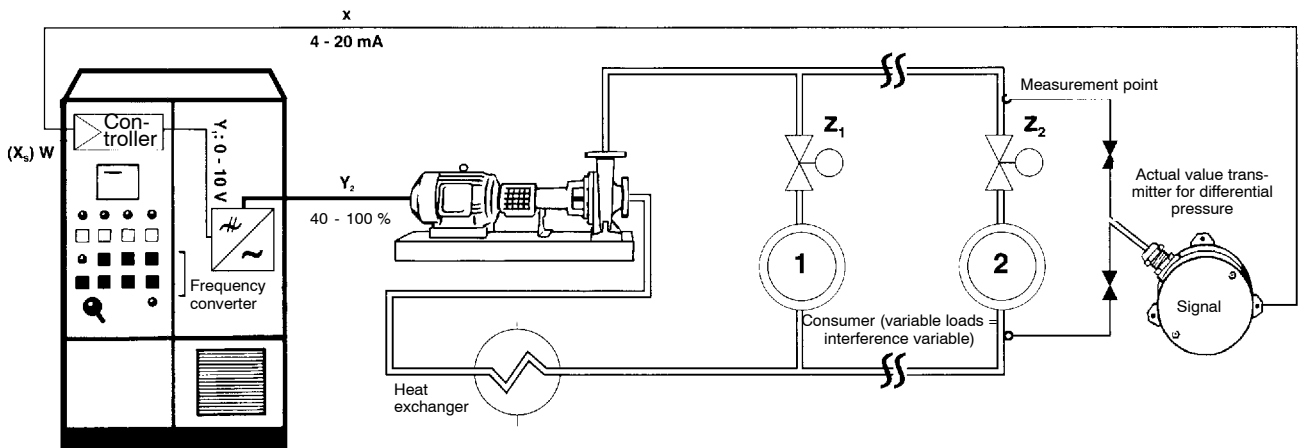
Such measures include for example:

- Star-earthing of all supplementary components and equipment.
- The control cabinet, all supplementary components and equipment, the baseplate or components fitted in the control cabinet door must fulfill the EMC requirements of the desired interference suppression class (A/B).
- A good large-area electrical connection must be ensured between the IP 00 mounting plate and the control cabinet door.

Note:

The implementation of and compliance with EMC standards falls within the responsibility of the control cabinet manufacturer.

Example: Heat Supply



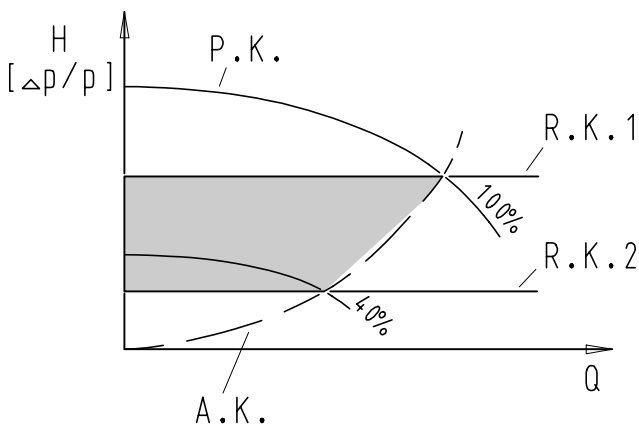
Advantages:

- ☞ Avoiding excessive pressure => saving energy
- ☞ Reducing wear of mechanical components
- ☞ Reducing load on the mains by reduced starting currents
- ☞ Smooth starting and shut-down of the pumps connected to the frequency converter
- ☞ Reducing hydraulic reactions
- ☞ Saving power
- ☞ Noise reduction

Typical Control Modes

● **Differential pressure or pressure controlled $\Delta p/p$ const**

Transmitters required: differential pressure transmitters/pressure transmitters

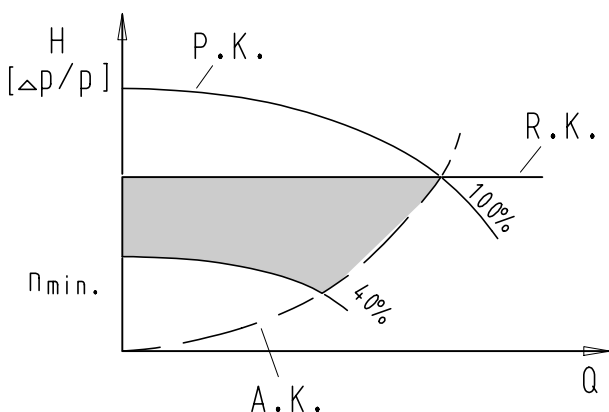


Reduced speed operation with changeover to second set value

In systems with one or more pumps the internal clock can be used to trigger changeover to a second set value (i.e. summer/winter operation). Thus, system-induced load changes are controlled. The changeover from set value 1 to 2 results in control curve (R.K.) 2.

Advantage:

- Better match between performance and requirements



Reduced speed operation (with base load): $n_{min} = const.$

Systems with one or more pumps set to base load operation (only one pump in operation) can be operated at a reduced speed with $n_{min} = const.$, if a second set value is set to "zero". Changeover is triggered by the internal clock.

Application: heating systems with reduced speed operation at night

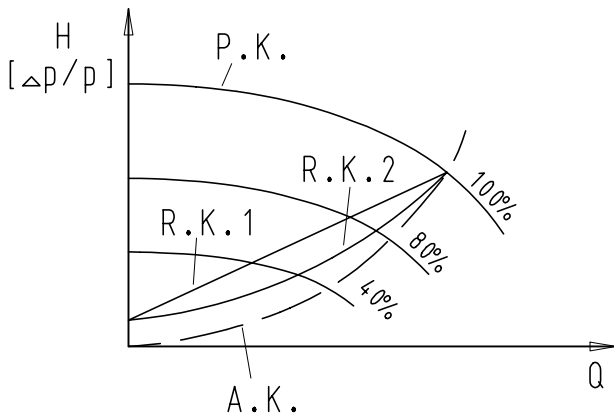
Advantages:

- Energy savings
- Reduced flow noise

● **Differential pressure governed by flow rate function**
 $\Delta p/p$ variable

Only possible for one-pump systems!

Transmitters required: differential pressure transmitters/pressure transmitters



In one-pump systems a flow rate-dependent signal is fed back internally, a flowmeter is not required. Load changes are compensated by way of linear (R.K.1) or square (R.K.2) adjustment.

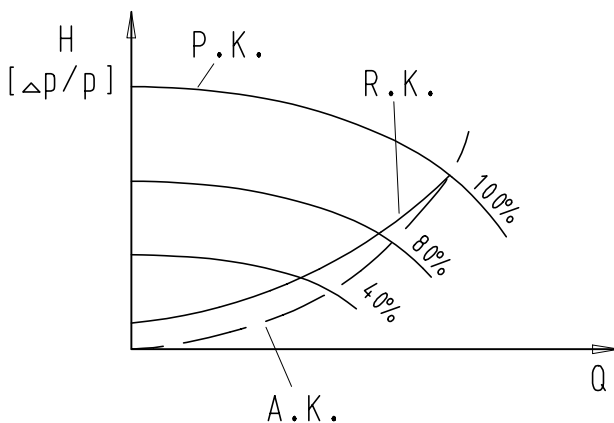
Advantages:

- Variable setting of pressure level
- The differential pressure transmitter can be fitted directly on the pump.
- No supplementary flow transmitter is required.
- Optimum adjustment to the plant requirements.

● **Differential pressure governed by the flow rate**
 $\Delta p/p$ variable

For multiple pump systems!

Transmitters required: differential pressure transmitters and flow transmitters



Optimized DFS* characteristic curve

* Pressure control with flow rate-dependent set value re-adjustment

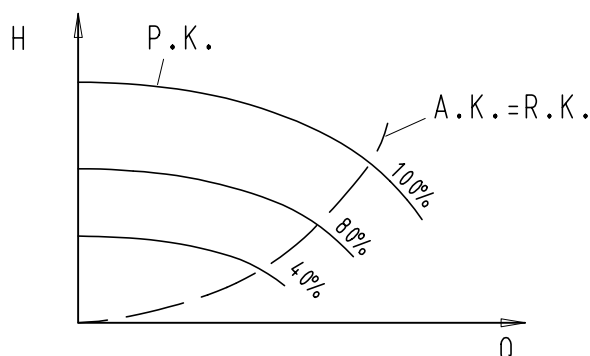
Measuring the flow rate compensates the dynamic pipeline losses and a square adjustment to the requirement is achieved for systems with throttling behaviour (control characteristic curve).

Advantages:

- Variable setting of the pressure level.
- The differential pressure transmitter can be fitted directly on the pump.
- Optimized adjustment to the system requirements.

● **Temperature control or differential temperature control**
 $T/\Delta T$ variable

Transmitters required: differential pressure transmitters and temperature sensor



Temperature control

In systems with one or more pumps the downstream, upstream and/or differential temperature can be controlled. This control mode should be preferably used for systems without throttling behaviour (i.e. heat exchanger).

Advantages:

- Variable speed adjustment .

One-pump System, 3~400 V, 50 Hz, 1 Frequency Converter

hyatronic mb	Rated motor power	Max. rated motor current in A	Sinus filter	Control cabinet (standard)	Weight (standard)		Dimensions H x W x D ≈mm
	P ₂ in kW			IP **)	Control cabinet ≈ kg	IP 00 ≈kg	
1 - 7	0.75 *)	2.1	■	54	55	45	800 x 600 x 250
1 - 11	1.1 *)	3.0	■	54	55	45	800 x 600 x 250
1 - 15	1.5 *)	3.7	■	54	55	45	800 x 600 x 250
1 - 22	2.2 *)	5.2	■	54	55	45	800 x 600 x 250
1 - 30	3.0 *)	7.0	■	54	55	45	800 x 600 x 250
1 - 40	4.0 *)	9.1	■	54	55	45	800 x 600 x 250
1 - 55	5.5	13	□	54	95	80	1000 x 800 x 300
1 - 75	7.5	16	□	54	95	80	1000 x 800 x 300
1 - 110	11	24	□	54	125	115	1200 x 800 x 400
1 - 150	15	32	□	54	130	120	1200 x 800 x 400
1 - 185	18.5	37.5	□	54	140	130	1200 x 800 x 400
1 - 220	22	44	□	54	155	145	1200 x 800 x 400
1 - 300	30	61	□	54	220	180	1800 x 800 x 400
1 - 370	37	73	□	54	260	210	1800 x 1200 x 400
1 - 450	45	90	□	54	370	290	2000 x 1200 x 500
1 - 550	55	106		42	610	460	2000 x 1800 x 500
1 - 750	75	147		42	730	580	2000 x 1800 x 500
1 - 900	90	177		42	on request	on request	2000 x 2000 x 600
1 - 1100	110	212		42	on request	on request	on request
1 - 1320	132	260		42	on request	on request	on request
1 - 1600	160	315		42	on request	on request	on request
1 - 2000	200	368		42	on request	on request	on request

*) Direct starting up to and incl. 4 kW, star-delta starting for 5.5 kW and above

■ standard

***) The use of accessories such as ammeters and voltmeters reduces the type of enclosure to IP 42. For systems > 45 kW the type of enclosure is reduced to IP 42; on request, type of enclosure up to IP 54.

□ available on option

● **Protection against mains feedback as a standard**, according to VDE 53 112

● **Sinus filter** as output filter of the frequency converter

Advantages: reduced motor noise,
reduced load on the motor insulation,
reduced radio interference.

● **EMC** (electro-magnetic compatibility)

Standard:

- **Emission: EN 55011/CISPR 11, group 1, class A;**

for installations in **industrial zones**. In Germany, the use of class A in residential areas is **prohibited**.

Where required, available **on option:**

- **Emission: EN 55011/CISPR 11, group 1, class B;**

for installations in **residential areas**. For use in hospitals, hotels etc., KSB recommends class B.

- **Immunity IEC Serie 801**

● **Housing**

Wall mounting:

up to height = 1200 mm

Floor installation:

height = 1800 mm and above, without support

IP 00:

Height and width reduced by approx. 50 mm each for wall mounting and by approx. 100 mm for floor installation.

Depth: at least the depth of the control cabinet variant.

Standard door plate for selector switch, control panel and options.

Height: 680 mm, width: 500 mm, with cable tree of approx. 3 m length

2-pump System, 3~400 V, 50 Hz, 1 Frequency Converter

hyatronic mb	Rated motor power	Max. rated motor current in A	Sinus filter	Control cabinet (standard) IP **)	Weight (standard)		Dimensions H x W x D ≈mm
	P ₂ in kW				Control cabinet ≈ kg	IP 00 ≈kg	
2 - 7	0.75 *)	2.1	■	54	60	50	800 x 600 x 250
2 - 11	1.1 *)	3.0	■	54	60	50	800 x 600 x 250
2 - 15	1.5 *)	3.7	■	54	60	50	800 x 600 x 250
2 - 22	2.2 *)	5.2	■	54	60	50	800 x 600 x 250
2 - 30	3.0 *)	7.0	■	54	60	50	800 x 600 x 250
2 - 40	4.0 *)	9.1	■	54	60	50	800 x 600 x 250
2 - 55	5.5	13	□	54	100	80	1000 x 800 x 300
2 - 75	7.5	16	□	54	100	80	1000 x 800 x 300
2 - 110	11	24	□	54	130	120	1200 x 800 x 400
2 - 150	15	32	□	54	135	125	1200 x 800 x 400
2 - 185	18.5	37.5	□	54	145	135	1800 x 800 x 400
2 - 220	22	44	□	54	225	150	1800 x 800 x 400
2 - 300	30	61	□	54	265	195	1800 x 1000 x 400
2 - 370	37	73	□	54	350	230	1800 x 1000 x 400
2 - 450	45	90	□	54	430	350	2000 x 1200 x 500
2 - 550	55	106		42	650	500	2000 x 1200 x 500
2 - 750	75	147		42	770	620	2000 x 1800 x 500
2 - 900	90	177		42	on request	on request	2000 x 2000 x 600
2 - 1100	110	212		42	on request	on request	on request
2 - 1320	132	260		42	on request	on request	on request
2 - 1600	160	315		42	on request	on request	on request
2 - 2000	200	368		42	on request	on request	on request

*) Direct starting up to and incl. 4 kW, star-delta starting for 5.5 kW and above

■ standard

**) The use of accessories such as ammeters and voltmeters reduces the type of enclosure to IP 42.

□ available on option

For systems > 45 kW the type of enclosure is reduced to IP 42; on request, type of enclosure up to IP 54.

● **Protection against mains feedback as a standard**, according to VDE 53 112

● **Sinus filter** as output filter of the frequency converter

Advantages: reduced motor noise,
reduced load on the motor insulation,
reduced radio interference.

● **EMC** (electro-magnetic compatibility)

Standard:

- **Emission: EN 55011/CISPR 11, group 1, class A;**

for installations in **industrial zones**. In Germany, the use of class A in residential areas is **prohibited**.

Where required, available **on option**:

- **Emission: EN 55011/CISPR 11, group 1, class B;**

for installations in **residential areas**. For use in hospitals, hotels etc., KSB recommends class B.

- **Immunity** IEC Serie 801

● **Housing**

Wall mounting: up to height = 1200 mm

Floor installation: height = 1800 mm and above, without support

IP 00: Height and width reduced by approx. 50 mm each for wall mounting and by approx. 100 mm for floor installation.

Depth: at least the depth of the control cabinet variant.

Standard door plate for selector switch, control panel and options.

Height: 680 mm, width: 500 mm, with cable tree of approx. 3 m length

3-pump System, 3~400 V, 50 Hz, 1 Frequency Converter

hyatronic mb	Rated motor power	Max. rated motor current in A	Sinus filter	Control cabinet (standard)	Weight (standard)		Dimensions H x W x D ≈mm
	P ₂ in kW			IP **)	Control cabinet ≈ kg	IP 00 ≈kg	
3 - 7	0.75 *)	2.1	■	54	70	60	1000 x 600 x 250
3 - 11	1.1 *)	3.0	■	54	70	60	1000 x 600 x 250
3 - 15	1.5 *)	3.7	■	54	70	60	1000 x 600 x 250
3 - 22	2.2 *)	5.2	■	54	70	60	1000 x 600 x 250
3 - 30	3.0 *)	7.0	■	54	70	60	1000 x 600 x 250
3 - 40	4.0 *)	9.1	■	54	70	60	1000 x 600 x 250
3 - 55	5.5	13	□	54	120	100	1200 x 800 x 300
3 - 75	7.5	16	□	54	120	100	1200 x 800 x 300
3 - 110	11	24	□	54	265	165	1800 x 800 x 400
3 - 150	15	32	□	54	310	170	1800 x 1000 x 400
3 - 185	18.5	37.5	□	54	315	175	1800 x 1000 x 400
3 - 220	22	44	□	54	320	180	1800 x 1000 x 400
3 - 300	30	61	□	54	345	262	1800 x 1200 x 400
3 - 370	37	73	□	54	450	370	2000 x 1200 x 500
3 - 450	45	90	□	54	510	430	2000 x 1200 x 500
3 - 550	55	106		42	760	610	2000 x 1800 x 500
3 - 750	75	147		42	880	730	2000 x 2000 x 500
3 - 900	90	177		42	on request	on request	2000 x 2600 x 600
3 - 1100	110	212		42	on request	on request	on request
3 - 1320	132	260		42	on request	on request	on request
3 - 1600	160	315		42	on request	on request	on request
3 - 2000	200	368		42	on request	on request	on request

*) Direct starting up to and incl. 4 kW, star-delta starting for 5.5 kW and above

■ standard

***) The use of accessories such as ammeters and voltmeters reduces the type of enclosure to IP 42. For systems > 45 kW the type of enclosure is reduced to IP 42; on request, type of enclosure up to IP 54.

□ available on option

● **Protection against mains feedback as a standard**, according to VDE 53 112

● **Sinus filter** as output filter of the frequency converter

Advantages: reduced motor noise,
reduced load on the motor insulation,
reduced radio interference.

● **EMC** (electro-magnetic compatibility)

Standard:

- **Emission: EN 55011/CISPR 11, group 1, class A;**

for installations in **industrial zones**. In Germany, the use of class A in residential areas is **prohibited**.

Where required, available **on option:**

- **Emission: EN 55011/CISPR 11, group 1, class B;**

for installations in **residential areas**. For use in hospitals, hotels etc., KSB recommends class B.

- **Immunity** IEC Serie 801

● **Housing**

Wall mounting:

up to height = 1200 mm

Floor installation:

height = 1800 mm and above, without support

IP 00:

Height and width reduced by approx. 50 mm each for wall mounting and by approx. 100 mm for floor installation.

Depth: at least the depth of the control cabinet variant.

Standard door plate for selector switch, control panel and options.

Height: 680 mm, width: 500 mm, with cable tree of approx. 3 m length

4-pump System, 3~400 V, 50 Hz, 1 Frequency Converter

hyatronic mb	Rated motor power	Max. rated motor current in A	Sinus filter	Control cabinet (standard) IP **)	Weight (standard)		Dimensions H x W x D ≈mm
	P ₂ in kW				Control cabinet ≈ kg	IP 00 ≈kg	
4 - 7	0.75 *)	2.1	■	54	75	65	1000 x 600 x 250
4 - 11	1.1 *)	3.0	■	54	75	65	1000 x 600 x 250
4 - 15	1.5 *)	3.7	■	54	75	65	1000 x 600 x 250
4 - 22	2.2 *)	5.2	■	54	75	65	1000 x 600 x 250
4 - 30	3.0 *)	7.0	■	54	75	65	1000 x 600 x 250
4 - 40	4.0 *)	9.1	■	54	75	65	1000 x 600 x 250
4 - 55	5.5	13	□	54	125	105	1200 x 800 x 300
4 - 75	7.5	16	□	54	125	105	1200 x 800 x 300
4 - 110	11	24	□	54	310	235	1800 x 1000 x 400
4 - 150	15	32	□	54	345	270	1800 x 1200 x 400
4 - 185	18.5	37.5	□	54	350	275	1800 x 1200 x 400
4 - 220	22	44	□	54	450	375	2000 x 1800 x 500
4 - 300	30	61	□	54	520	420	2000 x 1800 x 500
4 - 370	37	73	□	54	630	530	2000 x 1800 x 500
4 - 450	45	90	□	54	740	590	2000 x 1800 x 500
4 - 550	55	106		42	870	720	2000 x 2200 x 500
4 - 750	75	147		42	990	840	2000 x 2200 x 500
4 - 900	90	177		42	on request	on request	on request
4 - 1100	110	212		42	on request	on request	on request
4 - 1320	132	260		42	on request	on request	on request
4 - 1600	160	315		42	on request	on request	on request
4 - 2000	200	368		42	on request	on request	on request

*) Direct starting up to and incl. 4 kW, star-delta starting for 5.5 kW and above

■ standard

**) The use of accessories such as ammeters and voltmeters reduces the type of enclosure to IP 42.

□ available on option

For systems > 45 kW the type of enclosure is reduced to IP 42; on request, type of enclosure up to IP 54.

● **Protection against mains feedback as a standard**, according to VDE 53 112

● **Sinus filter** as output filter of the frequency converter

Advantages: reduced motor noise,
reduced load on the motor insulation,
reduced radio interference.

● **EMC** (electro-magnetic compatibility)

Standard:

- **Emission: EN 55011/CISPR 11, group 1, class A;**

for installations in **industrial zones**. In Germany, the use of class A in residential areas is **prohibited**.

Where required, available **on option**:

- **Emission: EN 55011/CISPR 11, group 1, class B;**

for installations in **residential areas**. For use in hospitals, hotels etc., KSB recommends class B.

- **Immunity** IEC Serie 801

● **Housing**

Wall mounting: up to height = 1200 mm

Floor installation: height = 1800 mm and above, without support

IP 00: Height and width reduced by approx. 50 mm each for wall mounting and by approx. 100 mm for floor installation.

Depth: at least the depth of the control cabinet variant.

Standard door plate for selector switch, control panel and options.

Height: 680 mm, width: 500 mm, with cable tree of approx. 3 m length

5-pump System, 3~400 V, 50 Hz, 1 Frequency Converter

hyatronic mb	Rated motor power	Max. rated motor current in A	Sinus filter	Control cabinet (standard)	Weight (standard)		Dimensions H x W x D ≈mm
	P ₂ in kW			IP **)	Control cabinet ≈ kg	IP 00 ≈kg	
5 - 7	0.75 *)	2.1	■	54	80	67	1000 x 600 x 250
5 - 11	1.1 *)	3.0	■	54	80	67	1000 x 600 x 250
5 - 15	1.5 *)	3.7	■	54	80	67	1000 x 600 x 250
5 - 22	2.2 *)	5.2	■	54	80	67	1000 x 600 x 250
5 - 30	3.0 *)	7.0	■	54	80	67	1000 x 600 x 250
5 - 40	4.0 *)	9.1	■	54	80	67	1000 x 600 x 250
5 - 55	5.5	13	□	54	140	115	1800 x 800 x 400
5 - 75	7.5	16	□	54	180	145	1800 x 800 x 400
5 - 110	11	24	□	54	on request	on request	on request
5 - 150	15	32	□	54	on request	on request	on request
5 - 185	18.5	37.5	□	54	on request	on request	on request
5 - 220	22	44	□	54	on request	on request	on request
5 - 300	30	61	□	54	on request	on request	on request
5 - 370	37	73	□	54	on request	on request	on request
5 - 450	45	90	□	54	on request	on request	on request
5 - 550	55	106		42	on request	on request	on request
5 - 750	75	147		42	on request	on request	on request
5 - 900	90	177		42	on request	on request	on request
5 - 1100	110	212		42	on request	on request	on request
5 - 1320	132	260		42	on request	on request	on request
5 - 1600	160	315		42	on request	on request	on request
5 - 2000	200	368		42	on request	on request	on request

*) Direct starting up to and incl. 4 kW, star-delta starting for 5.5 kW and above

■ standard

***) The use of accessories such as ammeters and voltmeters reduces the type of enclosure to IP 42. For systems > 45 kW the type of enclosure is reduced to IP 42; on request, type of enclosure up to IP 54.

□ available on option

● **Protection against mains feedback as a standard**, according to VDE 53 112

● **Sinus filter** as output filter of the frequency converter

Advantages: reduced motor noise,
reduced load on the motor insulation,
reduced radio interference.

● **EMC** (electro-magnetic compatibility)

Standard:

- **Emission: EN 55011/CISPR 11, group 1, class A;**

for installations in **industrial zones**. In Germany, the use of class A in residential areas is **prohibited**.

Where required, available **on option:**

- **Emission: EN 55011/CISPR 11, group 1, class B;**

for installations in **residential areas**. For use in hospitals, hotels etc., KSB recommends class B.

- **Immunity IEC Serie 801**

● **Housing**

Wall mounting:

up to height = 1200 mm

Floor installation:

height = 1800 mm and above, without support

IP 00:

Height and width reduced by approx. 50 mm each for wall mounting and by approx. 100 mm for floor installation.

Depth: at least the depth of the control cabinet variant.

Standard door plate for selector switch, control panel and options.

Height: 680 mm, width: 500 mm, with cable tree of approx. 3 m length

6-pump System, 3~400 V, 50 Hz, 1 Frequency Converter

hyatronic mb	Rated motor power	Max. rated motor current in A	Sinus filter	Control cabinet (standard) IP **)	Weight (standard)		Dimensions H x W x D ≈mm
	P ₂ in kW				Control cabinet ≈ kg	IP 00 ≈kg	
6 - 7	0.75 *)	2.1	■	54	85	70	1000 x 600 x 250
6 - 11	1.1 *)	3.0	■	54	85	70	1000 x 600 x 250
6 - 15	1.5 *)	3.7	■	54	85	70	1000 x 600 x 250
6 - 22	2.2 *)	5.2	■	54	85	70	1000 x 600 x 250
6 - 30	3.0 *)	7.0	■	54	85	70	1000 x 600 x 250
6 - 40	4.0 *)	9.1	■	54	85	70	1000 x 600 x 250
6 - 55	5.5	13	□	54	145	120	1800 x 800 x 400
6 - 75	7.5	16	□	54	210	175	1800 x 800 x 400
6 - 110	11	24	□	54	on request	on request	on request
6 - 150	15	32	□	54	on request	on request	on request
6 - 185	18.5	37.5	□	54	on request	on request	on request
6 - 220	22	44	□	54	on request	on request	on request
6 - 300	30	61	□	54	on request	on request	on request
6 - 370	37	73	□	54	on request	on request	on request
6 - 450	45	90	□	54	on request	on request	on request
6 - 550	55	106		42	on request	on request	on request
6 - 750	75	147		42	on request	on request	on request
6 - 900	90	177		42	on request	on request	on request
6 - 1100	110	212		42	on request	on request	on request
6 - 1320	132	260		42	on request	on request	on request
6 - 1600	160	315		42	on request	on request	on request
6 - 2000	200	368		42	on request	on request	on request

*) Direct starting up to and incl. 4 kW, star-delta starting for 5.5 kW and above

■ standard

**) The use of accessories such as ammeters and voltmeters reduces the type of enclosure to IP 42.

□ available on option

For systems > 45 kW the type of enclosure is reduced to IP 42; on request, type of enclosure up to IP 54.

● **Protection against mains feedback as a standard**, according to VDE 53 112

● **Sinus filter** as output filter of the frequency converter

Advantages: reduced motor noise,
reduced load on the motor insulation,
reduced radio interference.

● **EMC** (electro-magnetic compatibility)

Standard:

- **Emission: EN 55011/CISPR 11, group 1, class A;**

for installations in **industrial zones**. In Germany, the use of class A in residential areas is **prohibited**.

Where required, available **on option**:

- **Emission: EN 55011/CISPR 11, group 1, class B;**

for installations in **residential areas**. For use in hospitals, hotels etc., KSB recommends class B.

- **Immunity** IEC Serie 801

● **Housing**

Wall mounting: up to height = 1200 mm

Floor installation: height = 1800 mm and above, without support

IP 00: Height and width reduced by approx. 50 mm each for wall mounting and by approx. 100 mm for floor installation.

Depth: at least the depth of the control cabinet variant.

Standard door plate for selector switch, control panel and options.

Height: 680 mm, width: 500 mm, with cable tree of approx. 3 m length

7-pump System, 3~400 V, 50 Hz, 1 Frequency Converter

hyatronic mb	Rated motor power	Max. rated motor current in A	Sinus filter	Control cabinet (standard) IP **)	Weight (standard)		Dimensions H x W x D ≈mm
	P ₂ in kW				Control cabinet ≈ kg	IP 00 ≈kg	
7 - 7	0.75 *)	2.1	■	54	100	85	1000 x 800 x 300
7 - 11	1.1 *)	3.0	■	54	100	85	1000 x 800 x 300
7 - 15	1.5 *)	3.7	■	54	100	85	1000 x 800 x 300
7 - 22	2.2 *)	5.2	■	54	100	85	1000 x 800 x 300
7 - 30	3.0 *)	7.0	■	54	100	85	1000 x 800 x 300
7 - 40	4.0 *)	9.1	■	54	100	85	1000 x 800 x 300
7 - 55	5.5	13	□	54	175	140	1800 x 800 x 400
7 - 75	7.5	16	□	54	260	210	1800 x 800 x 400
7 - 110	11	24	□	54	on request	on request	on request
7 - 150	15	32	□	54	on request	on request	on request
7 - 185	18.5	37.5	□	54	on request	on request	on request
7 - 220	22	44	□	54	on request	on request	on request
7 - 300	30	61	□	54	on request	on request	on request
7 - 370	37	73	□	54	on request	on request	on request
7 - 450	45	90	□	54	on request	on request	on request
7 - 550	55	106		42	on request	on request	on request
7 - 750	75	147		42	on request	on request	on request
7 - 900	90	177		42	on request	on request	on request
7 - 1100	110	212		42	on request	on request	on request
7 - 1320	132	260		42	on request	on request	on request
7 - 1600	160	315		42	on request	on request	on request
7 - 2000	200	368		42	on request	on request	on request

*) Direct starting up to and incl. 4 kW, star-delta starting for 5.5 kW and above

■ standard

**) The use of accessories such as ammeters and voltmeters reduces the type of enclosure to IP 42. For systems > 45 kW the type of enclosure is reduced to IP 42; on request, type of enclosure up to IP 54.

□ available on option

● **Protection against mains feedback as a standard**, according to VDE 53 112

● **Sinus filter** as output filter of the frequency converter

Advantages: reduced motor noise,
reduced load on the motor insulation,
reduced radio interference.

● **EMC** (electro-magnetic compatibility)

Standard:

- **Emission: EN 55011/CISPR 11, group 1, class A;**

for installations in **industrial zones**. In Germany, the use of class A in residential areas is **prohibited**.

Where required, available **on option**:

- **Emission: EN 55011/CISPR 11, group 1, class B;**

for installations in **residential areas**. For use in hospitals, hotels etc., KSB recommends class B.

- **Immunity** IEC Serie 801

● **Housing**

Wall mounting:

up to height = 1200 mm

Floor installation:

height = 1800 mm and above, without support

IP 00:

Height and width reduced by approx. 50 mm each for wall mounting and by approx. 100 mm for floor installation.

Depth: at least the depth of the control cabinet variant.

Standard door plate for selector switch, control panel and options.

Height: 680 mm, width: 500 mm, with cable tree of approx. 3 m length

8-pump System, 3~400 V, 50 Hz, 1 Frequency Converter

hyatronic mb	Rated motor power	Max. rated motor current in A	Sinus filter	Control cabinet (standard) IP **)	Weight (standard)		Dimensions H x W x D ≈mm
	P ₂ in kW				Control cabinet ≈ kg	IP 00 ≈kg	
8 - 7	0.75 *)	2.1	■	54	105	90	1000 x 800 x 300
8 - 11	1.1 *)	3.0	■	54	105	90	1000 x 800 x 300
8 - 15	1.5 *)	3.7	■	54	105	90	1000 x 800 x 300
8 - 22	2.2 *)	5.2	■	54	105	90	1000 x 800 x 300
8 - 30	3.0 *)	7.0	■	54	105	90	1000 x 800 x 300
8 - 40	4.0 *)	9.1	■	54	105	90	1000 x 800 x 300
8 - 55	5.5	13	□	54	180	145	1800 x 800 x 400
8 - 75	7.5	16	□	54	275	220	1800 x 800 x 400
8 - 110	11	24	□	54	on request	on request	on request
8 - 150	15	32	□	54	on request	on request	on request
8 - 185	18.5	37.5	□	54	on request	on request	on request
8 - 220	22	44	□	54	on request	on request	on request
8 - 300	30	61	□	54	on request	on request	on request
8 - 370	37	73	□	54	on request	on request	on request
8 - 450	45	90	□	54	on request	on request	on request
8 - 550	55	106		42	on request	on request	on request
8 - 750	75	147		42	on request	on request	on request
8 - 900	90	177		42	on request	on request	on request
8 - 1100	110	212		42	on request	on request	on request
8 - 1320	132	260		42	on request	on request	on request
8 - 1600	160	315		42	on request	on request	on request
8 - 2000	200	368		42	on request	on request	on request

*) Direct starting up to and incl. 4 kW, star-delta starting for 5.5 kW and above

■ standard

**) The use of accessories such as ammeters and voltmeters reduces the type of enclosure to IP 42.

□ available on option

For systems > 45 kW the type of enclosure is reduced to IP 42; on request, type of enclosure up to IP 54.

● **Protection against mains feedback as a standard**, according to VDE 53 112

● **Sinus filter** as output filter of the frequency converter

Advantages: reduced motor noise,
reduced load on the motor insulation,
reduced radio interference.

● **EMC** (electro-magnetic compatibility)

Standard:

- **Emission: EN 55011/CISPR 11, group 1, class A;**

for installations in **industrial zones**. In Germany, the use of class A in residential areas is **prohibited**.

Where required, available **on option**:

- **Emission: EN 55011/CISPR 11, group 1, class B;**

for installations in **residential areas**. For use in hospitals, hotels etc., KSB recommends class B.

- **Immunity** IEC Serie 801

● **Housing**

Wall mounting: up to height = 1200 mm

Floor installation: height = 1800 mm and above, without support

IP 00: Height and width reduced by approx. 50 mm each for wall mounting and by approx. 100 mm for floor installation.

Depth: at least the depth of the control cabinet variant.

Standard door plate for selector switch, control panel and options.

Height: 680 mm, width: 500 mm, with cable tree of approx. 3 m length

2- to 8-pump System, 3~400 V, 50 Hz, 2 Frequency Converters

hyatronic mb	Rated motor power	Max. rated motor current in A	Sinus filter	Control cabinet (standard) IP **)	Weight (standard)		Dimensions H x W x D ≈mm
	P ₂ in kW				Control cabinet ≈ kg	IP 00 ≈kg	
__ - 7/2	0.75 *)	2.1	■	54	105 - 145	85 - 125	1200 x 800 x 300
__ - 11/2	1.1 *)	3.0	■	54	105 - 145	85 - 125	1200 x 800 x 300
__ - 15/2	1.5 *)	3.7	■	54	105 - 145	85 - 125	1200 x 800 x 300
__ - 22/2	2.2 *)	5.2	■	54	105 - 145	85 - 125	1200 x 800 x 300
__ - 30/2	3.0 *)	7.0	■	54	105 - 145	85 - 125	1200 x 800 x 300
__ - 40/2	4.0 *)	9.1	■	54	105 - 145	85 - 125	1200 x 800 x 300
__ - 55/2	5.5	13	□	54	250 - 290	200 - 240	1800 x 1200 x 400
__ - 75/2	7.5	16	□	54	320 - 380	240 - 290	1800 x 1200 x 400
__ - 110/2	11	24	□	54	on request	on request	on request
__ - 150/2	15	32	□	54	on request	on request	on request
__ - 185/2	18.5	37.5	□	54	on request	on request	on request
__ - 220/2	22	44	□	54	on request	on request	on request
__ - 300/2	30	61	□	54	on request	on request	on request
__ - 370/2	37	73	□	54	on request	on request	on request
__ - 450/2	45	90	□	54	on request	on request	on request
__ - 550/2	55	106		42	on request	on request	on request
__ - 750/2	75	147		42	on request	on request	on request
__ - 900/2	90	177		42	on request	on request	on request
__ - 1100/2	110	212		42	on request	on request	on request
__ - 1320/2	132	260		42	on request	on request	on request
__ - 1600/2	160	315		42	on request	on request	on request
__ - 2000/2	200	368		42	on request	on request	on request

*) Direct starting up to and incl. 4 kW, star-delta starting for 5.5 kW and above

■ standard

***) The use of accessories such as ammeters and voltmeters reduces the type of enclosure to IP 42. For systems > 45 kW the type of enclosure is reduced to IP 42; on request, type of enclosure up to IP 54.

□ available on option

__ = Number of pumps

● **Protection against mains feedback as a standard**, according to VDE 53 112

● **Sinus filter** as output filter of the frequency converter

Advantages: reduced motor noise,
reduced load on the motor insulation,
reduced radio interference.

● **EMC** (electro-magnetic compatibility)

Standard:

- **Emission: EN 55011/CISPR 11, group 1, class A;**

for installations in **industrial zones**. In Germany, the use of class A in residential areas is **prohibited**.

Where required, available **on option:**

- **Emission: EN 55011/CISPR 11, group 1, class B;**

for installations in **residential areas**. For use in hospitals, hotels etc., KSB recommends class B.

- **Immunity** IEC Serie 801

● **Housing**

Wall mounting: up to height = 1200 mm

Floor installation: height = 1800 mm and above, without support

IP 00: Height and width reduced by approx. 50 mm each for wall mounting and by approx. 100 mm for floor installation.

Depth: at least the depth of the control cabinet variant.

Standard door plate for selector switch, control panel and options.

Height: 680 mm, width: 500 mm, with cable tree of approx. 3 m length

Special Variants

- Master switch, volt-free
- Manual-0-automatic switch per pump, volt-free
- Manual-automatic switch per pump, volt-free
- Control cabinet lighting with 230 V socket (only possible if fitted with neutral conductor)
- Special paint coat
- Lightning protection equipment


Accessories / Options

Description	Ident. No.	Weight kg
Documentation hyatronic mb One documentation set is included in the scope of supply; further sets on request. Operating instructions hyatronic mb Supplementary operating instructions HPC Planning manual, frequency converter Circuit diagram	E 001	
Special documentation hyatronic mb acc. to the customer's requirements	E 005	
Parameterization kit for hyatronic mb and Hyamat V HPC parameterization software incl. parameterization cable	18 040 550 L	0.1
Digital timer with weekly programme, 500 h power reserve, for installation on top hat rail, ready-wired	E 050 ○	0.1
Indication via volt-free contact ready-wired to terminal, per indication ● Individual "in operation" message (volt-free; NO contact) per pump ● Individual fault message (volt-free; NC contact) per pump (over-current) ● Operation frequency inverter (volt-free; NO contact) ● Fault frequency inverter (volt-free; changeover contact) generally: relay contact rating 8 A 250 V AC	E 051 ○	0.1 0.1 0.1 0.1
Temperature control by continuous controller: KSY 1/50 0 - 50 °C +50 °C max. KSY 1/100 0 - 100 °C +100 °C max. KSY 1/120 20 - 120 °C +120 °C max.	E 101 ○ E 102 ○ E 103 ○	0.5 0.5 0.5
Temperature range converter: KCR from -20, 0, 20 °C up to 50 K, 100 K fixed KCU from -20 to 20 °C linear up to 10 - 150 K var	E 105 ○ E 106 ○	0.5 0.5
Plug-in module for differential temperature: MD for KP 250 transmitter	E 110 ○	0.1
Suitable temperature sensors with KP 250 transmitter: TAV Clip-on sensor 0 to 120 °C TV1 Immersion sensor 100 mm 0 to 120 °C TA Weather sensor -20 to +30 °C Z6/10 Stainless steel sensor well for TV1	00 131 063 00 133 631 00 133 630 00 133 632	0.1 0.4 0.1 0.4

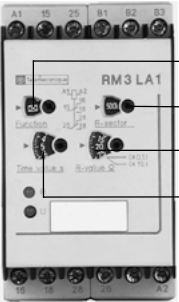

L = available from stock ○ = option, not retrofittable

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<p>Differential pressure transmitter, type 16D, 3-wire system, 24 V DC / 4 - 20 mA; pressure connections with compression-type fitting for 6 mm diameter (0 - 16.0 bar with 8 mm compression-type fitting)</p> <table border="1"> <thead> <tr> <th>Measuring range</th> <th>PN</th> <th>t_{max}</th> <th>Ident No.</th> <th>Weight kg</th> </tr> </thead> <tbody> <tr> <td>0 - 1.0 bar</td> <td>16</td> <td>+70 °C</td> <td>01 012 051 L</td> <td>1.2</td> </tr> <tr> <td>0 - 1.6 bar</td> <td>25</td> <td>+70 °C</td> <td>01 037 456 L</td> <td>1.2</td> </tr> <tr> <td>0 - 2.5 bar</td> <td>25</td> <td>+70 °C</td> <td>01 012 052 L</td> <td>1.2</td> </tr> <tr> <td>0 - 4.0 bar</td> <td>25</td> <td>+70 °C</td> <td>01 012 053 L</td> <td>1.2</td> </tr> <tr> <td>0 - 6.0 bar</td> <td>25</td> <td>+70 °C</td> <td>01 015 633 L</td> <td>1.2</td> </tr> <tr> <td>0 - 10.0 bar</td> <td>25</td> <td>+70 °C</td> <td>01 013 329 L</td> <td>1.2</td> </tr> <tr> <td>0 - 16.0 bar</td> <td>25</td> <td>+70 °C</td> <td>01 036 057 L</td> <td>1.2</td> </tr> </tbody> </table>	Measuring range	PN	t _{max}	Ident No.	Weight kg	0 - 1.0 bar	16	+70 °C	01 012 051 L	1.2	0 - 1.6 bar	25	+70 °C	01 037 456 L	1.2	0 - 2.5 bar	25	+70 °C	01 012 052 L	1.2	0 - 4.0 bar	25	+70 °C	01 012 053 L	1.2	0 - 6.0 bar	25	+70 °C	01 015 633 L	1.2	0 - 10.0 bar	25	+70 °C	01 013 329 L	1.2	0 - 16.0 bar	25	+70 °C	01 036 057 L	1.2																																																		
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<p>Wall mounting kit IP 67, consisting of: wall holder, 5 screw unions PG 13.5, 2x 5 m shielded cable and 2 additional clamps for pipe mounting</p> <p>In case of separate installation, additional wall mounting accessories are required (temperature range up to 120 °C) Higher temperature ranges as well as ultrasonic one or two-way measuring equipment on request</p>	01 040 314	1.6																																																																																								

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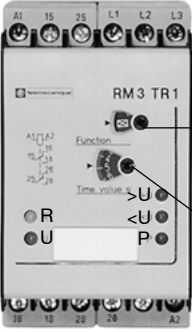
Description	Ident. No.	Weight kg
 <p>EWS 10.1 Electronic flow monitor EWS 10.1 is a retrofittable monitoring unit for protecting the pumps against lack-of-water conditions. A flow sensor continuously monitors flow through the suction pipe. At flow velocities <math><0.3\text{ m/s}</math> and simultaneous "Pressure- (minus)" signal and/or "Drive running", the EWS 10.1 switches off the control unit after a user-definable delay, due to lack of water. If one of the conditions disappears in the defined delay period, the relay will be reset automatically.</p> <p>Lack-of-water conditions occur when</p> <ol style="list-style-type: none"> 1. the <i>flow velocity</i> of the water in the suction pipe <i>is less than 0.3 m/s</i> and the <i>pressure</i> at the discharge nozzle <i>is lower</i> than the set system pressure <p>or</p> <ol style="list-style-type: none"> 2. the <i>flow velocity</i> of the water in the suction pipe <i>is less than 0.3 m/s</i> and the <i>pump(s)</i> is (are) running <p>or</p> <ol style="list-style-type: none"> 3. the <i>flow velocity</i> of the water in the suction pipe <i>is less than 0.3 m/s</i> and the <i>pressure</i> at the discharge nozzle <i>is lower</i> than the set system pressure and the <i>pump(s)</i> is (are) running. <p>After the system has been switched off, the lack-of-water conditions must be eliminated (also refer to the manual of the main system). The system can then be started up again by switching it off and on again by the master switch (or optional reset button).</p> <p>Should the lack-of-water conditions persist after the system has been re-started, the control unit will switch the system off again.</p> <p>The lack-of-water cut-out delay must not exceed 10 seconds max.. If additional lack-of-water cut-out delays are set elsewhere in the system, the sum of these delays must not exceed 10 seconds. The cut-out delay on EWS 10.1 can be adjusted to requirements.</p> <p>Scope of supply (standard model)</p> <ul style="list-style-type: none"> ● Plastic housing <ul style="list-style-type: none"> - Monitoring relay - Pressure switch 0 - 16 bar - Installation hardware and small parts - Circuit diagram and operating manual 	19 070 923	0.3
<p>EWS electronic flow monitor EWS is a ready-wired monitoring unit for protecting the pumps against lack-of-water conditions.</p> <p>Description see EWS 10.1</p> <p>Scope of supply (standard model)</p> <ul style="list-style-type: none"> - Monitoring relay, fitted and wired - Pressure switch 0 - 16 bar - Installation hardware and small parts - Circuit diagram and operating manual 	E 201	0.3
<p>Pressure switch (Pressure control unit) for lack-of-water monitoring at existing inlet pressure Pressure range 0 to 10 bar</p>	01 034 231 L	1.0

L = available from stock ○ = option, not retrofittable

Description	Ident. No.	Weight kg
<div style="display: flex; align-items: flex-start;">  <div style="margin-top: 10px;"> <p>Liquid level monitor: for monitoring lack-of-water conditions in inlet tanks. Ready-wired electrode relay</p> <p>This device monitors the level of conductive liquids. Illustration:</p> <ul style="list-style-type: none"> ① Response delay selector switch for relay pick-up or drop-off. ② Fine adjustment of response delay ③ Potentiometer for pick-up sensitivity (max., in k) ④ Fine adjustment of pick-up sensitivity <ul style="list-style-type: none"> U Green LED goes on, relay is energized R Yellow LED goes on, relay picks up <p>The relay can be used for the following liquids:</p> <ul style="list-style-type: none"> - Spring water, town water, seawater, industrial water - Metal salt solutions, acids or bases, liquid fertilizers, non-concentrated alcohol (<40 %) - Liquids in the food industry: beer, milk, coffee, etc. <p>The relay <u>cannot</u> be used for the following liquids:</p> <ul style="list-style-type: none"> - Chemically pure water - Fuel, liquefied gas (flammable) - Oil, concentrated alcohol (>40 %) - Ethylene, glycol, paraffin, paint </div> </div>	E 202 ○	0.3
<div style="display: flex; align-items: flex-start;">  <div style="margin-top: 10px;"> <p>Probe for electrode relay</p> <p>This probe is suspended in the tank. It is a coaxial probe, i.e. in addition to the standard integrated electrode the stainless steel housing serves as earth reference electrode, eliminating the need for a separate reference electrode. A single probe is therefore enough for monitoring one level, and two probes (instead of three) for monitoring two levels. If cables are used (e.g. H07RN-F 1 x 1.5 mm²), three probes will be required. Connection cable: coaxial cable, PVC-sheathed, max. Ø 6.3 mm. The housing also prevents inaccurate measurements in the case of moving surfaces. Max. operating temperature: 100 °C.</p> </div> </div>	01 048 984 L	0.1
<p>Control cable for electrode relay probe 1 x 1,5 mm², per meter</p>	01 046 306 L	
<p>Master switch with emergency switch-off function, 3-pole, with locking facility for three padlocks</p>	on request	0.1
<p>Control transformer incl. protection via motor protection switch</p> <p>Primary: 400 V +/-5 % Secondary I: 230 V, rating 50, 100, 180 or 300 VA Secondary II: 18 V, rating 35 VA</p> <p>The 100 VA version is also available with secondary II in 24 V / 35 VA.</p> <p>Other primary voltages on request.</p>	on request	0.5

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Description	Ident No.	Weight kg
Voltmeter with phase changeover, mounted in the control cabinet door, ready-wired Measuring range 500 V 72 x 72 mm	E 301 <input type="radio"/>	0.2
Ammeter mounted in the control cabinet door, ready-wired 72 x 72 mm	Measuring range 6 A E 305 <input type="radio"/> 10 A E 306 <input type="radio"/> 15 A E 307 <input type="radio"/> 25 A E 308 <input type="radio"/> 40 A E 309 <input type="radio"/>	0.2 0.2 0.2 0.2 0.2
 <p>Monitoring relay (phase failure / sequence, under/over-voltage) ready-wired</p> <p>The relay monitors phase failure and sequence, as well as over-/under-voltage. Illustration:</p> <p>① Selector switch for delay function: <input type="checkbox"/> Fault detection delayed <input checked="" type="checkbox"/> Fault detection extended</p> <p>② Delay potentiometer in seconds</p> <p>R Yellow LED goes on, relay picks up U Green LED goes on, relay is energized >U Red LED goes on, overvoltage fault <U Red LED goes on, undervoltage fault P Red LED goes on, phase failure or incorrect phase sequence .</p>	E 320 <input type="radio"/>	0.4

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KSB Aktiengesellschaft

67225 Frankenthal • Johann-Klein-Str. 9 • 67227 Frankenthal (Germany)
Tel. +49 62 33 86 0 • Fax +49 62 33 86-34 01 • www.ksb.com