

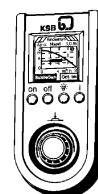
**High-efficiency circulators
with continuously variable differential pressure control
and IR interface for remote control**



Rio-Eco



Rio-Eco Z



Tele-Monitor

Applications

- Hot-water heating systems
- Heat recovery systems
- Cooling circuits in air-conditioning systems

Fluid Pumped

Clean water and/or water treated in accordance with the relevant regulations, not containing aggressive, abrasive or solid substances.

Water treated with commercial antifreeze agents based on glycols (mixture ratio max. 1 : 1) with inhibitors (antirust). If the glycol content equals or exceeds 20 %, the operating data must be checked and verified.

Heating water in accordance with VDI 2035.

Operating Data

	Screw-ended pumps	Flanged pumps
Rp	1 1/4	DN 32 to 65
Q	up to 10 m³/h, 2.8 l/s	up to 44 m³/h, 12 l/s ¹⁾
H	up to 12 m	up to 13 m
P ₁	up to 290 W	up to 620 W
p	10 bar	10 bar
t	-10 °C to +110 °C	-10 °C to +110 °C

Ambient temperature: max. +40 °C

¹⁾ if operated in parallel

Designation

Type series	Rio	Eco	(Z)	50	-	80
High-efficiency pump						
Twin pump						
Nominal diameter in mm						
Head in m x 10 (example 100 = 10 m)						

Design

Rio-Eco: Maintenance-free wet rotor pump (glandless), flanged or screw-ended, with integrated frequency inverter for continuously variable differential pressure control.

IR (infra-rot) interface for remote control.

LON bus interface can be retrofitted.

- Graphical display
- Full motor protection with integrated trip electronics
- Volt-free contacts for general fault reporting
- Automatic night-time operation
- Interface for communication modules

Rio-Eco Z: Rio-Eco twin pump model for stand-by operation (integrated swing check valve) or additional pump start-up in case of peak load (parallel operation)

Control modes:

- Δp-c for constant differential pressure at the pump
- Δp-c for variable differential pressure at the pump
- Δp-c for temperature-governed differential pressure at the pump

Bearings

Special plain bearings lubricated by the fluid pumped.

Materials

Volute casing	cast iron	EN-GJL-250 ²⁾
	DN 30	EN-GJL-200 ³⁾
Shaft	chrome steel	X 40 Cr 13
Impeller	glass fibre reinforced	polypropylene
Bearings	special carbon,	metal-impregnated

²⁾ to EN 1561 (was GG-25)

³⁾ to EN 1561 (was GG-20)

Drive

EC motor, IP 44, thermal class F

Connection to power supply

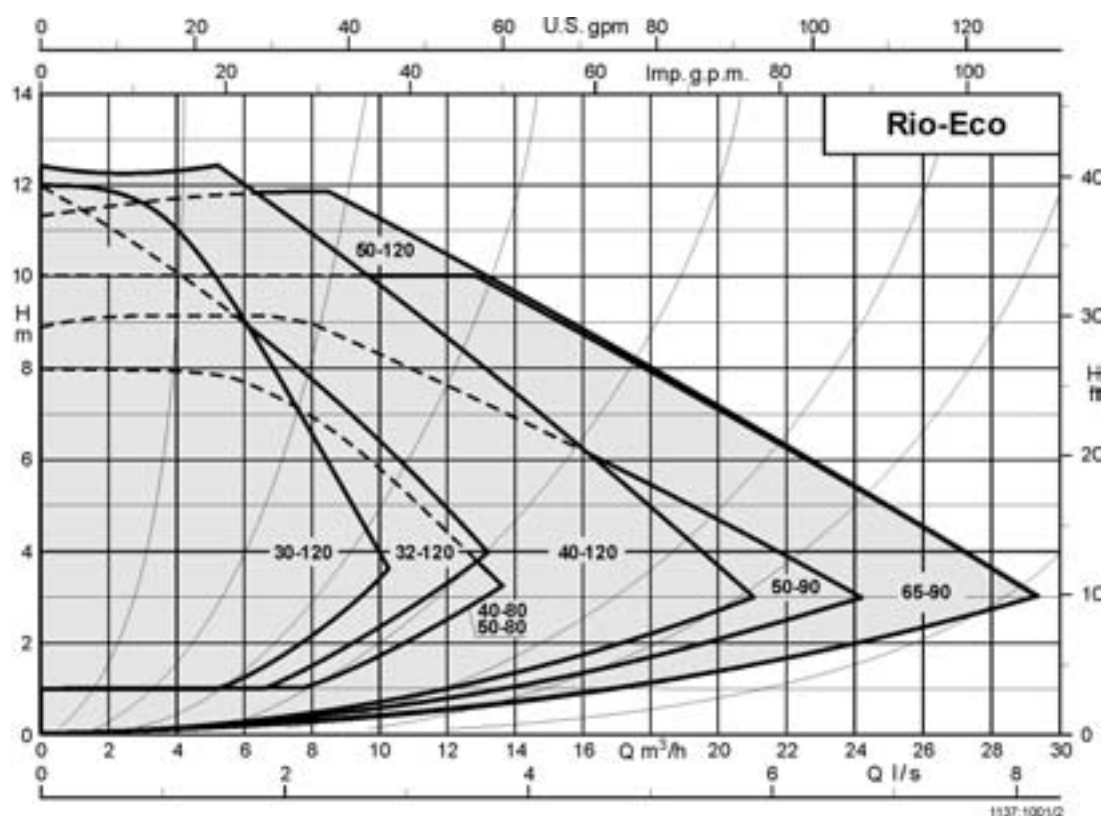
Rio-Eco/Rio-Eco Z: 1~230 V, 50 Hz

interference suppression class B

Selection Chart Single Pumps



Rio-Eco

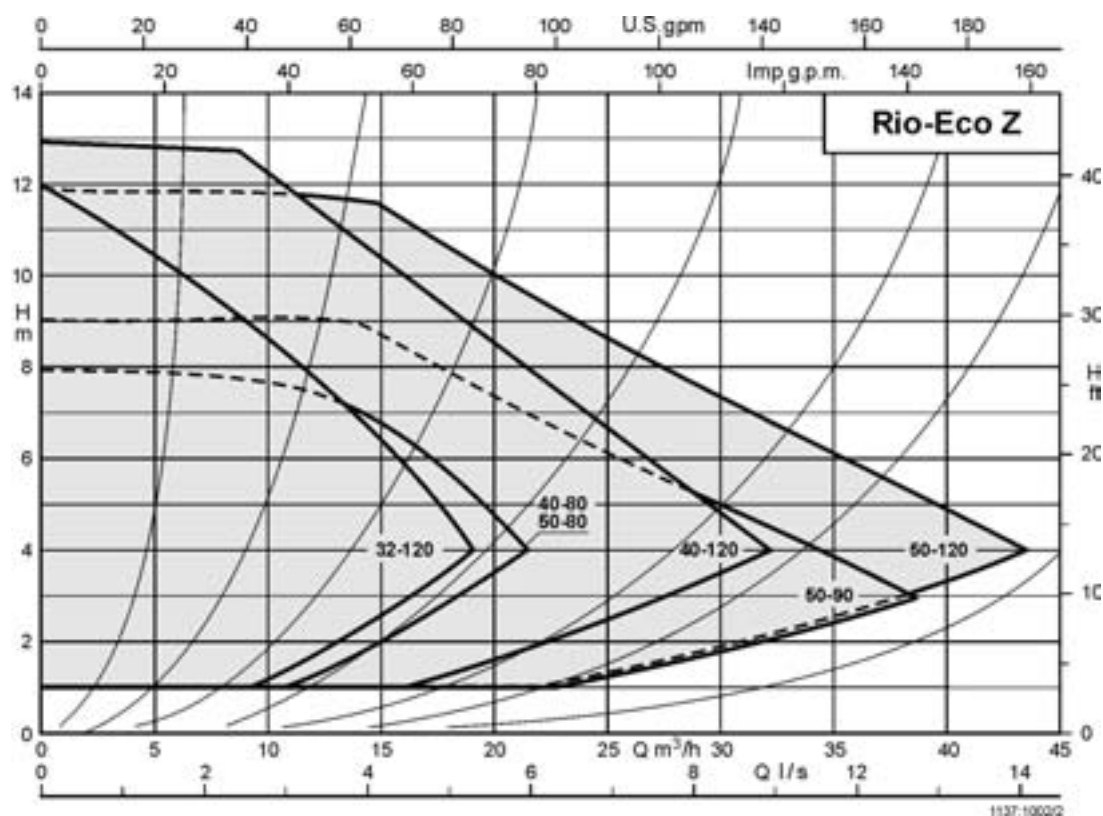


Selection Chart Twin Pumps

The characteristic curves refer to parallel operation of both pumps.



Rio-Eco Z

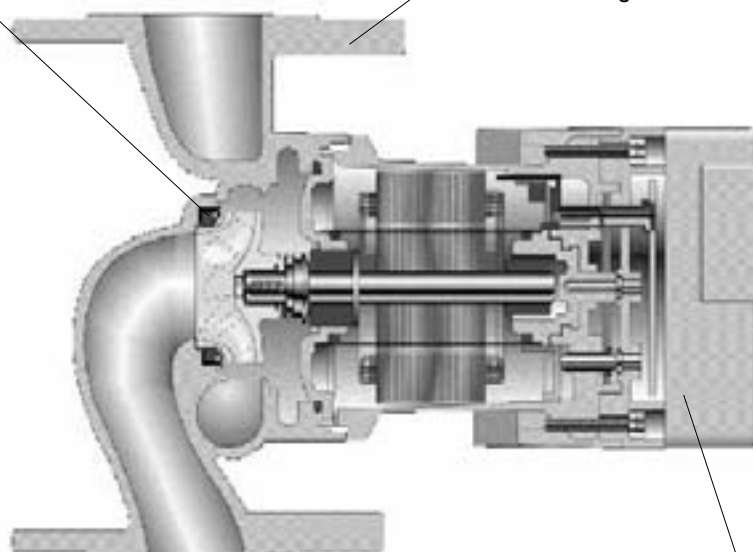


Energy-efficient

- Maintenance-free glandless pump with EC motor of new high-efficiency design helps reduce energy costs by up to 80 % compared with fixed speed circulators.
- The suction neck liner between impeller and pump casing reduces the clearance gap width.
- The non-metallic can reduces eddy current losses.
- The plastic impeller with multiply curved vanes ensures high efficiency.
- The cataphoretic coating makes for smooth surfaces in the pump casing.

Reduction in logistics and storage costs

- Flexible installation options thanks to PN 6 / PN 10 adapter (oval bolt hole) flange.



Universal use

- All-round pump for the entire range of heating, ventilation and air-conditioning applications from -10 to +110 °C
- Continuously variable speed adjustment and various **control modes:**
 - Δp -c for constant differential pressure at the pump
 - Δp -c for variable differential pressure at the pump
 - Δp -c for temperature-governed differential pressure at the pump
 - Automatic night-time operation

Ease of installation and handling

- Optimum access to flanges and flexible arrangement of the electronics module
- Integrated general fault reporting by volt-free contacts
- Pump casing with standard heat insulation equipment
- Integrated LC display

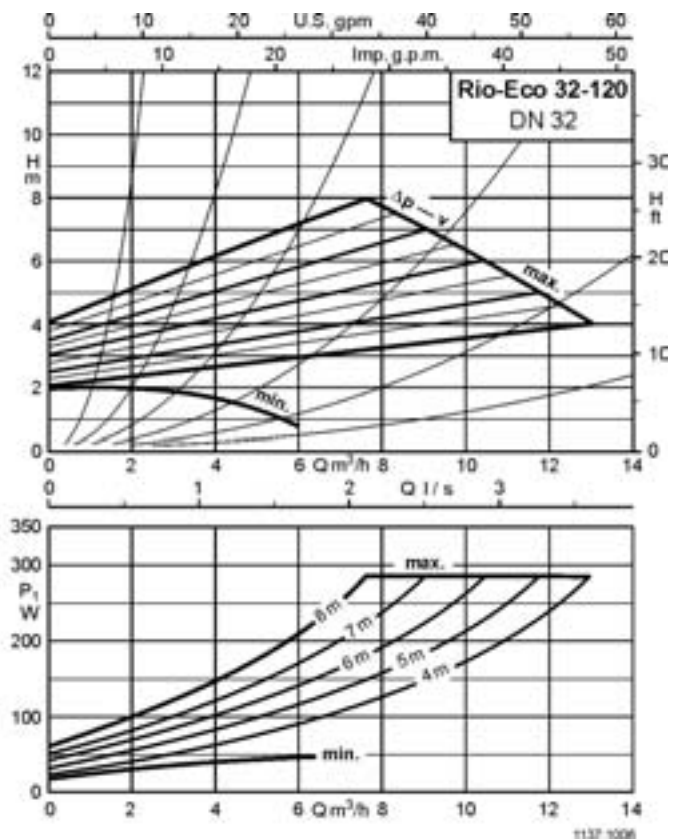
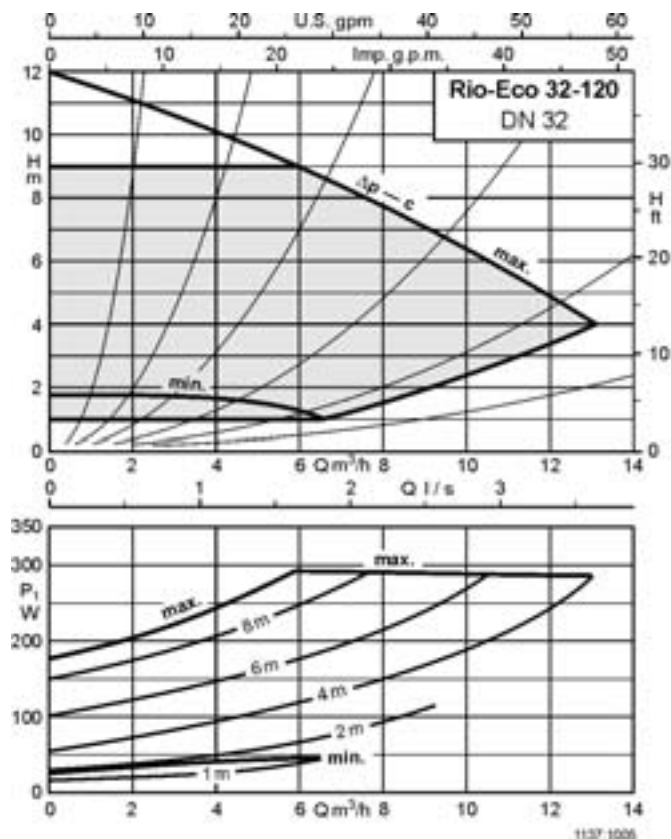
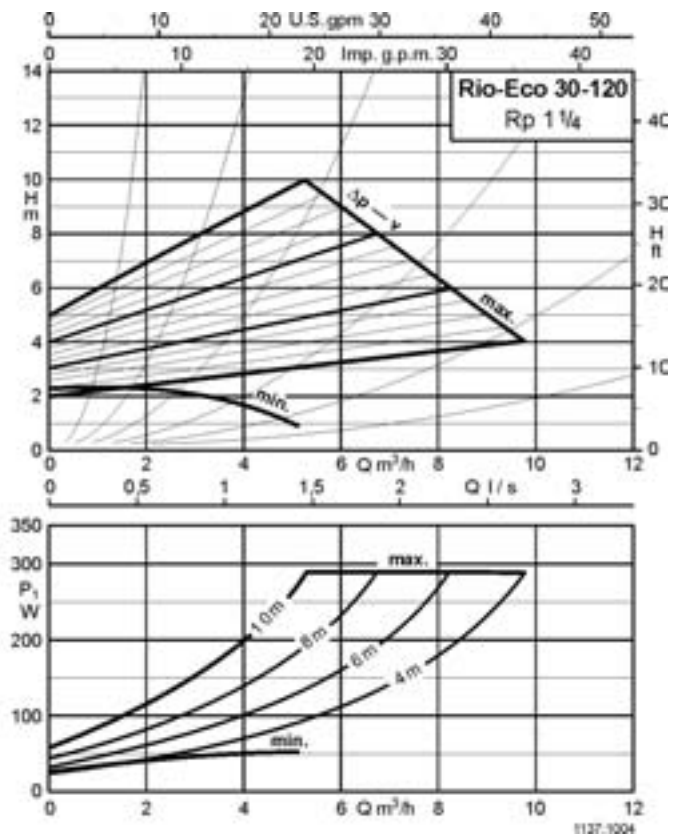
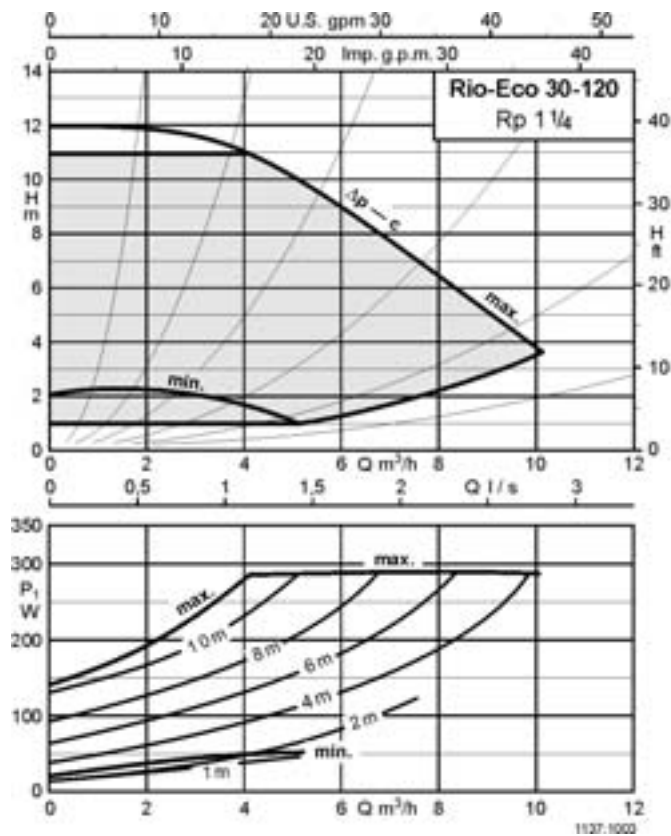
Minimum Pressure

Minimum pressure $p_{\min}$ at the pump suction nozzle to avoid cavitation noise at an ambient temperature of +40 °C and a pumped-water temperature of $\vartheta_{\max}$:

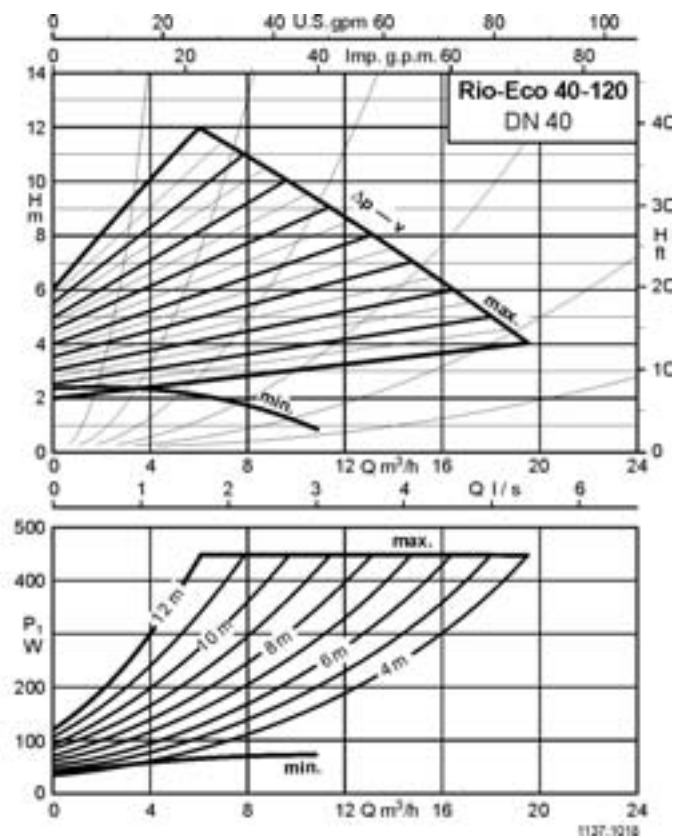
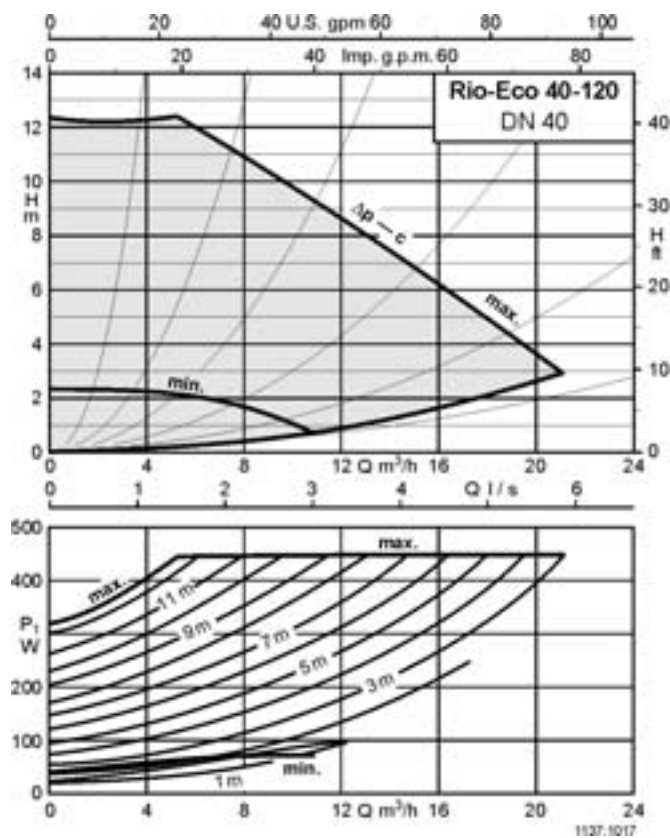
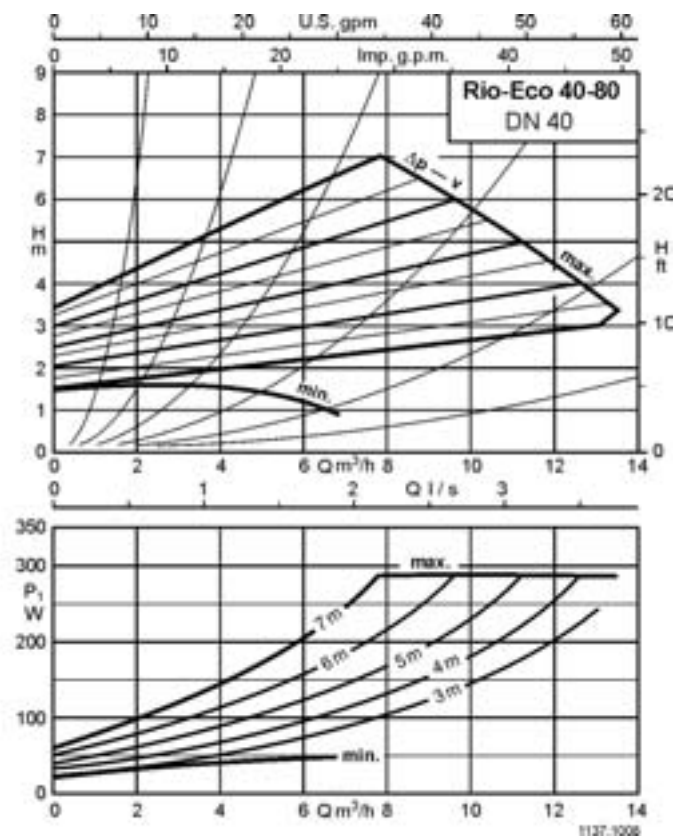
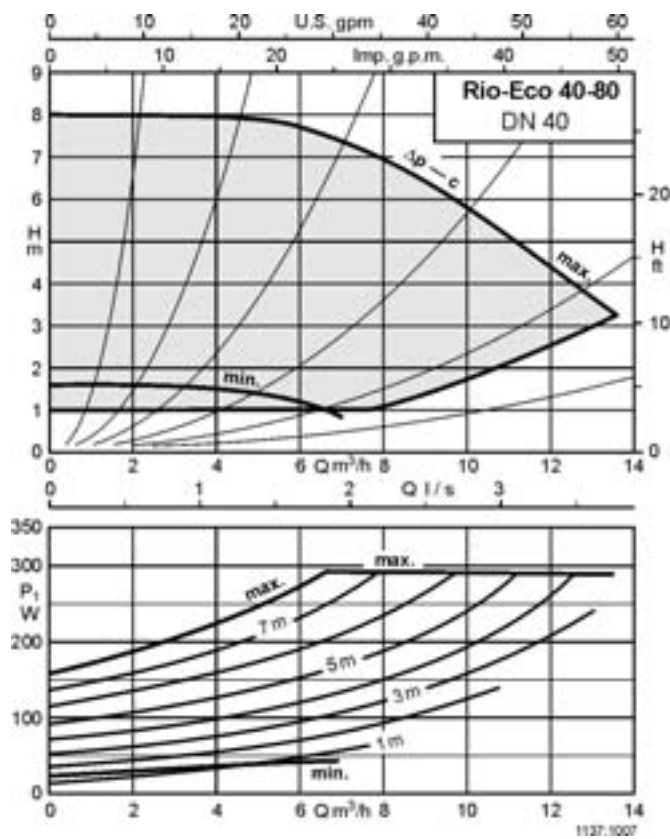
The values are applicable up to 300 m above sea level.
For installation heights >300 m, an allowance of +0.01 bar/100m must be added.

t	50 °C	95 °C	110 °C
Rio-Eco/Rio-Eco Z	bar	$p_{\min}$ bar	bar
30-120	0,05	0,5	1,1
32-120	0,05	0,5	1,1
40-80	0,05	0,5	1,1
40-120	0,05	0,5	1,1
50-80	0,05	0,5	1,1
50-90	0,05	0,5	1,1
50-120	0,05	0,5	1,1
65-90	0,05	0,5	1,1

Single Pump Characteristic Curves

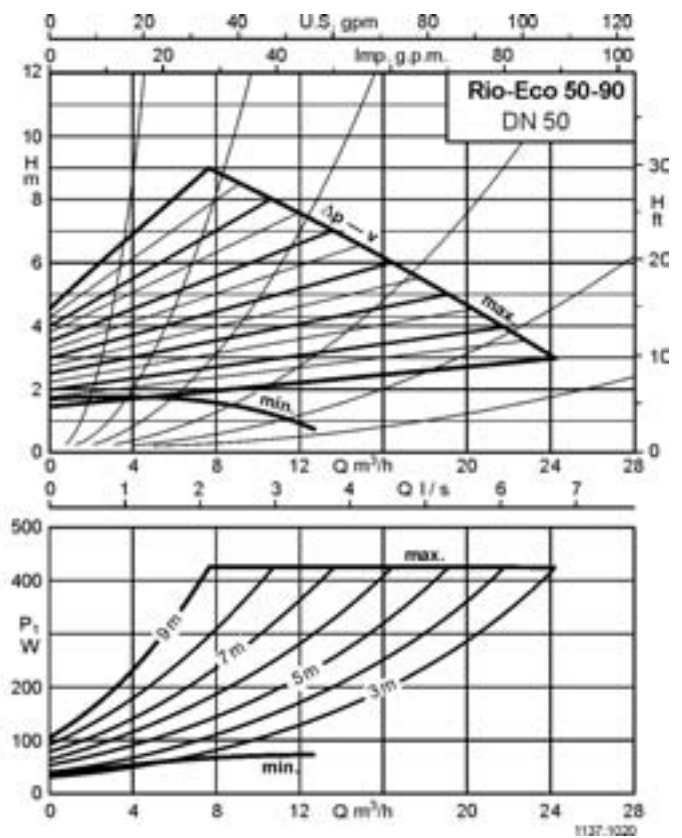
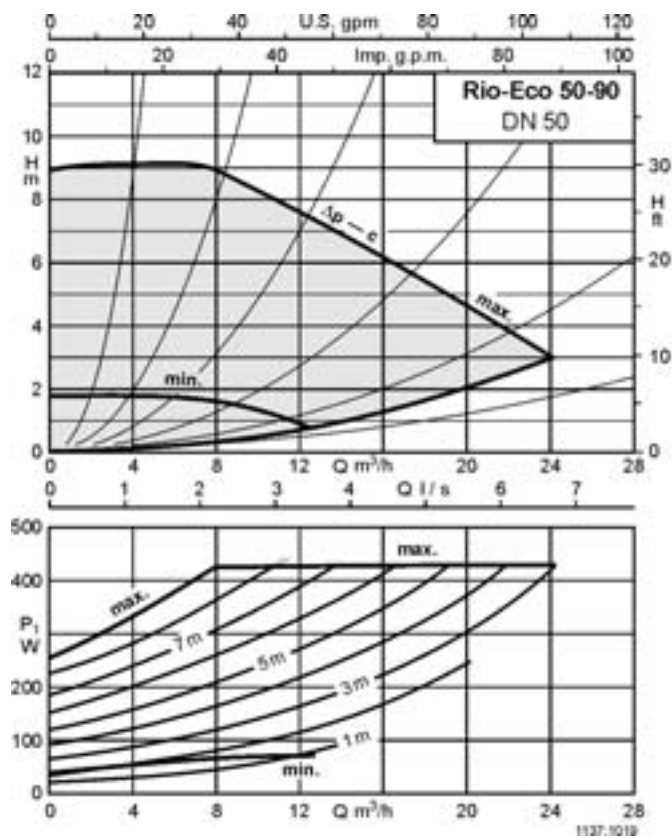
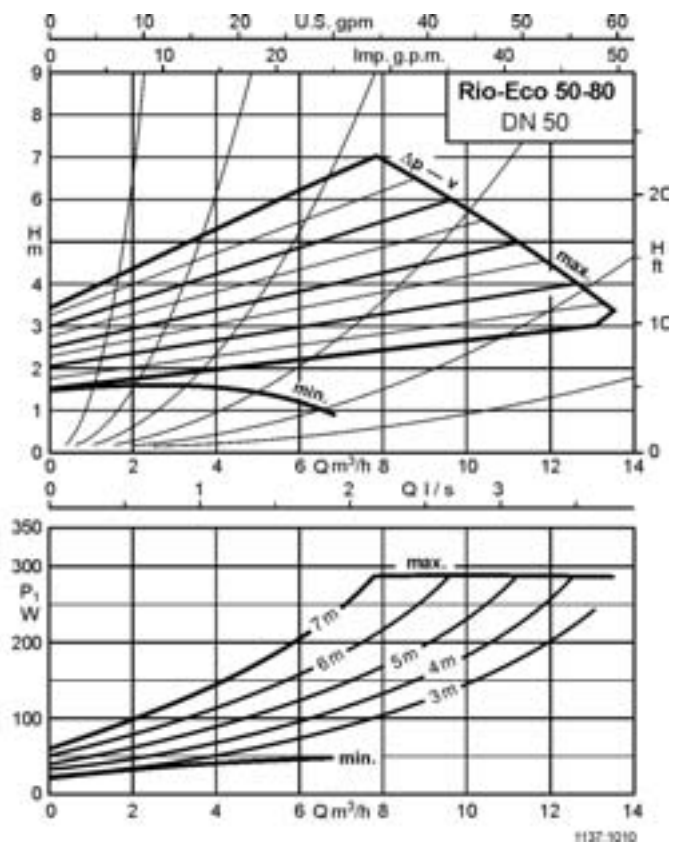
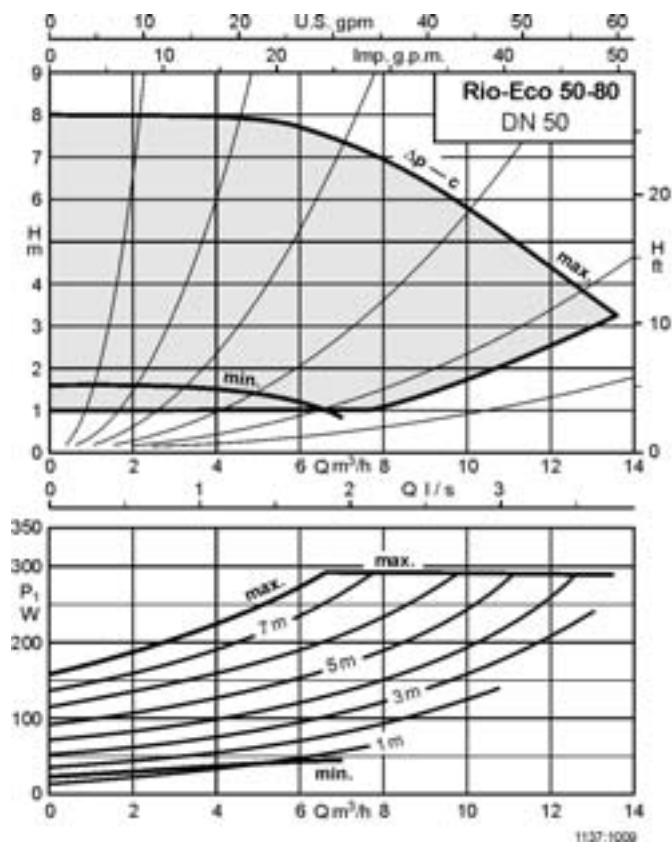


Single Pump Characteristic Curves



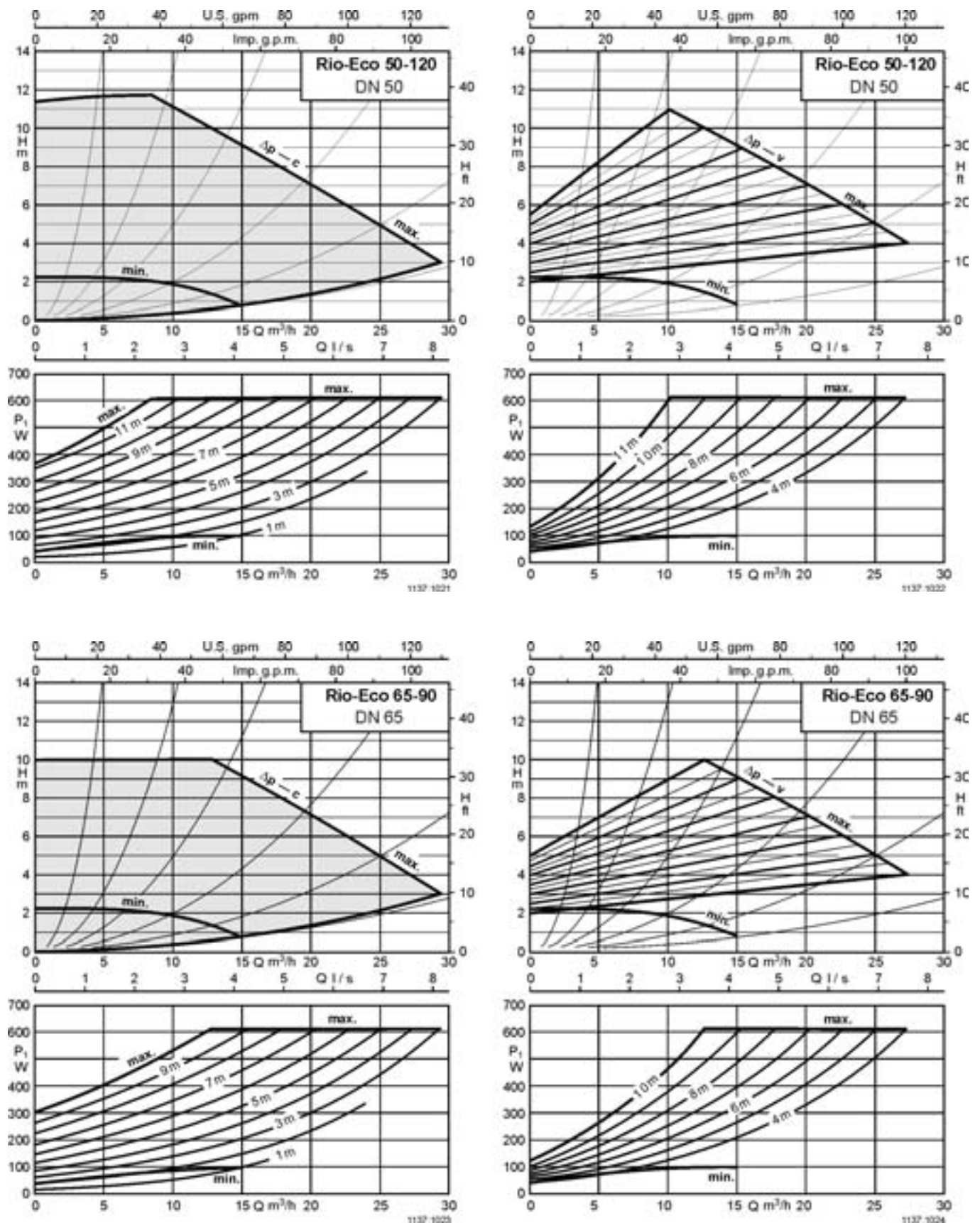
min. = Night-time operation at minimum speed

Single Pump Characteristic Curves



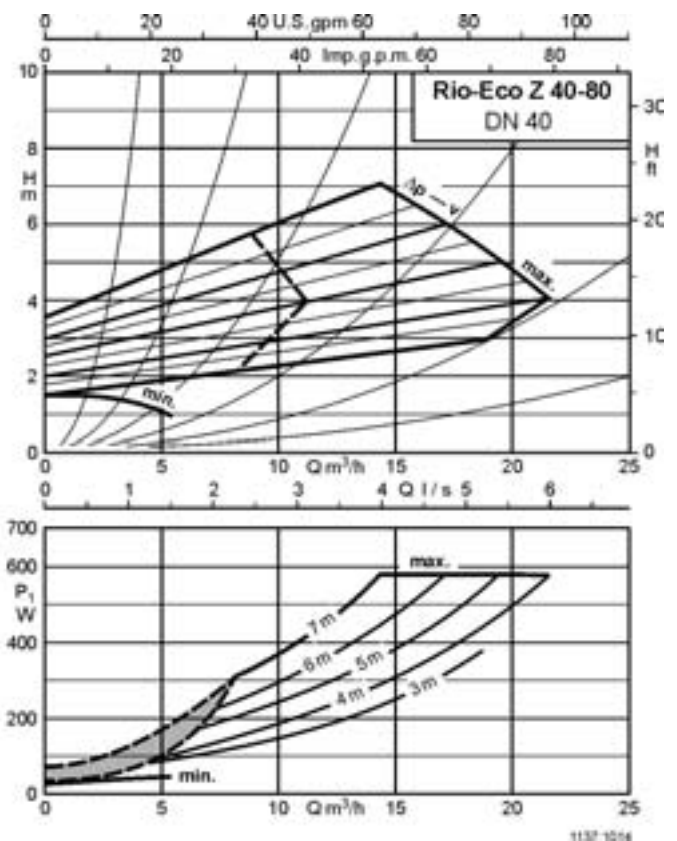
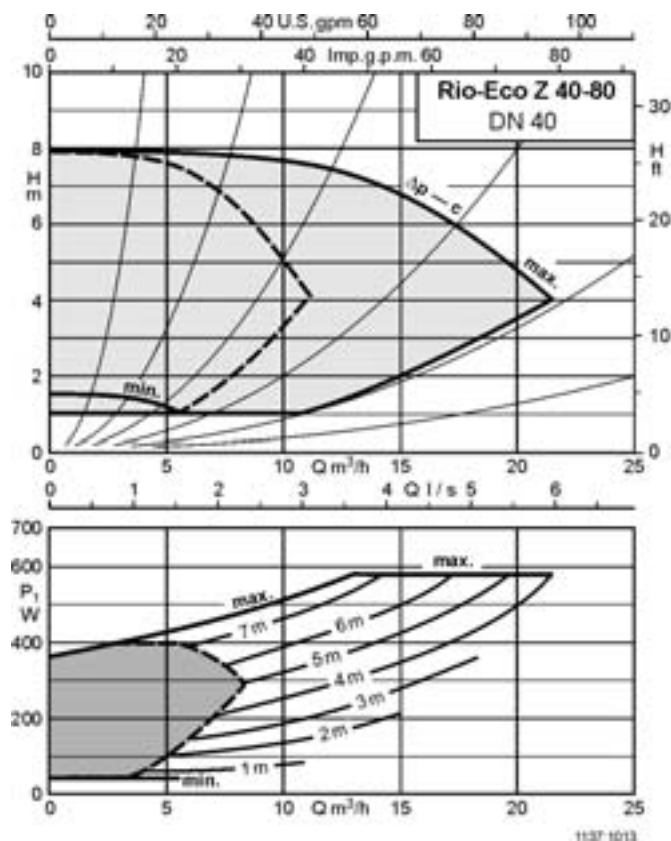
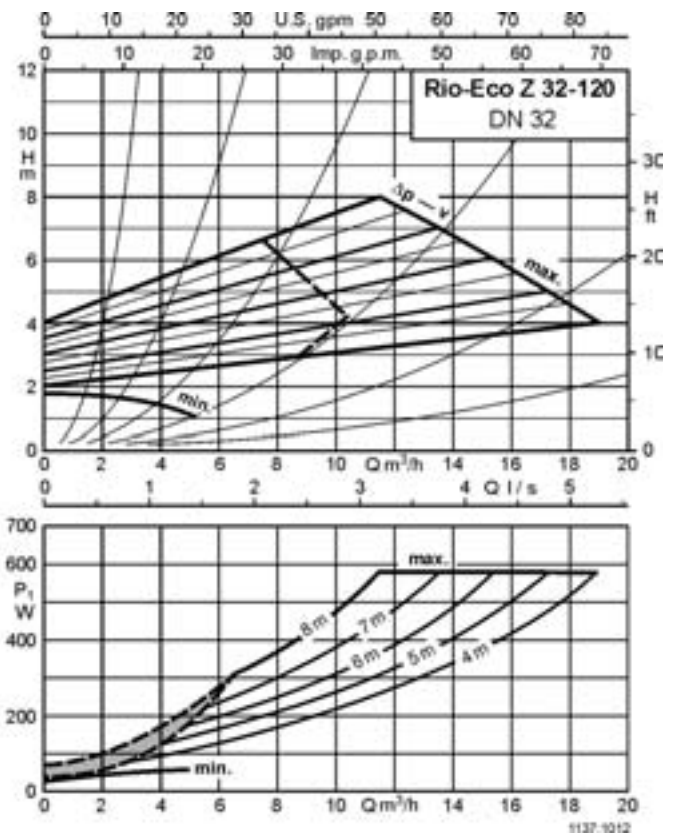
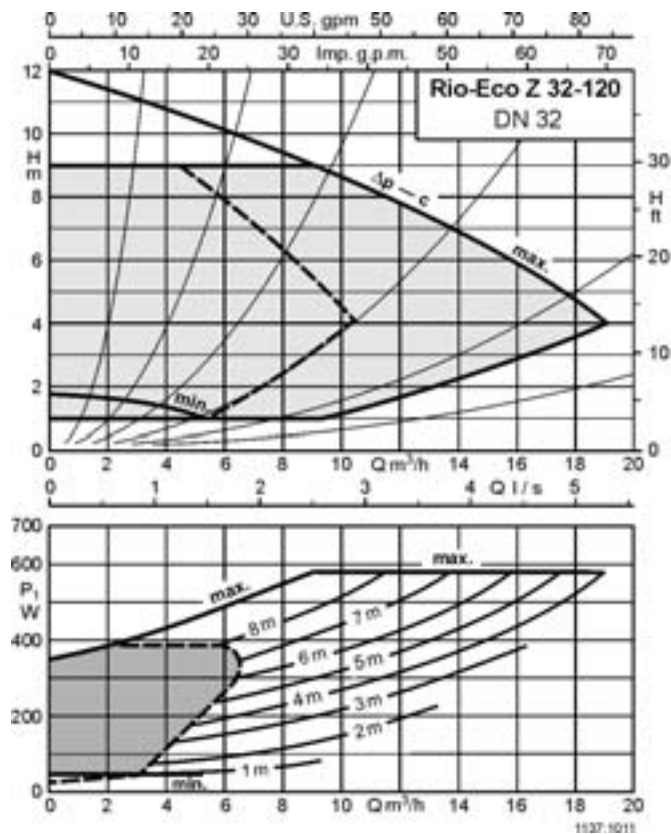
min. = Night-time operation at minimum speed

Single Pump Characteristic Curves



min. = Night-time operation at minimum speed

Twin Pump Characteristic Curves

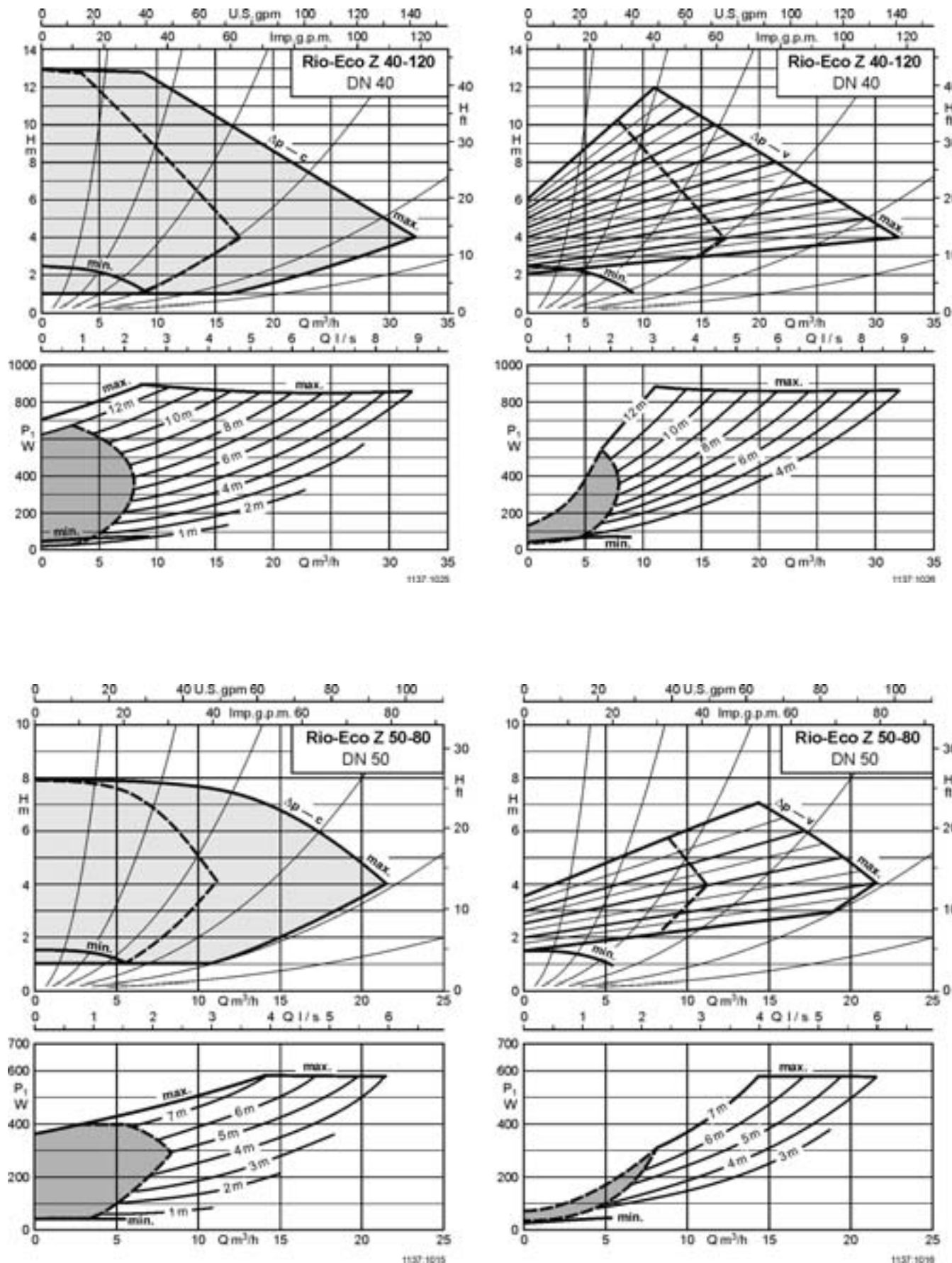


min = Nachabsenkung auf Min.-Drehzahl — Einzelbetrieb

Parallelbetrieb

P₁-Kennlinie für Einzelbetrieb

Twin Pump Characteristic Curves

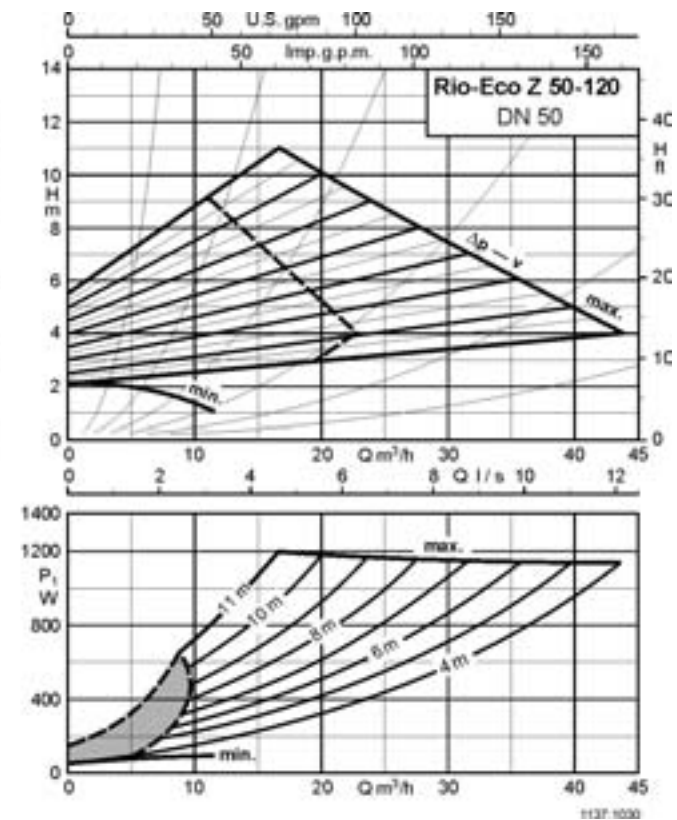
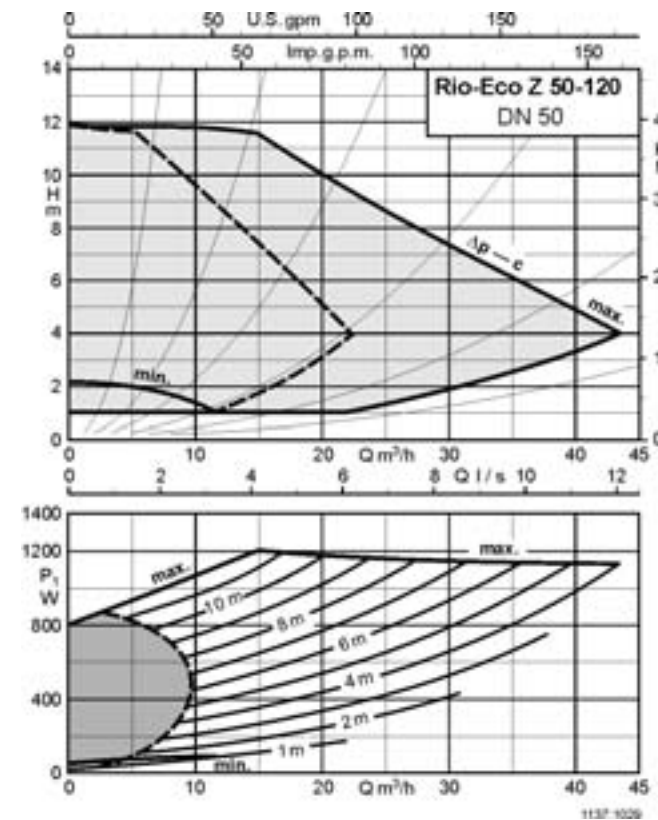
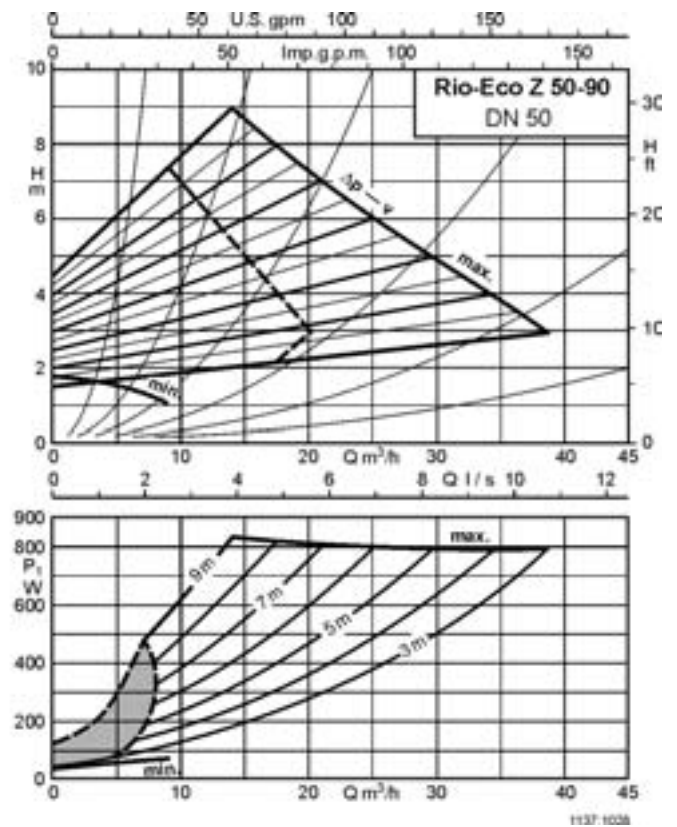
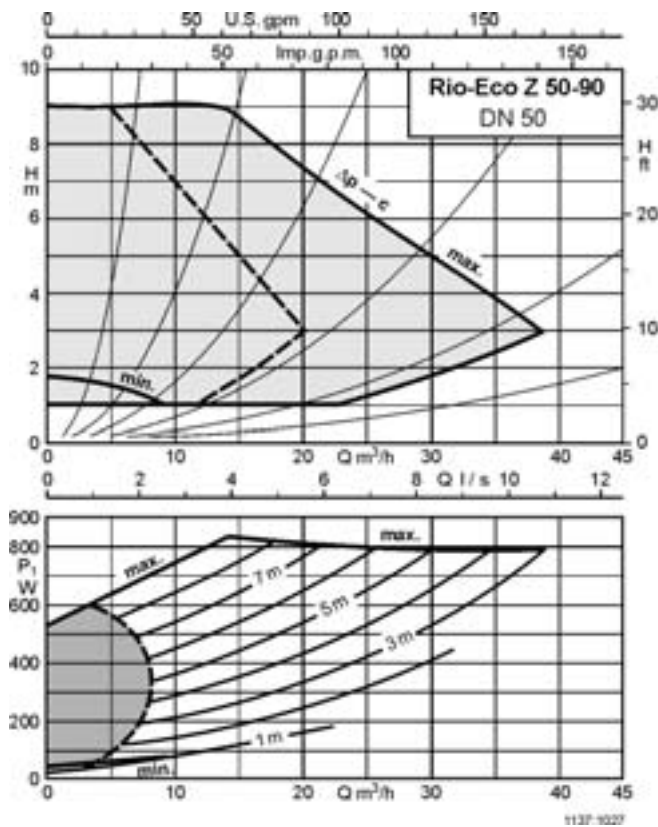


min = Nachabsenkung auf Min.-Drehzahl - - - Einzelbetrieb

— Parallelbetrieb

 P₁-Kennlinie für Einzelbetrieb

Twin Pump Characteristic Curves



min = Nachabsenkung auf Min.-Drehzahl - - - - Einzelbetrieb

— Parallelbetrieb

 P₁-Kennlinie für Einzelbetrieb

Technical Data

Rio-Eco	DN Rp	Speed	P ₁	P ₂ max	Motor protection	Signalling contacts	Rated current	Max. permissible operating pressure 10 bar	
		1/min	W	W					kg
30-120	1 1/4	1600 - 4800	18 - 290	200	●	SSM	0.18 - 1.32	29 130 534	6.0
32-120	32	1600 - 4800	18 - 290	200	●	SSM	0.18 - 1.32	29 130 535	8.5
40-80	40	1800 - 4800	18 - 290	200	●	SSM	0.18 - 1.32	29 130 536	9.5
40-120	50	1400 - 4600	21 - 450	350	●	SSM	0.16 - 2.01	29 130 541	14.0
50-80	50	1800 - 4800	18 - 290	200	●	SSM	0.18 - 1.32	29 130 537	11.5
50-90	50	1400 - 4100	21 - 430	350	●	SSM	0.16 - 1.88	29 130 542	15.5
50-120	50	1400 - 4600	21 - 620	500	●	SSM	0.16 - 2.70	29 130 543	15.5
65-90	65	1400 - 4600	21 - 620	500	●	SSM	0.16 - 2.70	29 130 544	17.0

Rio-Eco Z									
Z 32-120	32	1600 - 4800	18 - 290	200	●	SSM	0.18 - 1.32	29 130 538	15.0
Z 40-80	40	1800 - 4800	18 - 290	200	●	SSM	0.18 - 1.32	29 130 539	16.0
Z 40-120	40	1400 - 4600	21 - 450	350	●	SSM	0.16 - 2.01	29 130 545	24.7
Z 50-80	50	1800 - 4800	18 - 290	200	●	SSM	0.18 - 1.32	29 130 540	18.0
Z 50-90	50	1400 - 4100	21 - 430	350	●	SSM	0.16 - 1.88	29 130 546	27.0
Z 50-120	50	1400 - 4600	21 - 620	500	●	SSM	0.16 - 2.70	29 130 547	27.0

1) ● = integrated motor protection in the terminal box
SSM = general fault reporting

Pipe Connection

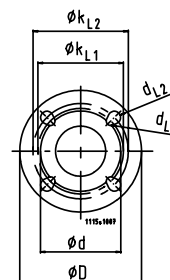
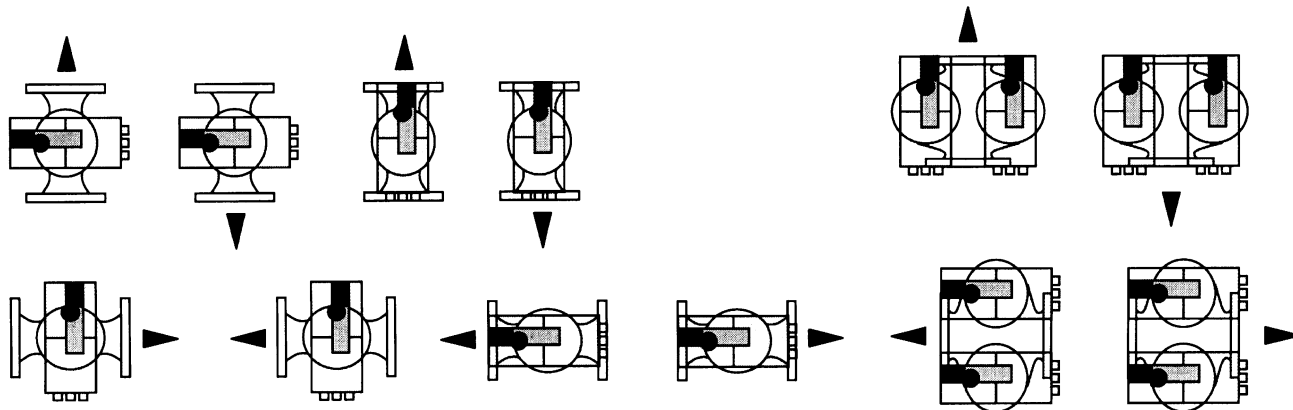
Flanged pumps fitted with an adapter flange (oval bolt hole pattern) can be connected to PN 6 and PN 16 mating flanges to DIN or DIN EN up to nominal diameters of DN 65. Adapter flanges of this type cannot be connected with other adapter flanges. Use bolts of property class 4.6 or higher for the flange connections. The washers included in the scope of supply must be fitted between the bolt / nut head and the adapter (oval bolt hole) flange.

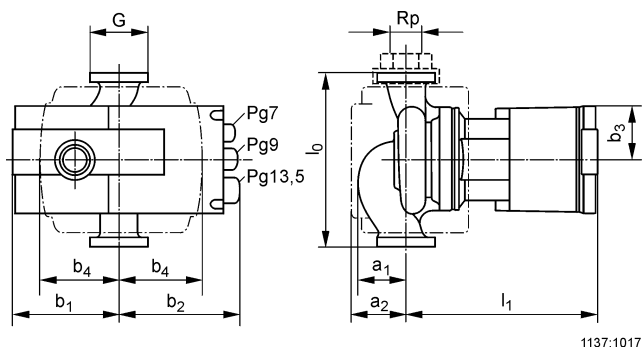
Recommended bolt lengths:

Thread	Tightening torque	Min. bolt length	
		DN 32/DN 40	DN 50/DN 65
PN 6 flanged connection			
M 12	40 Nm	55 mm	60 mm
PN 10 flanged connection			
M 16	95 Nm	60 mm	65 mm

Flange Dimensions

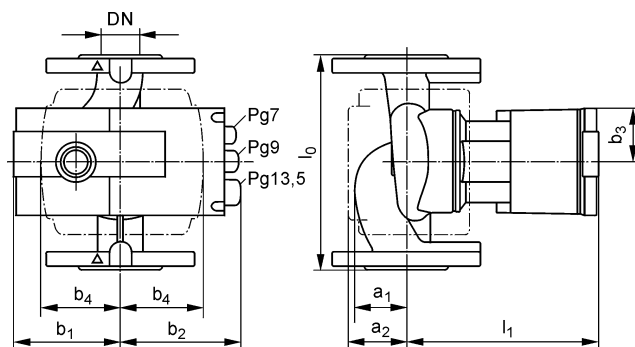
Adapter flange	ØD	Ød	Ø _{kL1} /k _{L2}		n x d _{L1} /d _{L2}	
			PN 6	PN 10	PN 6	PN 10
DN 32	140	78	90	100	4 x Ø14	4 x Ø19
DN 40	150	88	100	110	4 x Ø14	4 x Ø19
DN 50	165	102	110	125	4 x Ø14	4 x Ø19
DN 65	185	122	130	145	4 x Ø14	4 x Ø19


Permissible Installation Positions


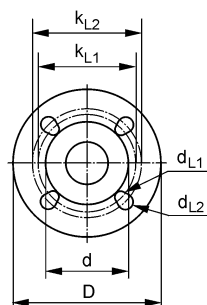
**Outline Drawing
Screw-ended Pump**


1137:1017

Rio-Eco	Rp	G	l_0	a_1	a_2	l_1	b_1	b_2	b_3	b_4
30-120	1 1/4	2	180	50	54	203	105	125	55	78

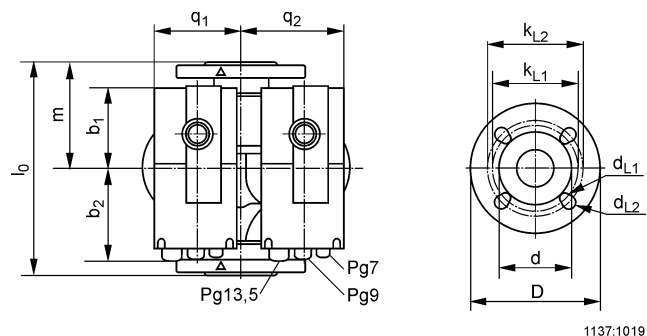
Flanged Pump


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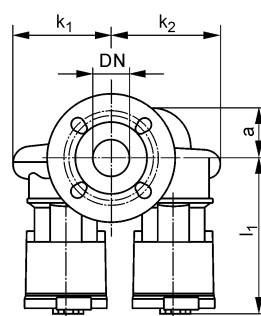


Caution: if the module is installed vertically, dimension b_2 will go beyond the length up to the pump connection nozzle.

Rio-Eco	DN	l_0	a_1	a_2	l_1	b_1	b_2	b_3	b_4
32-120	32	220	50	54	204	105	125	55	78
40-80	40	220	53	59.5	205	105	125	55	78
40-120	40	250	62	84	252	119	142	65	92
50-80	50	240	50	64.5	210	105	125	55	78
50-90	50	280	61	83	256	119	142	65	92
50-120	50	280	61	83	256	119	142	65	92
65-90	65	280	61	83	256	119	142	65	92

Flanged Twin Pump


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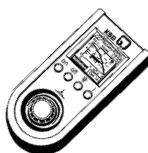


Caution: dimension b_2 will go beyond the length up to the pump connection nozzle.

Rio-Eco Z	DN	l_0	m	l_1	a	k_1	k_2	b_1	b_2	q_1	q_2
32-120	32	220	110	204	59	119	132	105	125	110	130
40-80	40	220	110	205	65	125	140	105	125	113	132
40-120	40	250	125	252	62	100	110	119	142	145	145
50-80	50	240	120	210	63	145	138	105	125	132	132
50-90	50	280	140	256	62	110	125	119	142	145	145
50-120	50	280	140	256	62	110	125	119	142	145	145

Modules and Accessories

Description	for pump series Rio-Eco / Rio-Eco Z	Ident. No.	kg
Process control processor (PCP) module (retrofittable) - with PCP interface for connection to the digital building management system	X	01 081 036	0.2
LON module (retrofittable) - with LON interface	X	01 081 037	0.2
Ext.Off module (retrofittable) - with control input for "Pump OFF" - with control output 0...10 V for remote setting of speed or set point	X	01 081 038	0.2
Ext.Min module (retrofittable) - with control input for "Minimum speed" - with control output 0...10 V for remote setting of speed or set point	X	01 081 039	0.2
SBM module (retrofittable) - for general "In operation" message - with control output 0...10 V for remote setting of speed or set point	X	01 081 040	0.2
Tele-Monitor - Remote control for Rio Eco / Rio Eco Z with infrared interface (IR) - Start-up and diagnostic instrument / tool - Extension of pump functions - Direction-of-rotation verification instrument for all pumps and standardized motors	X	01 054 714	0.4



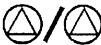
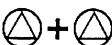
The following combination options and functions are available for twin pump management:

Module type	PCP module	LON module	Ext.Off module	Ext.Min module	SBM module
Function 1)					
Serial digital PCP interface for connection to the building management system (BMS) via KSB interface converter or coupler modules provided on site	1xMA 1xSL				
Serial digital LON interface for connection to LON/Works networks, FTT 10 A transceiver	1xSL	1xMA			
Input for volt-free NC contact enabling the " Ext.Off " function 2) " 0...10 V " control input for remote setting of speed or set point 3)	1xSL		1xMA		
Input for volt-free NC contact enabling the " Ext.Min " function 4) " 0...10 V " control input for remote setting of speed or set point 3)	1xSL			1xMA	
SBM general "In operation" message via volt-free NO contact 5) " 0...10 V " control input for remote setting of speed or set point 3)					1xMA 1xSL

MA = Master, SL = Slave

- 1) The control functions govern the entire twin pump set.
The control functions are enabled at the twin pump's master.
The twin pump's slave receives the master pump's command via the modules' DP interface (2-core connection cable).
- 2) None of the drives runs.
- 3) The 0...10 V control input has various additional functions, see table on page 15.
- 4) The base load pump runs at minimum speed; the other drive does not run.
- 5) The general "In operation" message at the master shows when either one drive is running or when both drives are running.

Functions of the “0...10 V” analog input for twin pump management

Twin pump control mode	Duty / Stand-by mode 	Parallel operation 
Functions “0...10 V”		
Remote setting of speed (DDC) 0...1 V: Off 1...3 V: Min. speed 3...10 V: $n_{min}...n_{max}$	- The base load pump's speed is set in line with the voltage signal. - Base load pump change-over after 24 operating hours	- Both pumps run at the same speed set in line with the voltage signal.
Remote setting of set point 0...1 V: H_{min} 1...10 V: $H_{min}...H_{max}$	- Base load pump controls differential pressure - Base load pump change-over after 24 operating hours	- Peak load pump is started and stopped as required for optimum efficiency - Base load pump change-over after 24 operating hours

If the “Ext.Off” and “Ext.Min” functions are to be available in addition via volt-free contacts, an analog interface converter and 2 PCP modules are required.
All functions are then available at the interface converter (analog).

Technical Data of the Tele-Monitor

Enclosure	IP 43	Voltage supply	2 mignon alkaline cells
Vibration fatigue limit	IEC 68-2-6	Battery life	(included in the scope of supply) approx. 24 hours when switched on and back-lit
Operating temperature	- 10 °C to 40 °C	Permanent buffering	EE-Prom
Bearing temperature	- 20 °C to 70 °C	Generic emission standard	EN 50081-1
Transmitting and receiving range	max. 10 m	Generic immunity standard	EN 50082-2
Display	50 x 50 mm, can be back-lit		

Functional Description of the Tele-Monitor

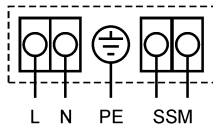
Communication Menu	Automatic connection between pump and Tele-Monitor via infrared interface (manual coding of the pumps is not required)
Display Menu	Display of the pump's actual data - Type - Set point Δp, actual Δp value - Flow rate - Set-point speed, actual speed - Power input - Modes of operation (Δp-c, Δp-v, Δp-T, On/Off, ...) - Fault reporting
Operation Menu	Changing the mode of operation and set point - Control mode (Δp-c, Δp-v, Δp-T, ...) - Set point (Δp, speed) - On/Off
Statistics Menu	Analysis of the pump's load profile - Histograms of the actual electrical and hydraulic values of an operating cycle - Operating hours and operating data counter
Service Menu	- Fault diagnosis - Fault statistics - Functional testing of pump - Functional testing of monitor - Functional testing of connection via PCP interface - Direction-of-rotation check (for all pumps and standardized motors)
Customization Menu	Customization of the Tele-Monitors - Dialogue language selection - Display contrast - Automatic cut-out (time-out) - Personal password - Default settings for automatic pump set-up at the push of a button

Wiring Diagram

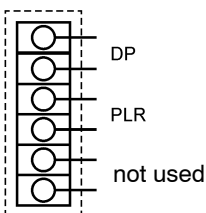
Connection to power supply

A.c. motor 1~230 V, 50 Hz

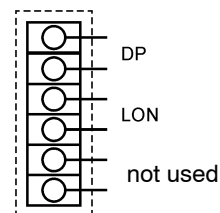
Standard



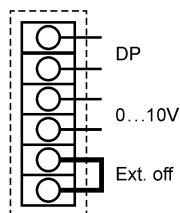
PCP Module



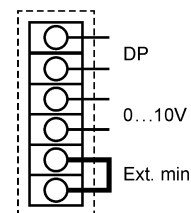
LON Module



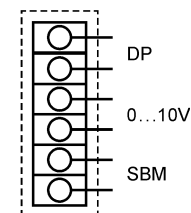
Ext.off Module



Ext.min Module



SBM Module



DP = Interface for twin pump management

PLR = Interface for PCP bus

LON = Interface for LON bus

0...10 V = remote setting of set point or speed

Ext.Off ¹⁾ = External volt-free NC contact
 - Closed: Pump enabled
 - Open: Pump "OFF"

Ext.Min ¹⁾ = External volt-free NC contact
 - Closed: Pump enabled
 - Open: Pump "OFF"

SBM = General "In operation" message (NO contact, 1 A, 250 V~)

¹⁾ Terminals are bridged on pump sets leaving the factory.

Technical Data

Process control processor (PCP) module:

Terminal cross-section	0.25 – 1.0 mm ²
Max. cable length	500 m

LON module:

Transceiver	FTT 10 A
Voltage supply	5 V= / 15 V= via the pump
Current requirement	30 mA
Terminal cross-section	0.25 – 1.0 mm ²
Bus cable	min 2x 0.34 mm ² , twisted pair (10 t/m), unshielded (for ex. J-Y(st)Y 2 x 2 x 0.8 mm ²)
Neuron ID	duplicate adhesive label with the bar code of the Neuron ID
Protocol	LONTalk

“Ext.Off” module

Contact rating	24 V DC, 10 mA
Electric strength	250 V AC
Max. cable length	100 m
Terminal cross-section	1.0 mm ²

“Ext.Min” module:

Contact rating	24 V DC, 10 mA
Electric strength	250 V AC
Max. cable length	100 m
Terminal cross-section	1.0 mm ²

General “In operation” message “SBM”:

Contact rating	250 V AC/1 A
Max. cable length	100 m
Terminal cross-section	1.0 mm ²

Control input “0...10 V”

Electric strength	24 V=
Input resistance of the voltage input	>100 kΩ
Accuracy	± 5 %
Max. cable length	25 m (shielded)
Terminal cross-section	1.0 mm ²