

Motor-independent Frequency Inverter

# PumpDrive R (KSB202)

## Type Series Booklet



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Type Series Booklet PumpDrive R (KSB202)

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## Pump Control Systems

### Variable Speed Systems

# PumpDrive R



### Main applications

Building services:

- Air-conditioning systems
- Heat generation/heat distribution
- Water supply systems

### Designation

Example: PDRV R 000K55 C

Designation key

Code	Description	
PDRV	PumpDrive type series	
R	R = Extended selection chart	
000K55	Power, e.g. 0.55 kW (0.75 hp)	
C	Mounting option	
	C	Cabinet-mounted model
	W	Wall-mounted model

Water:

- Water extraction/water withdrawal
- Water treatment/water conditioning
- Water distribution/water transport

Industry:

- Refrigeration/cooling distribution
- Heat generation/heat distribution
- Water treatment
- Fluid transport
- Cooling lubricant distribution
- Water extraction
- Service water supply

Waste water:

- Tank drainage
- Waste water transport

### General description

- Motor-independent variable speed system for centrifugal pumps

Modular self-cooling frequency inverter that enables continuously variable speed control of asynchronous motors and synchronous reluctance motors by means of analog standard signals, a field bus or the control panel. As PumpDrive R is self-cooling, it can be mounted on the motor, on the wall or in a control cabinet. Up to six pumps can be controlled without needing an additional controller. PumpDrive R extends the power range of PumpDrive 2 up to a rated power of 250 kW (standard) / 1400 kW (on request).

**PumpDrive R, cabinet-mounted models (IP20 / NEMA protected chassis enclosure)**

PumpDrive R, cabinet-mounted models (IP20 / NEMA protected chassis enclosure)

Housing type	P <sub>N</sub>		I		Enclosure	η	T <sup>1)2)</sup>			Dimensions <sup>3)</sup>						Mat. No.	[kg]	[lbs]
			3~400 V <sup>4)</sup>	3~480 V <sup>4)</sup>			Max.	Height	Width	Depth	Height	Width	Depth					
	[kW]	[hp]	[A]	[A]										[%]	[°C]			
A2	0,37	0,50	1,30	1,20	IP20	93,00	50	122	268	90	205	10,6	3,6	8,1	48229676	4,7	10,4	
A2	0,55	0,75	1,80	1,60	IP20	95,00	50	122	268	90	205	10,6	3,6	8,1	48229678	4,7	10,4	
A2	0,75	1,00	2,40	2,10	IP20	96,00	50	122	268	90	205	10,6	3,6	8,1	48229680	4,8	10,6	
A2	1,10	1,50	3,00	2,70	IP20	96,00	50	122	268	90	205	10,6	3,6	8,1	48229682	4,8	10,6	
A2	1,50	2,00	4,10	3,40	IP20	97,00	50	122	268	90	205	10,6	3,6	8,1	48229684	4,9	10,9	
A2	2,20	3,00	5,60	4,80	IP20	97,00	50	122	268	90	205	10,6	3,6	8,1	48229686	4,9	10,9	
A2	3,00	4,00	7,20	6,30	IP20	97,00	50	122	268	90	205	10,6	3,6	8,1	48229688	4,9	10,9	
A2	4,00	5,00	10,00	8,20	IP20	97,00	50	122	268	90	205	10,6	3,6	8,1	48229690	4,9	10,9	
A3	5,50	7,50	13,00	11,00	IP20	97,00	50	122	268	130	205	10,6	5,2	8,1	48229692	6,6	14,6	
A3	7,50	10,00	16,00	14,50	IP20	97,00	50	122	268	130	205	10,6	5,2	8,1	48229694	6,6	14,6	
B3	11,00	15,00	24,00	21,00	IP20	98,00	50	122	399	165	249	15,8	6,5	9,9	48229696	11,4	25,2	
B3	15,00	20,00	32,00	27,00	IP20	98,00	50	122	399	165	249	15,8	6,5	9,9	48229698	11,4	25,2	
B3	18,50	25,00	37,00	34,00	IP20	98,00	50	122	399	165	249	15,8	6,5	9,9	48229700	11,4	25,2	
B4	22,00	30,00	44,00	40,00	IP20	98,00	50	122	520	230	242	20,5	9,1	9,6	48229702	20	44,1	
B4	30,00	40,00	61,00	52,00	IP20	98,00	50	122	520	230	242	20,5	9,1	9,6	48229704	20	44,1	
B4	37,00	50,00	73,00	65,00	IP20	98,00	50	122	520	230	242	20,5	9,1	9,6	48229706	25	55,2	
C3	45,00	60,00	90,00	80,00	IP20	98,00	50	122	550	308	333	21,7	12,2	13,2	48229708	36,3	80,1	
C3	55,00	75,00	106,00	105,00	IP20	98,00	50	122	550	308	333	21,7	12,2	13,2	48229710	36,3	80,1	
C4	75,00	100,00	147,00	130,00	IP20	98,00	50	122	660	370	333	26	14,6	13,2	48229712	50,2	110,7	
C4	90,00	125,00	177,00	160,00	IP20	99,00	50	122	660	370	333	26	14,6	13,2	48229714	50,2	110,7	
D3H	110,00	150,00	212,00	190,00	IP20	98,00	50	122	909	250	375	35,8	9,9	14,8	48229716	62	136,7	
D3H	132,00	200,00	260,00	240,00	IP20	98,00	50	122	909	250	375	35,8	9,9	14,8	01733781	62	136,7	
D3H	160,00	250,00	315,00	302,00	IP20	98,00	50	122	909	250	375	35,8	9,9	14,8	01733783	62	136,7	
D4H	200,00	300,00	395,00	361,00	IP20	98,00	50	110	1027	375	375	40,4	14,8	14,8	01839750	125	136,7	
D4H	250,00	350,00	480,00	443,00	IP20	98,00	50	110	1027	375	375	40,4	14,8	14,8	01839789	125	136,7	

**PumpDrive R, wall-mounted models (IP54/IP55 / NEMA 12 enclosure)**

PumpDrive R, wall-mounted models (IP54/IP55 / NEMA 12 enclosure)

Housing type	P <sub>N</sub>		I		Enclosure	η	T <sup>5)6)</sup>			Dimensions <sup>7)</sup>						Mat. No.	[kg]	[lbs]
			3~400 V <sup>8)</sup>	3~480 V <sup>8)</sup>			Max.	Height	Width	Depth	Height	Width	Depth					
	[kW]	[hp]	[A]	[A]										[%]	[°C]			
A4	0,37	0,50	1,30	1,20	IP55	93,00	50	122	420	242	195	16,6	9,6	7,7	48229677	12,1	26,7	
A4	0,55	0,75	1,80	1,60	IP55	95,00	50	122	420	242	195	16,6	9,6	7,7	48229679	12,4	29,8	
A4	0,75	1,00	2,40	2,10	IP55	96,00	50	122	420	242	195	16,6	9,6	7,7	48229681	12,2	26,9	
A4	1,10	1,50	3,00	2,70	IP55	96,00	50	122	420	242	195	16,6	9,6	7,7	48229683	12,2	26,9	
A4	1,50	2,00	4,10	3,40	IP55	97,00	50	122	420	242	195	16,6	9,6	7,7	48229685	12,3	27,2	
A4	2,20	3,00	5,60	4,80	IP55	97,00	50	122	420	242	195	16,6	9,6	7,7	48229687	12,3	27,2	
A4	3,00	4,00	7,20	6,30	IP55	97,00	50	122	420	242	195	16,6	9,6	7,7	48229689	12,3	27,2	
A4	4,00	5,00	10,00	8,20	IP55	97,00	50	122	420	242	195	16,6	9,6	7,7	48229691	12,3	27,2	
A5	5,50	7,50	13,00	11,00	IP55	97,00	50	122	420	242	195	16,6	9,6	7,7	48229693	14	30,9	

- 1 T = maximum permissible ambient temperature
- 2 Not including power derating for increased ambient temperature
- 3 Standard design without shielding plate and without optional components
- 4 Output current of frequency inverter. Serves as a comparison with the nominal motor current. The output current is not suitable for selecting back-up fuses.
- 5 T = maximum permissible ambient temperature
- 6 Not including power derating for increased ambient temperature
- 7 Standard design without optional components
- 8 Output current of frequency inverter. Serves as a comparison with the nominal motor current. The output current is not suitable for selecting back-up fuses.

Housing type	P <sub>N</sub>		I		Enclosure	η	T <sup>(5)6)</sup>		Dimensions <sup>7)</sup>						Mat. No.	[kg]	[lbs]
			3~400 V <sup>8)</sup>	3~480 V <sup>8)</sup>			Max.	°C	°F	Height	Width	Depth	Height	Width			
	[kW]	[hp]	[A]	[A]													
							[%]										
A5	7,50	10,00	16,00	14,50	IP55	97,00	50	122	420	242	195	16,6	9,6	7,7	48229695	14	30,9
B1	11,00	15,00	24,00	21,00	IP55	98,00	50	122	480	242	260	18,9	9,6	10,3	48229697	23	50,8
B1	15,00	20,00	32,00	27,00	IP55	98,00	50	122	480	242	260	18,9	9,6	10,3	48229699	23	50,8
B1	18,50	25,00	37,00	34,00	IP55	98,00	50	122	480	242	260	18,9	9,6	10,3	48229701	23	50,8
B2	22,00	30,00	44,00	40,00	IP55	98,00	50	122	650	242	260	25,6	9,6	10,3	48229703	28	61,8
B2	30,00	40,00	61,00	52,00	IP55	98,00	50	122	650	242	260	25,6	9,6	10,3	48229705	28	61,8
C1	37,00	50,00	73,00	65,00	IP55	98,00	50	122	680	308	310	26,8	12,2	12,3	48229707	34,1	75,2
C1	45,00	60,00	90,00	80,00	IP55	98,00	50	122	680	308	310	26,8	12,2	12,3	48229709	41,2	90,9
C1	55,00	75,00	106,00	105,00	IP55	98,00	50	122	680	308	310	26,8	12,2	12,3	48229711	41,2	90,9
C2	75,00	100,00	147,00	130,00	IP55	98,00	50	122	770	370	335	30,4	14,6	13,2	48229713	59,9	132,1
C2	90,00	125,00	177,00	160,00	IP55	99,00	50	122	770	370	335	30,4	14,6	13,2	48229715	60,2	132,8
D1H	110,00	150,00	212,00	190,00	IP54	98,00	50	122	1324	325	381	52,2	12,8	15,1	48229717	62	136,7
D1H	132,00	200,00	260,00	240,00	IP54	98,00	50	122	1324	325	381	52,2	12,8	15,1	01733782	62	136,7
D1H	160,00	250,00	315,00	302,00	IP54	98,00	50	122	1324	325	381	52,2	12,8	15,1	01733784	62	136,7
D2H	200,00	300,00	395,00	361,00	IP54	98,00	50	110	1107	325	379	43,6	12,8	14,9	01839790	125	276
D2H	250,00	350,00	480,00	443,00	IP54	98,00	50	110	1107	325	379	43,6	12,8	14,9	01839792	125	276

### Technical data

Technical data

Characteristic	Value
<b>Mains supply</b>	
Mains voltage	3~ 380-480 V ±10 %
Extended mains voltage range (on request)	3~200 -240V or 3~525 -690V
Mains frequency	50/60 Hz
<b>Environment</b>	
Enclosure	IP20 for cabinet-mounted models (NEMA protected chassis) IP55 for wall-mounted models (NEMA 12)
<b>Inputs and outputs</b>	
Inputs	2 × analog 4 × digital
Outputs	1 × analog 2 × digital
Terminals	2 × digital

### Functions (overview)

- Variable speed control of centrifugal pumps with asynchronous motors, permanent magnet synchronous motors or KSB SuPremE synchronous reluctance motors
- Multi-functional graphical control panel
- Change between Manual / Off / Auto modes and alarm acknowledgement
- Help function for each parameter
- Quick menu for quick start-up/commissioning
- Full motor protection with PTC data analysis
- Emergency operation at reduced speed in the event of excessive temperature, undervoltage or mains phase failure
- Mains phase failure monitoring
- Real-time clock for timed control functions
- Separate operating hours counters, kWh meters and fault message memories for inverter and motor
- Trend function (integrated electronic operating data log)
- Standard cascade control, dry running of pump and no-flow/low-flow detection
- Energy-saving mode with sleep mode function
- Dynamic pressure/differential pressure setpoint compensation
- 4 internal PID controllers
- Smart logic function with 10 actions for simple drive tasks
- Control terminals galvanically isolated from the power unit
- Up to a rating of 90 kW compliant with Product Standard EN 61800-3, category C1 for use in residential, commercial and light industrial environments (first environment).
- For ratings of 110 kW and above compliant with category C2 for use in industrial environments (second environment).
- Deragging function

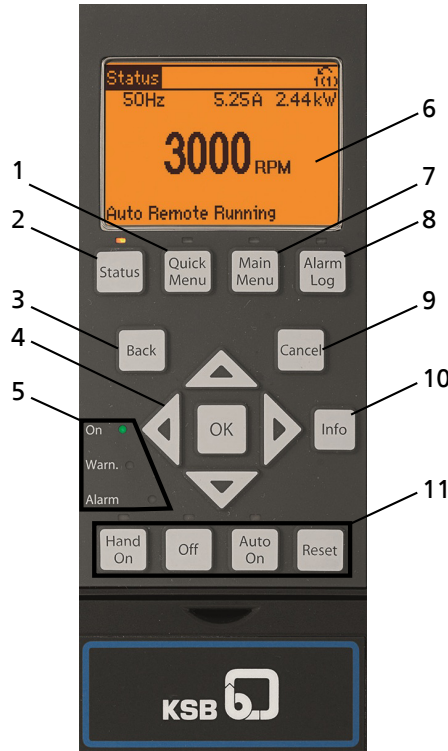
### Deragging function

The deragging function is a preventive measure to keep the impeller clean. The function can be triggered by start/stop command or as a time based action with a programmable Off-

Delay and Run-Time. The deragging feature is easy to configure, prolongs the lifetime and number of callouts due to blockage of the pump.

**CAUTION!** The de-ragging function must not be activated if the pump must not be operated in reverse.

### Control panel



Control panel

### Control panel

Description of control panel

Item	Description	Function
1	Quick Menu	Quick menu for quick start-up/commissioning
2	Status	Display of operating status information
3	Back	Serves to return to the previous menu item or the previous list
4	Navigation key	Quick navigation between menu options
5	LED traffic light function	The traffic light function provides information about the pump system's operating status.
6	Display	Plain-text display in end user's language
7	Main Menu	Access to all parameters
8	Alarm Log	Display of fault history
9	Cancel	Serves to undo the last entry unless it has been confirmed
10	Info	Help function for each parameter
11	Change between Manual / Off / Auto modes and alarm acknowledgement	Keys for fast change to Off, or manual or automatic mode, as well as acknowledgement of alarms

The control panel can be used for the following, for example:

- Plain-text display in end user's language
- Illustration of curves (e.g. current, voltage, energy consumption, etc.)
- Access to all system parameters
- Password protection for all frequency inverter settings
- Freely configurable user menu with separate password protection
- Saving and copying of parameter sets

## Accessories

### Interface description

#### Integrated interfaces

- USB interface
- RS485 interface

### Optionally available interfaces for bus communication (no combinations)

- Profibus DPV1
- ProfiNet
- Ethernet IP
- Modbus TCP
- DeviceNet

### Bus communication integrated as standard

- MODBUS (RTU)

## Inputs and outputs

Description of inputs and outputs

	Version	Description
Inputs:	2 × analog	0/4 - 20 mA switchable, scalable and invertible
	4 × digital	24 V logic, selection of H-enabled or L-enabled, programmable (e.g. for release, etc.)
Outputs:	1 × analog	0/4 - 20 mA programmable and scalable
Terminals:	2 × digital	24 V logic, for use as input or output (selection of H-enabled or L-enabled)
Relays:	1×240 V AC 1×400 V AC	Both relays volt-free, programmable, ON delay and/or OFF delay (e.g. for "in operation" message and fault message, etc.)
Auxiliary voltages:	1×10 V DC	For 1 kΩ setpoint potentiometer and motor protection (PTC thermistor)
	2×24 V DC	For the digital inputs and to supply active feedback value transmitters, such as KSB PumpMeter

- Optional input (safe stop)  
A digital input for a safe stop function provided as additional terminal; may eliminate the need for a mains contactor for Emergency OFF (level 2 to EN 13849-1 or SIL 2 to EN 61508)
- Optional integrated fuse and mains switch
- Extended input/output options  
On request







**KSB SE & Co. KGaA**  
Johann-Klein-Straße 9 • 67227 Frankenthal (Germany)  
Tel. +49 6233 86-0  
[www.ksb.com](http://www.ksb.com)