

wilo

Pioneering for You

HVAC OEM Competence Centre

Para ST ** 7/iPWM Datasheet

iPWM



iPWM



Para ST ** 7/iPWM

Heating



Field of application



Solar thermal

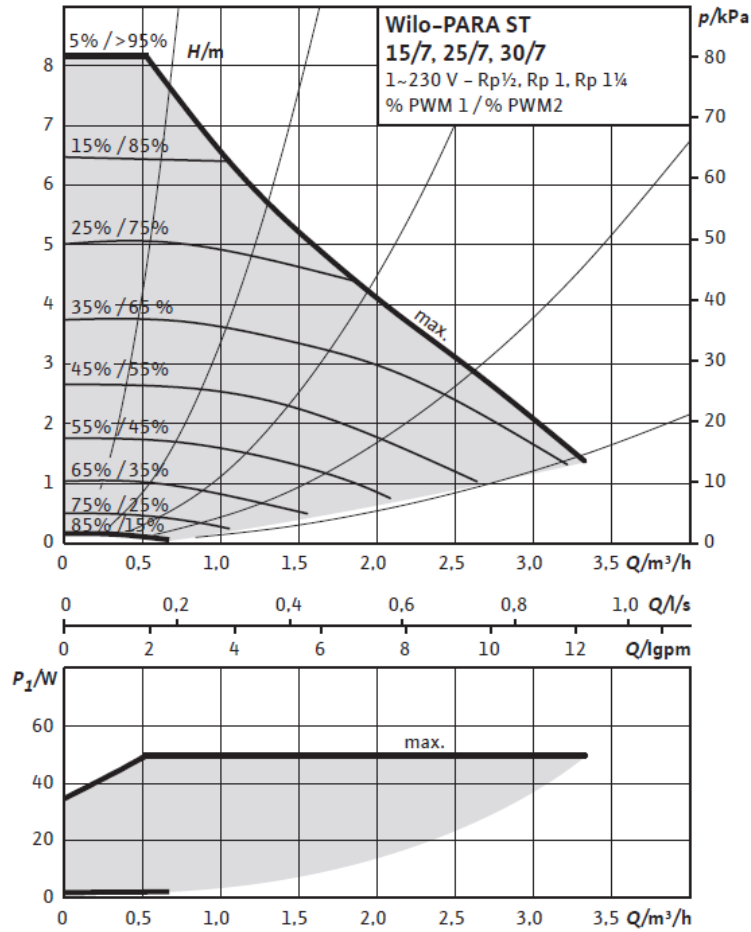
Para ST 15-130/7-50/ iPWM2-12

WILO	High Efficiency pump for heating application
ST	Inline cast iron pump housing dedicated for solar thermal application
15	Threaded connection DN 15 (25,30: also available)
130	Pump housing length 130 (180: also available)
7	7,7 = delivery head in [m] at Q = 0 m ³ /h
50	Max power consumption
iPWM	The pump is controlled by an external signal PWM2, i=feedback signal
12	Control box orientation 12 o'clock (3, 6, 9 o'clock: also available)

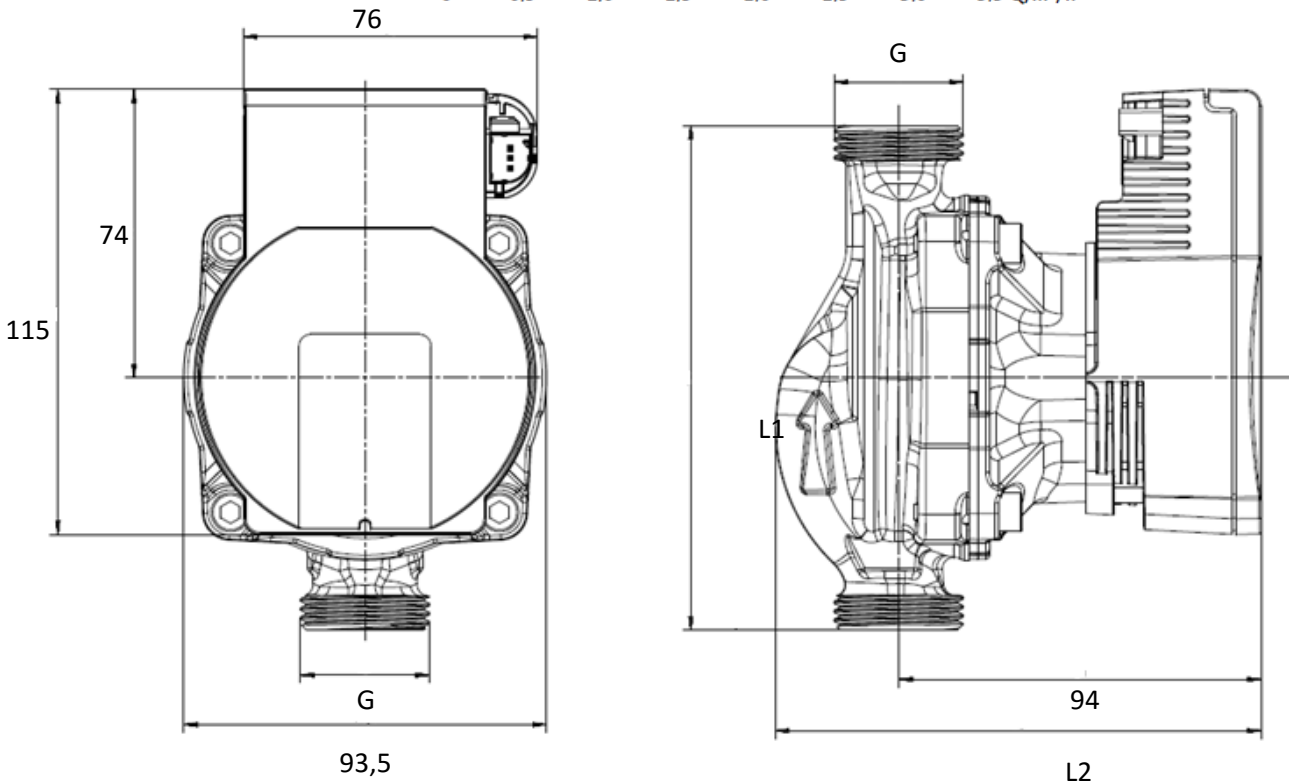


Heating

Hydraulic operational area



Dimensions



Type	G	L1	L2	Weight
	mm	mm	mm	kg
15-130	1"	130	125	1,5
25-130	1"1/2	130	127	1,7
25-180	1"1/2	180	127	1,8
30-180	2"	180	127	2

Approved fluids (other fluids on request)	Heating water (in accordance with VDI 2035) Water-glycol mixtures (max. 1:1; above 20% admixture, the pumping data must be checked)
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Power

Energy Efficiency Index (EEI)	≤ 0.20
Max. delivery head	7,7 m
Max. volume flow	3,5 m ³ /h

Permitted field of application

Temperature range for applications in HVAC systems at max. ambient temperature. Limit values for continuous operation at maximum rated power	Of 58°C = 0 to 100°C Of 62°C = 0 to 90°C Of 66°C = 0 to 80°C Of 71°C = 0 to 70°C
Maximum static pressure	PN 10

Electrical connection

Mains connection	1~230 V +10%/-15%, 50/60 Hz (IEC 60038 standard voltage)
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Motor/electronics

Low voltage directive	20014/95/EC Conform
Electromagnetic compatibility	EN 61800-3
Emitted interference	EN 61000-6-3 EN 61000-6-4
Interference resistance	EN 61000-6-2 EN 61000-6-1
Protection class	IPx4D
Insulation class	F
RoHS / REACH	Compliant but not submitted

Minimum suction head at suction port to avoid cavitation at water pumping temperature

Minimum suction head at 50/95°C	0.5/4.5 m
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Motor data

Para	Speed	Power consumption 1-230 V	Current at 1-230 V	Motor protection
	n	P1	I	-
	rpm	W	A	-
ST ** 7/iPWM	700 - 4700	1.8-50	0.02-0.43	Integrated

Materials

Para	Pump housing	Impeller	Pump shaft	Bearing
ST ** 7/iPWM	Cast iron with cataphoresis treatment	PP composite with GF 40%	Stainless steel	Carbon, metal impregnated



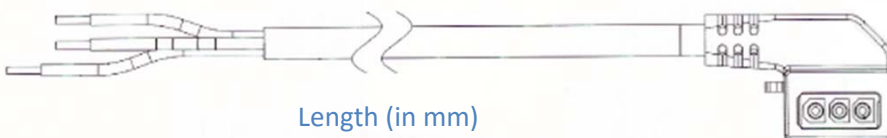
Electrical Power connections

Integrated Molex 3-way connector



Heating

Accessories power cable



Available mains cables

Overmoulded power connector with brass end splices and type Facon PR260 on terminal box side (disconnection possible)

cable length 500mm	4530966
cable length 1000mm	4524578
cable length 1500mm	4530763
cable length 2000mm	4527857

Not assembled



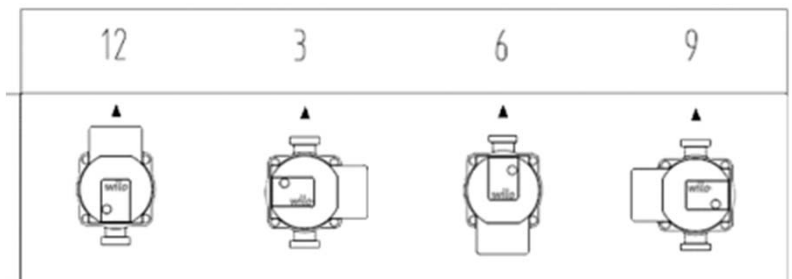
Molex 3 ways



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Electrical Box orientation

▲ Flow direction



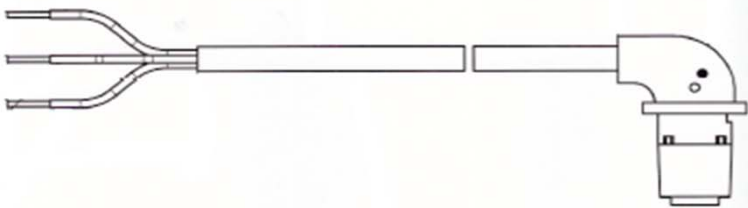


Electrical Signal connections

Front signal connection



Accessories signal cable



Available mains cables

Overmoulded signal connector with brass end splices and type Facon PR72 (3 wires) on terminal box side (disconnection possible)

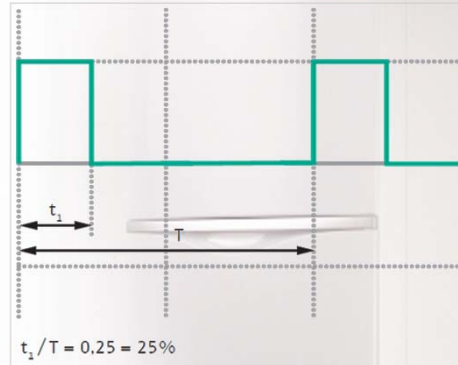
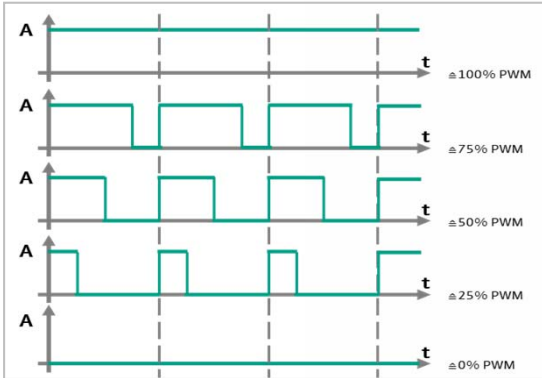
Overmoulded signal connector with brass end splices and type Facon PR72 (3 wires) on terminal box side (disconnection possible)	cable length 500mm	4530965
	cable length 1000mm	4530663
	cable length 1500mm	4530764
	cable length 2000mm	4530664

Not assembled



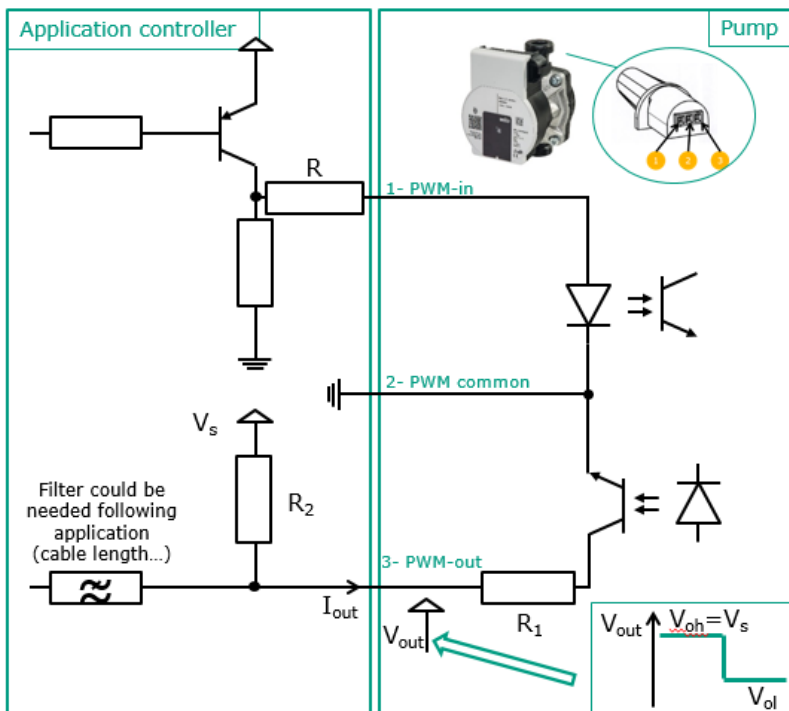
External control via a iPWM system

The actual /setpoint level assessment required for control is referred to a remote controller. The remote controller sends a PWM signal as an actuating variable to the Wilo-Para. The PWM signal generator gives a periodic pulse order to the pump (the duty cycle) according to DIN IEC 60469-1. The actuating variable is determined by the ratio between pulse duration and pulse period. The duty cycle is defined as a ratio without dimension, with a value of 0 ... 1 or 0 ... 100 %. This is explained in the following with ideal pulses which form a rectangular wave.



Heating

iPWM interface



PWM-in

Signal frequency	100Hz-5000Hz (1000Hz nominal)
Signal amplitude:	$U_{IH} = 4 - 24V$ $U_{IL} \leq 1V$ $I_{IH} = 3.5 - 10mA$ (depending on U_{IH})
Output resistance [R]:	$>50 \Omega *$

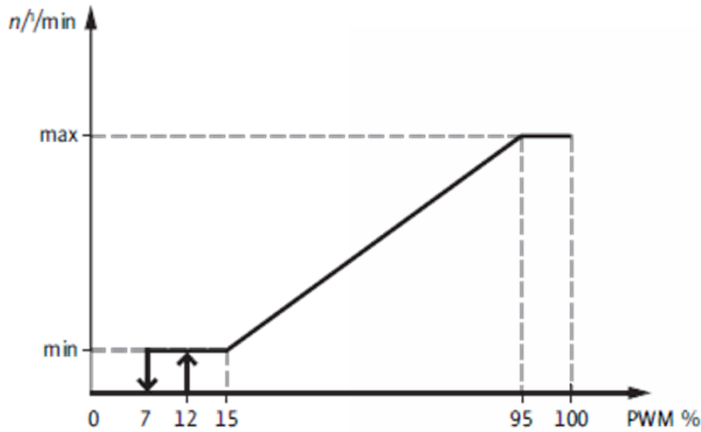
PWM-out

V_s	$3V \leq V_s \leq 24V$
R_2	typical $4,7k\Omega$ for $V_s = 5V *$
Signal frequency:	$75Hz \pm 2Hz$
R_1	$470\Omega \pm 5\%$
$V_{ol} = V_{out low}$	$<1V$ for $I_{out} < 1mA$

* depending on customer application

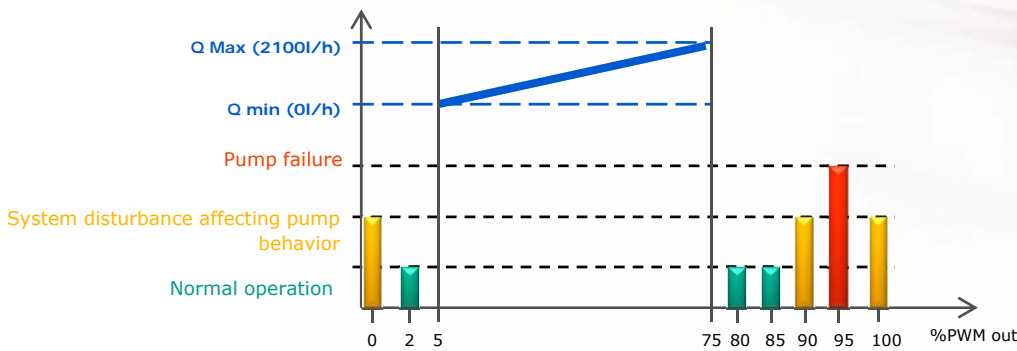


iPWM-in signal logic 2 (Solar) (%)



< 7	Pump stops (standby)
7-15	Pump runs at minimum speed (operation)
12-15	Pump runs at minimum speed (start-up)
15-95	Pump speed increases linearly from minimum to maximum
> 95	Pump runs at maximum speed
Signal frequency:	100 Hz-5000 Hz (1000 Hz nominal)
Signal amplitude:	Minimum 3.6V at 3 mA Up to 24V for 7.5 mA absorbed by the pump interface
Signal polarity:	yes

iPWM-out signal logic (heating) (%)



% PWM-out	Status	Potential causes
0	Pump output iPWM interface damaged	iPWM interface in short circuit
2	Stand-by, pump is ready to run	/
5-75	Pump is running normally, flow information is supplied	/
80	Abnormal running mode Pump is running but not at optimal performance	- Undervoltage 160/170-194V - Self thermal protecting mode
85	Abnormal function mode Pump has stopped but is still functional	- Undervoltage <160/170V - Overvoltage - Unexpected external flow
90	Abnormal function mode Pump has stopped but is still functional Check the installation setup and medium	- Failure on another component than pump - Debris in the installation - Bad temperature setup
95	The pump has stopped due to permanent failure	- Pump blocked - Electronic module out of order
100	Problem of iPWM connection	iPWM interface in open circuit

Heating



iPWM-out accuracy

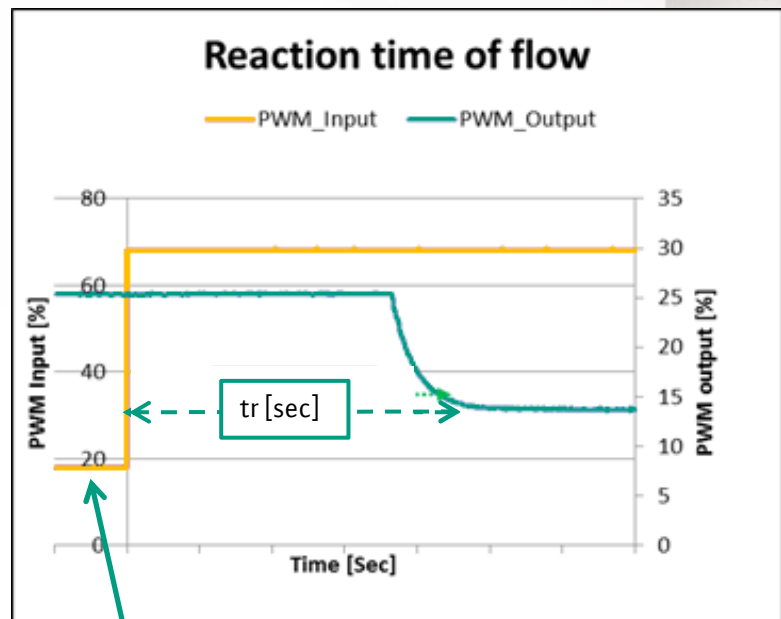
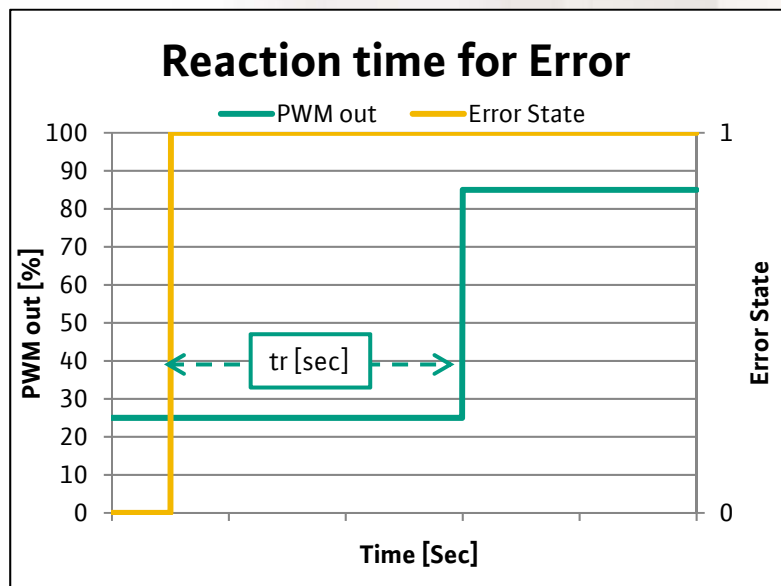
Heating circuit (water)	Accuracy on measurement (valid for rotation speed > 2000 RPM)	Resolution on iPWM output (additional to accuracy)
for $Q \leq 1400\text{L/h}$	+/- 200 L/h*	10 L/h
for $Q > 1400\text{L/h}$	+/- 20%*	10 L/h

*temperature correction factor available on demand for refining

Heating

iPWM-out reaction time

% PWM-out	Reaction time
0	
2	5 sec
5-75	5 sec
80	60 sec
85	2 sec
90	2 sec
95	5 sec
100	



Demand of modification via iPWM-in at t=0

If the controller adjusts iPWM-in with a higher frequency than the “reaction time”, the flow data sent by iPWM-out may not be updated. However the rotation speed will change according to the demand.

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