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Pioneering for You

HVAC OEM Competence Centre

Para ST ** 7/iPWM Datasheet

iPWM



iPWM



Para ST ** 7/iPWM

Heating



iPWM

Field of application



Solar thermal

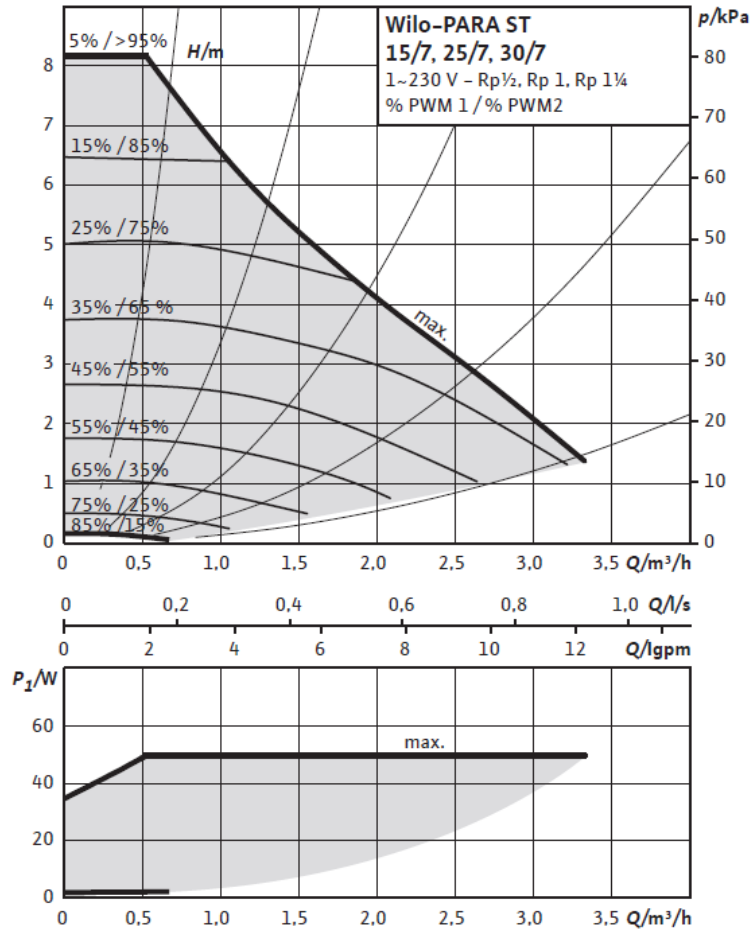
Para ST 15-130/7-50/ iPWM2-12

| 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) |

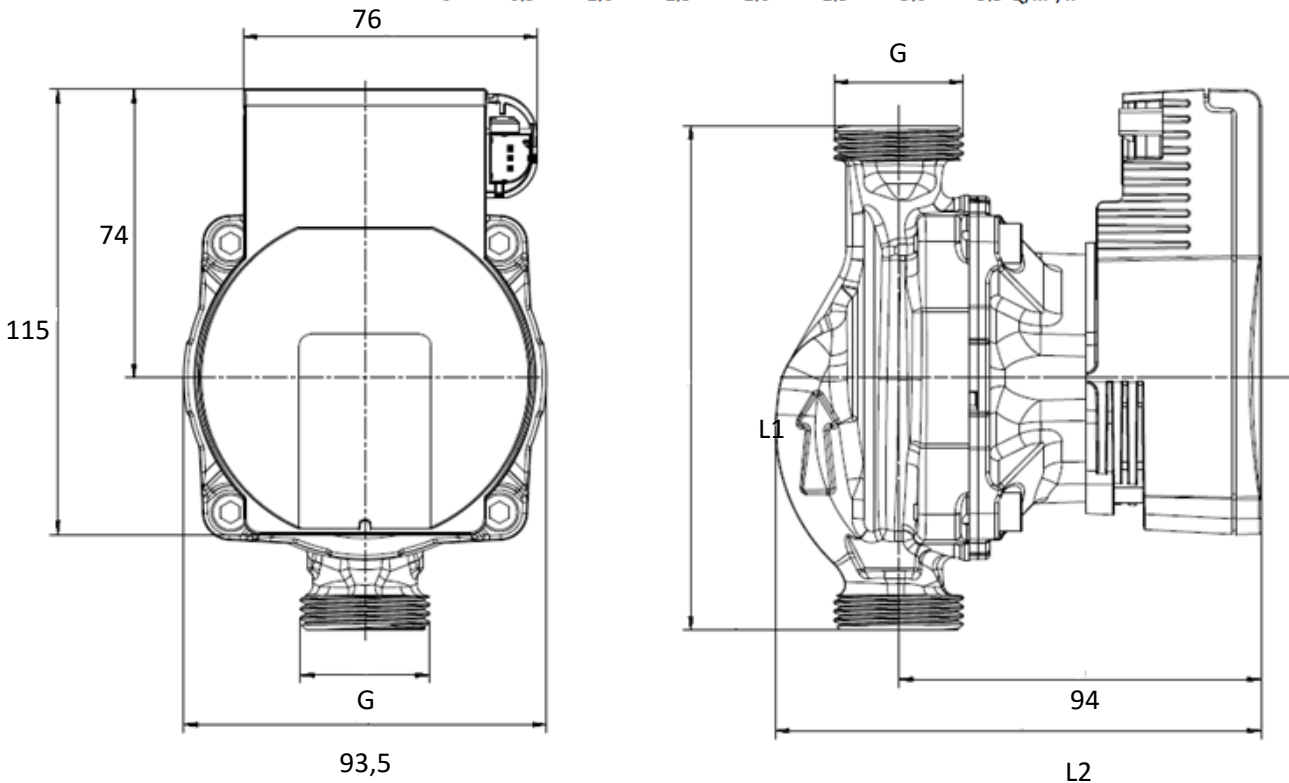


Heating

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) |
|--|--|

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) |
|------------------|--|

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 |
|---------------------------------|-----------|

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

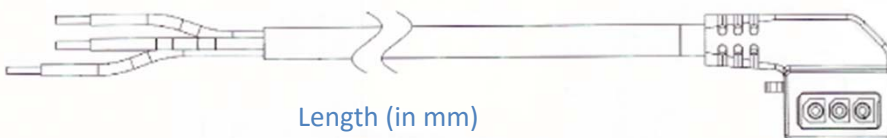
Integrated Molex 3-way connector



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



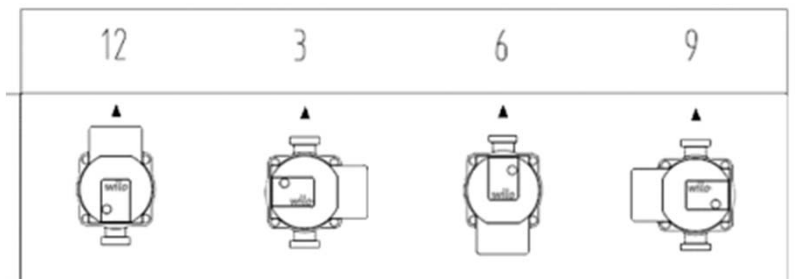
Molex 3 ways



WS8

Electrical Box orientation

▲ Flow direction



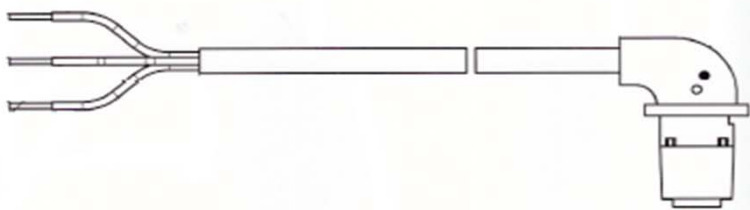


Electrical Signal connections

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)

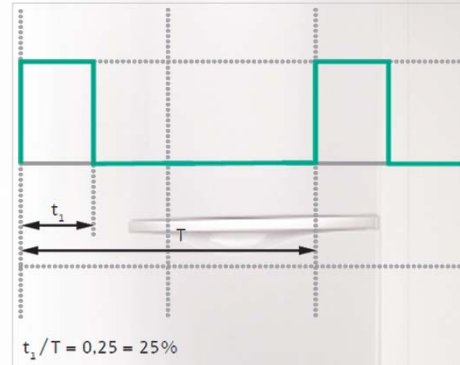
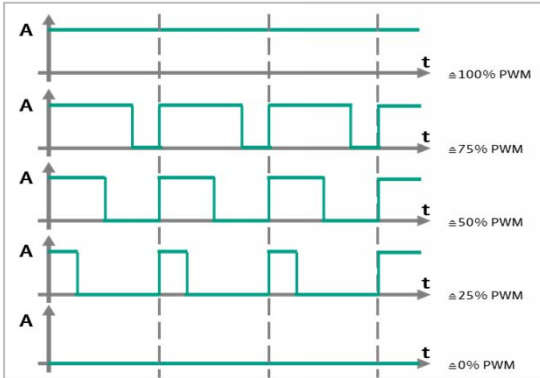
| | | |
|---|---------------------|---------|
| Overmoulded signal connector with brass end splices and type Facon PR72 (3 wires) on terminal box side (disconnection possible) | cable length 500mm | 4530965 |
| | cable length 1000mm | 4530663 |
| | cable length 1500mm | 4530764 |
| | cable length 2000mm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

Not assembled



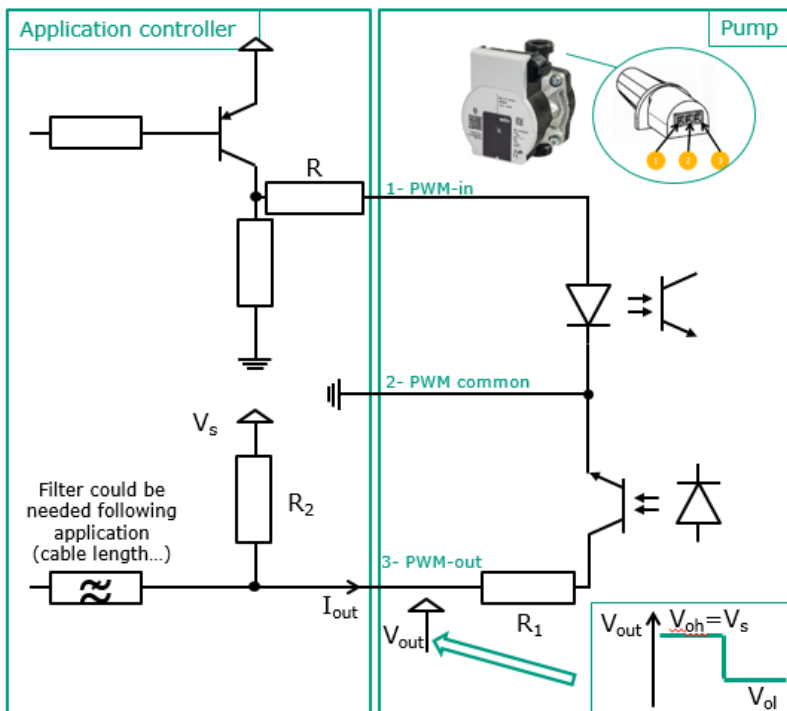
External control via a iPWM system

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]: | $>50 \Omega *$ |

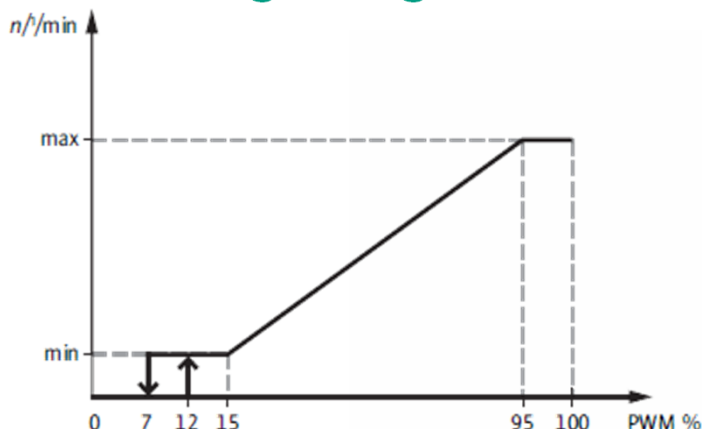
PWM-out

| | |
|------------------------|-------------------------------------|
| 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

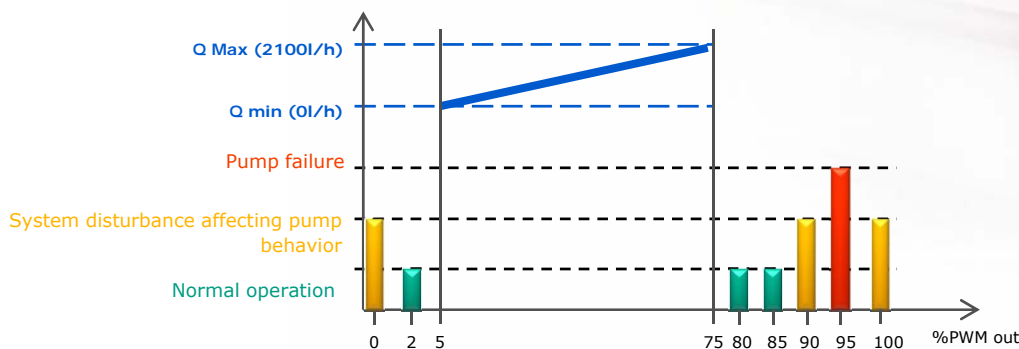


iPWM-in signal logic 2 (Solar) (%)



| | |
|-------------------|--|
| < 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

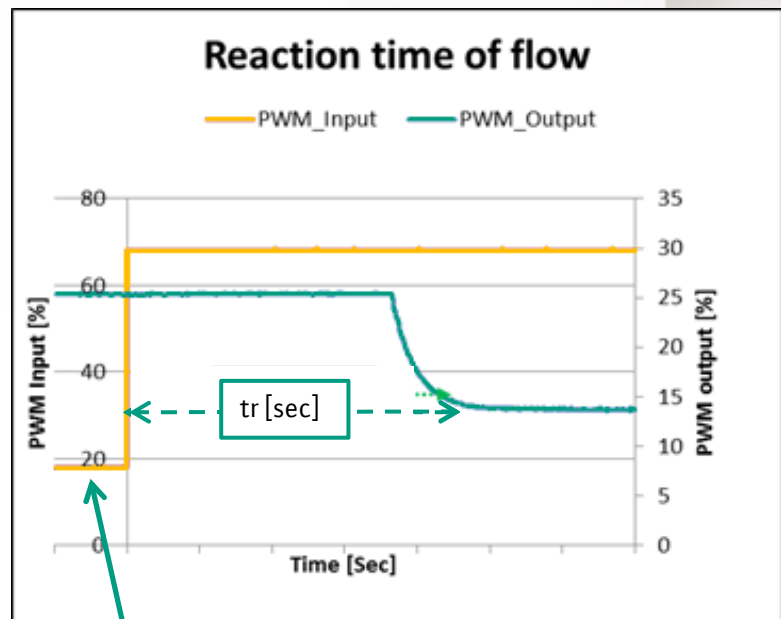
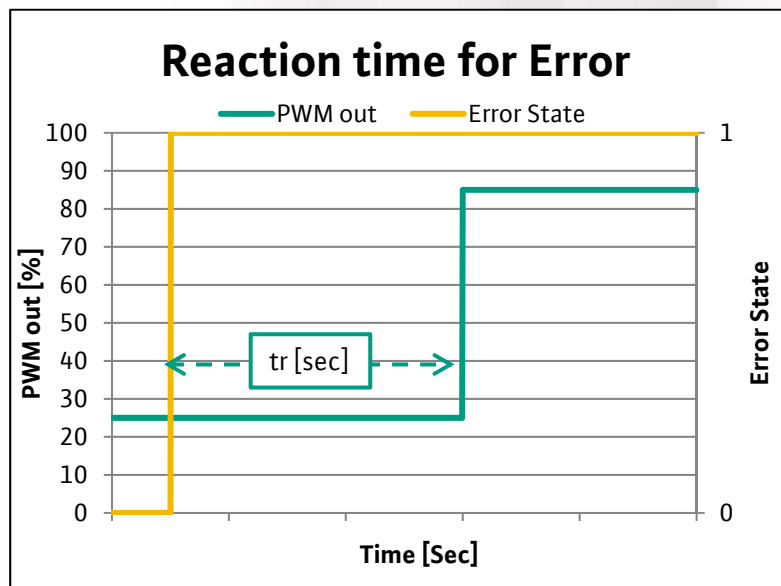
| Heating circuit (water) | Accuracy on measurement (valid for rotation speed > 2000 RPM) | Resolution on iPWM output (additional to accuracy) |
|-----------------------------|---|--|
| for $Q \leq 1400\text{L/h}$ | +/- 200 L/h* | 10 L/h |
| for $Q > 1400\text{L/h}$ | +/- 20%* | 10 L/h |

*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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