

**wilo**®



**Wilo-Star E 21  
EC Motor-Driven High-Efficiency, wet-rotor, HW boiler circulator**

**Engineering Specification**

Division 23 – Heating, Ventilating and Air Conditioning (HVAC)  
**23 21 23.13 - INLINE HYDRONIC PUMPS**

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**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. High-Efficiency, electronically commutated motor-driven circulator pump shall be a Wilo-Star E 21 as manufactured by Wilo.
- B. Furnish and install a residential HW, closed-loop circulator with a capacity as indicated in the plans.

1.02 RELATED SECTIONS

- A. 23 53 13 – Boiler Feedwater Pumps.
- B. 23 09 13 – Instrumentation and Control Devices for HVAC.
- C. 25 14 00 – Integrated Automation Local Control Units.

1.03 REFERENCES

- A. ETL – Edison Testing Laboratories
- B. DOE – US Department of Energy
- C. CEI – Circulator Efficiency Index
- D. NEC – National Electrical Code.
- E. ANSI – American National Standards Institute.
- F. ISO – International Standards Organization.
- G. ECM – Electronically Commutated Motor

1.04 SUBMITTALS

- A. Submittal data sheet(s).
- B. Dimensional print(s).
- C. Installation, operation, and maintenance manual.

1.05 QUALITY ASSURANCE

- A. Shall be third-party evaluated and tested by Intertek to comply to Motor-Operated Water Pumps [UL 778:2016 Ed.6+R:29Jun2021] and Liquid Pumps [CSA C22.2#108:2014 Ed.5]
- B. The circulator shall be rated for 36°F to 230°F fluid temperatures.
- C. The circulator shall be able to circulate up to a 50% propylene or ethylene-glycol / 50% water mixture.
- D. The circulator shall have a rated ambient air temperature range of 0°F - 104°F.
- E. The circulator shall have a rated maximum pressure of 145 PSI.
- F. The Department of Energy rating number for the Circulator Efficiency Index (CEI) shall be clearly displayed on the electrical enclosure of the pump.
- G. The circulator's date of manufacture shall be stickered to the front of the box.

## 1.06 WARRANTY

- A. Provide manufacturer's standard warranty against defects in materials and workmanship.
  - 1. Warranty Period: The Wilo-Star E 21 circulator shall be free of defects in materials and workmanship for a period of two (2) years from the date of purchase.

## **PART 2 PRODUCTS**

### 2.01 MANUFACTURERS

- A. Subject to compliance with these specifications, the following manufacturers shall be acceptable:
  - 1. Wilo high-efficiency, electronically commutated, wet-rotor motor-driven circulator pump as manufactured by Wilo.
  - 2. Pre-approved equal.

### 2.02 COMPONENTS

- A. Pump housing
  - 1. Shall be constructed of cast iron HT 200 with cataphoresis coating.
  - 2. Shall be provided with a two-bolt, oval flange.
  - 3. Shall have a flange-to-flange spacing of 6-3/8 inches (162 mm).
- B. Pump shaft
  - 1. Shall be constructed from ceramic.
- C. Pump bearings
  - 1. Shall be constructed from ceramic.
- D. Impeller
  - 1. Shall be constructed of engineered composite PA66+30% GF.
- E. Stator housing
  - 1. Shall be constructed of cast aluminum ALSI9CU3
- F. Motor
  - 1. Shall be, an electronically commutated, synchronous permanent magnet, wet-rotor motor.
  - 2. Shall have a protection class of IP42.
  - 3. Shall produce motor efficiencies greater than, or equal to, IE4.
  - 4. Shall be rated for 115, single phase, voltage.
  - 5. Shall have a FLA rating of .65A

G. Control interface

1. Shall allow for quick access to the main parameters using LCD display with three press buttons:
  - a. Up arrow
  - b. Down arrow
  - c. Set Button

H. Control modes

1. Shall offer four control modes:
  - a. Constant speed control with four selectable speeds
  - b. HD (Head defined) control with three proportional settings
  - c. Differential temperature control
  - d. Auto-Mode control
  - e. Set Point Heat Mode
  - f. Set Point Cool Mode
  - g. Boiler Protection Mode

I. (External Components)<sup>1</sup>

1. (Differential Temperature sensor)
2. (Optional check valve shall be made of plastic composite material (recommended for parallel pumping applications))

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. Install equipment in accordance with the manufacturer's instructions as written in the Installation and Operation Manual (IOM).
- B. Power wiring, as required, shall be the responsibility of the electrical contractor. All wiring shall be performed per manufacturer's instructions and in accordance with applicable state and local codes.
- C. Unit shall be a Wilo-Star E 21 as manufactured by Wilo.

END OF SECTION

<sup>1</sup> Components in parenthesis indicate an optional item.