# Wilo-SiBooster EXCEL
# High Efficiency, Electronically Commutated Motor-Driven, Pressure Boosting Systems

**Engineering Specification**

WILO_SPC_SiBooster_10112018

## 22 11 23.13 – DOMESTIC-WATER PACKAGED BOOSTER PUMPS

### PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Electronically commutated motor-driven, vertical multistage, centrifugal pump booster package shall be a Wilo-SiBooster EXCEL booster system as manufactured by Wilo USA
B. Furnish and install a high efficiency, electronically commutated motor-driven, vertical multistage, centrifugal booster pumping package with a capacity as indicated in the plans

1.02 RELATED SECTIONS

A. 23 21 23 – Hydronic Pumps
B. 23 22 23.13 – Electric-Driven Steam Condensate Pumps
C. 23 53 13 – Boiler Feedwater Pumps

1.03 REFERENCES

A. EC - Electronically Commutated
B. NSF – NSF International
C. HI – Hydraulic Institute
D. UL – Underwriters Laboratories
E. NEC – National Electrical Code
F. ANSI – American National Standards Institute
G. AISI - American Iron and Steel Institute
H. ISO – International Standards Organization
I. NEMA – National Electrical Manufacturers Association
J. ODP – Open Drip Proof
K. TEFC – Totally Enclosed Fan Cooled

1.04 SUBMITTALS

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

1.05 QUALITY ASSURANCE

A. The complete packaged pumping system shall be NSF 61 and NSF 372 listed for drinking water and low lead requirements
B. The pump manufacturer shall be ISO 9001 and ISO 14001 certified
C. All wetted surfaces shall be made of corrosion-resistant material
D. Liquid temperature range for the booster package shall be rated for -4°F to 248°F with a minimum of 32°F for

domestic water.

E. Ambient temperature range for the booster package shall be rated for +32°F – 104°F
F. Booster pressure rating shall be 232 PSI or 363 PSI depending on number of stages provided with the pump
G. The pumping package shall be hydrostatically tested prior to shipment

1.06 WARRANTY

A. Provide manufacturer's standard warranty against defects in materials and workmanship
    1. Warranty Period: Wilo-SiBooster EXCEL boosters shall be free of defects in materials and workmanship for a period of two (2) years from date of installation; not to exceed 6 months from date of purchase.

**PART 2 – PRODUCTS**

2.01 MANUFACTURERS

A. Subject to compliance with these specifications, the following manufacturers shall be acceptable:
    1. Wilo-SiBooster EXCEL series boosters as manufactured by Wilo
    2. Pre-approved equal
B. The packaged pumping system shall be a standard product of a single pump manufacturer. The entire pump system including pumps and pump logic controller, shall be designed, built and tested by the same manufacturer.

2.02 COMPONENTS

A. PUMPS
    1. Shall be of vertical, inline, multistage design
    2. Shall be NSF 61/Annex G listed for drinking water and low lead requirements
    3. Pump Housings:
        a. Shall be constructed of AISI 304 Stainless Steel with 300 class ANSI flanges; either welded to the pump or cast iron rotating split flange dependent on size
        b. Shall be furnished with a carbon and polyphenylene sulfide (PPS) wear ring
        c. Shall be equipped with drain and vent ports with ability to accommodate a bypass
        d. Shall be equipped with an AISI 304, AISI 318 LN, or AISI431 stainless steel shaft depending on number of impeller stages and flowrate
        e. Shall have lifting lugs to facilitate pump installation or extraction from packaging
        f. Shall have a coupling guard in AISI 316 L Stainless Steel with Wilo design for better shaft protection
        g. Shall allow for easy access to the coupler, spacer and seal cartridge assembly
        h. Shall allow for removal/replacement of seal cartridge without removing motor at any horse power
        i. Seal cartridge assemblies shall have the ability to be disassembled in order to replace the mechanical seal without having to replace the entire X-cartridge assembly
    4. Mechanical Seal:
        a. Sleeve shall be AISI 316 L
        b. Springs and clips shall be AISI 304 Stainless Steel
        c. Inserts shall be constructed of EPDM
    5. Impellers:
        a. Shall be constructed of AISI 304 L Stainless Steel and 100% laser-welded 2D/3D blades shall be sandblasted prior to shipment

B. MOTORS

1. Shall be a Wilo-developed, electronically commutated, synchronous, permanent magnet, super premium motor.
2. Shall produce motor efficiencies or equal to IE5 efficiency classification
3. Shall be rated at 480V~3
4. Shall be a 2-pole motor and run up to 60 hz
5. Shall meet standard IEC 60034-30-2.
6. Shall have a protection class of IP55 with Class F insulation
7. Shall include a Programmable Power-Head that converts AC Voltage to a DC output to control the speed requirement of the pump
8. Shall be equipped with a Modbus IF module installed in the Power-head for communication to the PLC

C. CONTROL PANEL

1. Shall meet the requirements of UL508A: Standard for Industrial Control Equipment
2. Shall be rated as a NEMA 12 enclosure with a fan, CFM rated for heat sink requirements.
3. Shall have labeled wires and terminal block for easy reference to the wiring diagram
4. Motor protector circuits sized for motor amperage
5. Through the door disconnect with selector handle and lockout
6. Shall be equipped with an alarm with silencing feature

D. PROGRAMABLE LOGIC CONTROLLER

1. Shall have a 7" LED color touchscreen
2. Shall have a display resolution of 800 x 480 pixels
3. Shall indicate on the display, per the pump icon, whether or not each pump is either green=running, amber=running with fault, red=failure, white=off
4. Shall be factory set for either lead/lag or duty/standby operation
5. Shall provide off/hand/auto function. Hand operation shall be password protected
6. Shall display pump hours, suction PSI, discharge PSI, pump frequencies, total kWh for system, and current kWh per pump
7. Shall be able to modify the discharge pressure setting through password protected screen
8. Shall have a low pressure cut out
9. Shall have pipe burst protection
10. Shall be able to be able to flash the PLC program by means of a Micro-SD card via Micro-SD port
11. Shall have a RJ45 Ethernet port capable of transmitting data 10/100Mbps using a Cat 5 cable
12. Shall have a 2.0 USB port available for communication
13. Shall have onboard Modbus Protocol. Two ports available; one for communication to the EXCEL Power-head and one open for the building management system.
14. Shall have the following I/O:
    a. Number of digital inputs: 18
    b. Number of digital outputs: 17
    c. Number of analog inputs: 9
    d. Number of analog outputs: 2
15. Shall use a coin-type 3v, lithium battery, CR2450
16. Shall have a have the ability of the owner/operator to receive a text message for critical alarms

17. Shall have the ability to access the PLC via downloadable app. Functionality shall be identical to PLC interface.

E. PUMP MANIFOLD

1. Shall be constructed of AISI 304 Stainless Steel
2. Manifolds shall have smooth contour transitions to minimize build-up of organisms
3. All pump line connections shall either be NPT male pipe threads in accordance with ANSI B1.20 or flanged connections depending on size.
4. All system connections shall either be NPT male or female pipe threads in accordance with ANSI B1.20 , ANSI 300 class flanges, or grooved connections depending on size
5. All manifolds shall be electrolytic polished
6. All manifolds shall be 5S or 10S depending on size and rated for 363 PSI maximum pressure
7. Suction and discharge manifolds shall each have two ¼" male NPT connections; one for a 316 stainless steel, pressure transducer and the other for a 2.5" 316 stainless steel, glycol-filled, analog pressure gauge
8. Suction and discharge manifolds shall have a ¾" Female NPT connection.
9. Discharge manifold shall be equipped with 3/4" Male NPT x 3/4" Female NPT shut-off valve with 3/4" Stainless steel plug engaged into the Female NPT portion of the shut-off valve.
10. Suction manifold shall be equipped with a 3/4" stainless steel plug engaged into the Female NPT portion of the 3/4" connection.

F. ISOLATION VALVES

1. Shall be constructed of either ASTM 304 Stainless steel or an epoxy coated cast iron wafer body ISO 5211 with API609 face to face flange; depending on size
2. All threads shall be female, nominal tapered threads in accordance with ANSI B1.20.1
3. Packing, thrust washer and gasket shall all be constructed of PTFE for threaded valve bodies
4. Seat shall be constructed of PTRE for threaded Stainless steel valve bodies and EPDM resilient seat for cast iron wafer body

G. CHECK VALVE

1. Every pump, in relation to the pump manifold, shall have a check valve in either a 316 Stainless Steel ASTM A240 in Female NPT or a Wafer-Style, Epoxy Coated Ductile Iron Body ASTM 65-45-12, with 316 Stainless steel internals; depending on booster size and model
2. Check valve shall be a "Piston-style", non-slam, check valve
3. Elastomer seal for check valve shall be made of EPDM

H. (External Components) [i]

1. (Hydropneumatic Tank Option; Tanks for system capacity and ASME-rated tanks shall also be available upon request)
2. (ODP motors available in lieu of TEFC upon request (but not recommended))
3. (NEMA 3R control panel enclosure)
4. (Dome tower light; options for Green (running)/Amber (running with fault)/Red (failure)/White (power present))
5. (Run/Fault LED lights, per pump, mounted on front of panel)

6. (BMS protocol options):
    a. (BacNET)
    b. (LonWorks)
    c. (CanBUS)
7. (Booster packages available at higher pressures upon request)

**PART 3 – EXECUTION**

3.01 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions
B. Power wiring, as required, shall be the responsibility of the electrical contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal and local codes.
C. All factory wiring shall be numbered for easy identification and the numbers shall coincide with those shown on the wiring diagram
D. Unit shall be a Wilo-SiBooster EXCEL booster system as manufactured by Wilo USA.

END OF SECTION

[1] Components in parenthesis indicate an optional item.