ENVELOPE™
By Armstrong Fluid Technology®

SE-F10 | VARIABLE SECONDARY OR TERTIARY OPTIMIZED PUMPING SYSTEM | SUBMITTAL

File No: 91.408
Date: DECEMBER 15, 2025
Supersedes: NEW
Date: NEW

Job: _____ Representative: _____

_____ Order no.: _____ Date: _____

Engineer: _____ Submitted by: _____ Date: _____

Contractor: _____ Approved by: _____ Date: _____

CONFIGURATION

SYSTEM EQUIPMENT QUANTITY	
DISTRIBUTION PUMPS	**ZONES**
☐ 1	—
☐ 2	
☐ 3	
☐ 4	
☐ 5	
☐ 6	
SE-F10.1S	(Specify 1 to 3)
☐ 1	—
☐ 2	
☐ 3	
☐ 4	
☐ 5	
☐ 6	
☐ 7	
☐ 8	
SE-F10.2S	(Specify 1 to 6)

DISTRIBUTION PUMP SPEED CONTROL	FOR ZONE(S)
☐ Sensorless*	1
☐ Hybrid: Sensorless* + critical zone sensor(s)	2 to 6
☐ Zone differential pressure sensor(s) ☐ and/or Zone return temperature sensor(s)	1 to 6

*Only available with Armstrong Design Envelope pump(s).

STANDARD FUNCTIONALITY AND CONSTRUCTION

The Armstrong SE-F10 Variable Secondary is a preprogrammed multi-zone pump set controller for secondary or tertiary heated or chilled water systems, designed for the automation of multi-distribution pumps installed in a variable speed headered configuration. It is supplied with all hardware, software and programming required to control up to eight variable speed distribution pumps including the following features:

STANDARD CONSTRUCTION

- Multi-color 4.3" back-lit touch-screen (Not to be directly exposed to sunlight)
- Internal circuit breaker protection
- NEMA regions enclosure rating: NEMA 4
- IEC regions enclosure rating: IP54
- Secure front cabinet door with lock and key

STANDARD FUNCTIONALITY

- Remote or local start/stop mode of operation
- Two-level (field and factory) password security
- Selectable on-screen languages : English, Spanish, French, Portuguese, Simplified Chinese and German
- Hand-Off-Automatic (H-O-A) control
- On-screen menu driven operator interface with :
  - Detailed view of the system of pump quantity, mode and status, system flow, deviation from the control curve (sensorless mode) or from the active zone (with zone sensors)
  - System zone overview with setpoint, status and active zone deviation
  - Zone (1 to 6) setup with one dP (differential pressure) or Temperature sensor per zone used to determine the active zone and pump speed
  - Pump overview (1 to 8) with their mode, status, speed (% and rpm) and total run time

- Detailed view of each pump with actual run hours, hand speed % and power consumption, and Hand-Off-Automatic (H-O-A) control
- Pump setup to configure the number of duty pumps (with option for up to one stand-by pump), lead pump switch & minimum running time and drive settings
- Pump speed setup with minimum, maximum and default speed, pump rated rpm and speed ramping
- Sensorless overview (sensorless technology only available with Armstrong Design Envelope pumps) completing the pump overview with individual and system flow and head
- Sensorless setup for flow and head at Best Efficiency Point (BEP), dead band, flow and head design, zero flow head.
- PID setup for the pump speed control based on selected cooling or heating mode
- Temperature control overview monitoring the valve position (%), the temperature sensor setpoint & present values, and sensor status.
- Temperature control setup with adjusting the P/I control parameters, the valve output type (0-10V or 2-10V), temperature sensor zero and range (4-20mA output as reference), valve maximum allowable opening (%) and PID action
- Bypass valve overview monitoring the valve position (%), actual system flow (from flow meter or sensorless readout) and Chiller/Boiler minimum & maximum flow rates dynamically based on number of equipment enabled
- Bypass valve setup adjusting the P/I control parameters, the valve output type (0-10V or 2-10V) and the valve minimum and maximum positions and ramp time setting (second)
- Optional BAS (Building Automation System) communication setup with protocol, address and BAUD rate and parity selection
- System valve control setup, if enabled, to maintain the position of the most open system valve at the optimum opening setpoint by adjusting the active zone setpoint
- VFD readout setup to scale values read from VFD
- Current alarm list and alarm history
- PLC diagnostic with current state and information of the PLC, HMI, and BAS protocol

INPUT/OUTPUT

Complete point schedule provided detailing analogue and digital input and output point description, functions and types. Accepting and processing signals (Differential Pressure, Temperature, or Flow) for the following dedicated terminal blocks:

Remote Start/Stop			x			x		x
SE-F On status						x		x
General system alarm				x		x	x	x
Pump alarm						x	x	
Sensor alarm						x	x	
PLC board high temperature alarm						x	x	x
Emergency stop			x			x	x	x
System flow					x			x
System head					x			x
Design flow					x			x
Design head					x			x
Zero flow head					x			x
Flow BEP					x			x
Head BEP					x			x
Dead band (K)					x			x
Staging sensor factor					x			x
Number of pump running in Auto					x			x

Point name	Hardware points				Software points			
	AI	AO	DI	DO	AV	DV	Alarm	Show on graphic
Lead pump ID					x			x
Number of pumps configured					x			x
Lead pump switch time					x			x
Pump start command signal (max 8)						x		x
Pump run status (max 8)						x		x
Pump speed reference (max 8)					x			x
Each pump speed feedback (max 8)					x			x
Each pump hand speed (max 8)					x			x
Each pump flow (max 8)					x			x
Each pump head (max 8)					x			x
Each pump drive amps (max 8)					x			x
Each pump drive volts AC (max 8)					x			x
Each pump drive power kW (max 8)					x			x
Each pump drive kWh (max 8)					x			x
Each pump drive rpm (max 8)					x			x
Each pump run hours (max 8)					x			x
Set each pump in Hand (max 8)						x		x
Set each pump in Off (max 8)						x		x
Set each pump in Auto (max 8)						x		x
Pumps in Hand mode (max 8)						x		x
Pumps in Off mode (max 8)						x		x
Pumps in Auto mode (max 8)						x		x
Each pump alarm (max 8)						x	x	x
Pump VFD fault signal/alarm (max 8)						x	x	x
Pump VFD communication alarm (max 8)						x	x	x
Pump run feedback alarm (max 8)						x	x	x
Pump DP switch (max 8)			x			x		x
Pump no flow alarm (max 8)						x	x	x
Zone differential pressure, temperature, or flow (max 6)	x				x			x
Active zone number					x			x
Active zone error					x			x
Active zone PV					x			x
Active zone SP					x			x
Each zone value (max 6)	x				x			x
Each zone SP (max 6)					x			x
Each zone error (max 6)					x			x
All zones sensors failed alarm						x	x	x
Each zone sensor failed alarm (max 6)						x	x	x
Max system valve opening					x			x

Point name	Hardware points				Software points			
	AI	AO	DI	DO	AV	DV	Alarm	Show on graphic
Temperature valve(s) hand/auto mode						x		x
Each temperature valve hand position (max 2)					x			x
Each temperature valve position					x			x
Each temperature valve actuator (max 2)		x						
Temperature transmitter PV	x				x			x
Temperature transmitter fail alarm						x	x	x
Temperature control loop setpoint					x			x

GENERAL SEQUENCE OF OPERATION

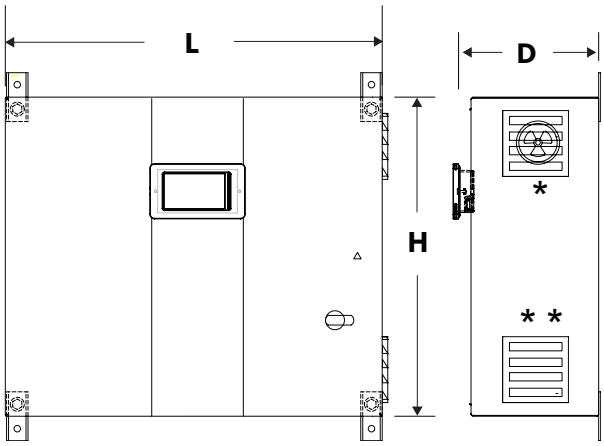
The SE-F controller:

- Determines the most efficient combination of operating pumps, and pump operating speed based on the zone differential pressure/temperature sensor signals and/or Parallel Sensorless™ as per the field adjustable configuration.
- The control system shall continuously monitor all zone signals to determine an active control zone. Use of a multiplexer for multiple sensor inputs is not acceptable.
- Responds to an increase in demand by increasing either: the number of operating pumps or the pump speed.
- If demand decreases, the IPS controller responds by decreasing either: the number of operating pumps (or) the pump speed to optimize the energy efficiency of the pumping operation while meeting system demand.
- The control system shall automatically disable any zone differential pressure or temperature signals that are not within limits and alert the operator of a possible transmitter failure. If system found all differential pressure/temperature sensors failure in the building, the pump speed will default to a pre-defined percent of full speed (factory default loaded as 95% of full speed).
- The pump set controller shall include a modulating valve control capability based on one of the zone temperature inputs of the pump set controller. The valve position is controlled by PID through the pump set controller to maintain the temperature at a set point specified by the user. The valve output shall be selectable between 0-10 VDC and 2-10 VDC.
- Rotates the pumps based on a field adjustable interval of operating hours with a 'bump-less' transfer algorithm.
- Incorporates embedded logic to prevent hunting, pump flow surge, and motor overloading.
- If any VFD/pump unit fails, the unit is locked out in alarm and the appropriate alarm signal is activated. In place of the failed assembly, the next available VFD/pump unit is operated.
- The pump set controller shall provide End-of-Curve (EOC) protection based on Parallel Sensorless™ (sensorless pumps) or pump operating speed (non-sensorless pumps)
- Manual operation mode (for commissioning): When the IPS is switched to the manual operation mode by the operator, there is no automatic operation or sequencing of any pump, and operation of chilled water distribution pumps can be manually set. When operation mode is switched back to auto, the automatic operation mode is restarted.

OPTIONAL FEATURES AND DIMENSIONS

	DIMENSIONS AND WEIGHTS				
	LENGTH	HEIGHT	DEPTH	WEIGHT	ENCLOSURE
SE-F10.1S	20.00 (508)	22.00 (559)	11.00 (279)	47 (21.0)	**NEMA:** NEMA 4 **IEC:** IP54
SE-F10.2S	24.00 (610)	24.00 (610)	11.00 (279)	47 (21.0)	

Notes:
- Dimensions in inches (mm) Weights in lbs (kg)
- Weights are approximate



INSTRUMENTATION	TOTAL QUANTITY	SECONDARY PUMP SPEED CONTROL OPTIONS		
		SENSORLESS*	HYBRID*	ZONE DP OR T
☐ Zone dP sensors	—	N/A	Σ= qty of critical zones	Σ = qty of zones
☐ Zone return temperature sensors	—	N/A		

* With Armstrong Design Envelope pumps only

PANEL APPROVAL

☐ UL (Standard)

☐ CSA

☐ CE

CLOUD ANALYTICS FOR SE-F

- A subscription-based health management service for sustaining high performance, high efficiency HVAC pumping plant applications.
- The cloud analytics provide valuable insights and alerts to help diagnose problems early, before they become critical and expensive to repair.

BAS COMMUNICATION

☐ Not required*

☐ Modbus RTU

☐ Modbus TCP

☐ BACnet™ MS/TP

☐ BACnet™ IP

*If there are no communication between the IPS and BMS, the IPS must have the chiller/boiler isolation valves status wired to the digital inputs of the IPS, to ensure min/max rates are maintained.

OTHER OPTIONS

☐ Export crating

☐ Controller assembly: Enclosed or rack mounted IPS and drives (please consult the factory)

TORONTO

23 BERTRAND AVENUE,
TORONTO, ONTARIO,
CANADA, M1L 2P3
+1 416 755 2291

BUFFALO

93 EAST AVENUE, NORTH
TONAWANDA, NEW YORK,
USA, 14120-6594
+1 716 693 8813

DROITWICH SPA

POINTON WAY, STONEBRIDGE CROSS
BUSINESS PARK, DROITWICH SPA,
WORCESTERSHIRE,
UNITED KINGDOM, WR9 0LW
+44 8444 145 145

MANCHESTER

WOLVERTON STREET, MANCHESTER
UNITED KINGDOM, M11 2ET
+44 8444 145 145

BANGALORE

#18, LEWIS WORKSPACE, 3RD FLOOR,
OFF MILLERS - NANDIDURGA ROAD,
JAYAMAHAL CBD, BENSON TOWN,
BANGALORE, INDIA 560 046
+91 80 6510 3555

SHANGHAI

UNIT 903, 888 NORTH SICHUAN RD.
HONGKOU DISTRICT, SHANGHAI
CHINA, 200085
+86 21 5237 0909

BEIJING

ROOM 1612, NANYIN BUILDING NO.2
NORTH EAST THRID RING ROAD
CHAOYANG DISTRICT, BEIJING,
CHINA 100027
+86 21 5237 0909

SÃO PAULO

RUA JOSÉ SEMIÃO RODRIGUES
AGOSTINHO, 1370 GALPÃO 6 EMBU
DAS ARTES, SAO PAULO, BRAZIL
+55 11 4785 1330

LYON

93 RUE DE LA VILLETTE
LYON, 69003 FRANCE
+33 4 20 10 26 21

DUBAI

JAFZA VIEW 19, OFFICE 402
P.O.BOX 18226 JAFZA,
DUBAI - UNITED ARAB EMIRATES
+971 4 887 6775

JIMBOLIA

STR CALEA MOTILOR NR. 2C
JIMBOLIA 305400, JUD.TIMIS
ROMANIA
+40 256 360 030

FRANKFURT

WESTERBACHSTRASSE 32,
D-61476 KRONBERG IM TAUNUS
GERMANY
+49 6173 999 77 55