

Data sheet

SEM-SAFE® high-pressure water mist pump unit

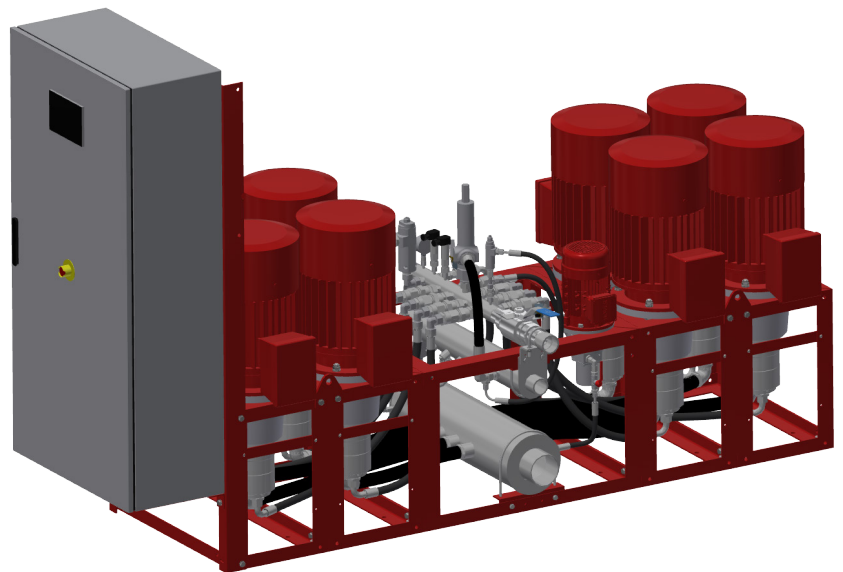
Product version 2.0, 2 to 4 pumps and 5 to 8 pumps

SEM-SAFE® high-pressure water mist system

SEM-SAFE® is a high-pressure water mist fire fighting system that uses micro-droplets released through the nozzle into protected areas. Water is discharged in a form that ensures fire suppression, control or extinguish. When water is forced through nozzles at high pressure, a super-fine mist is formed that has a two-fold extinguishing effect. As well as cooling the fire it simultaneously starves the fire of oxygen. This cooling effect also reduces the likelihood of re-ignition.

A SEM-SAFE® system is comprised of several SEM-SAFE® high-pressure water mist nozzles connected by stainless steel piping to a modular SEM-SAFE® high-pressure pump unit. Stainless steel SEM-SAFE® high-pressure water mist section valves are supplied with the SEM-SAFE® system in order to separate the individual fire sections.

The SEM-SAFE® pump unit can feed either automatic frangible glass bulb nozzles or open nozzles in "wet", "pre-action" or "deluge/dry" applications.

**General description of high-pressure pump unit, product version 2.0, 2 to 4 pumps and 5 to 8 pumps**

The pump unit is a vital part of the SEM-SAFE® high-pressure water mist system for fire fighting. The main components are high-pressure pumps, pilot pump, electric motors, inlet- return- and high-pressure manifolds and control panel, all mounted on one skid frame.

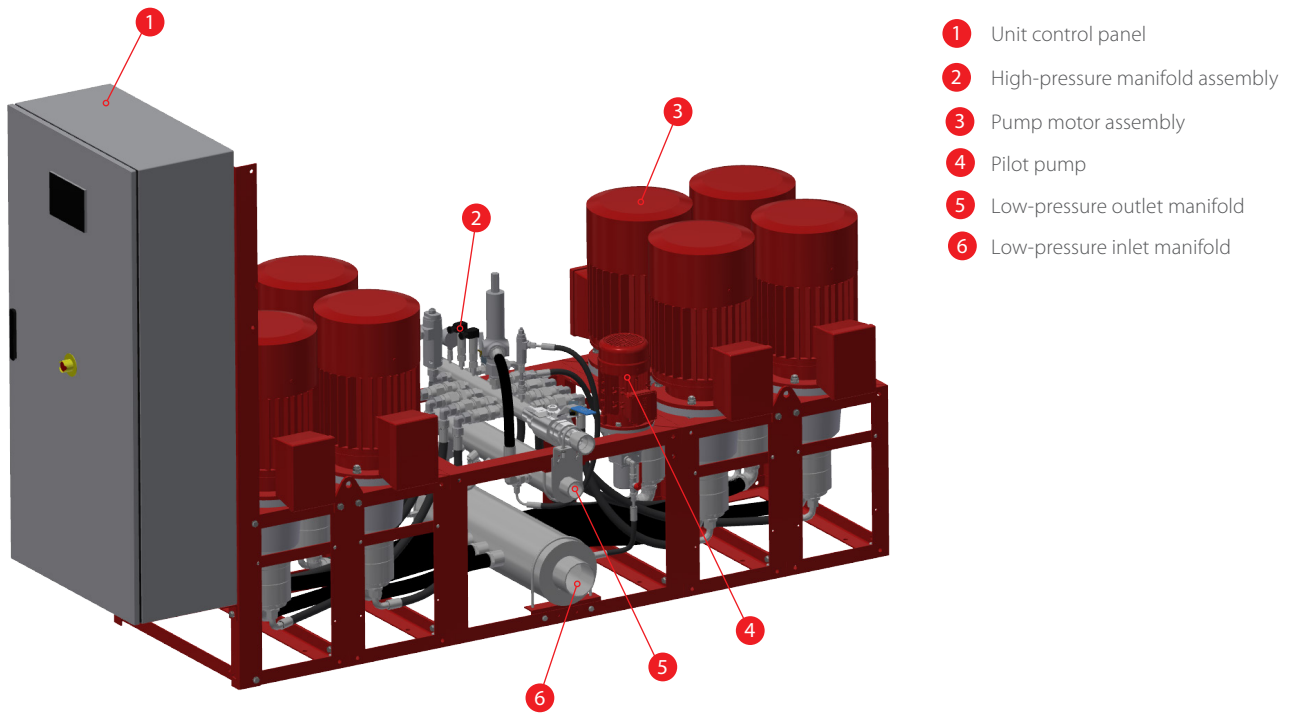
The pump unit consists of up to 8 electrically driven high-pressure pumps. The pumps are water lubricated multi axial piston pumps, starting direct on line (DOL). It supplies fresh water at high pressure to automatic frangible glass bulb nozzles or open nozzles in "wet", "pre-action" or "deluge/dry" applications. This is a modular, small footprint pump unit supplied with water from a separate source, i.e. public water mains, a full water storage tank or a reduced capacity tank.

Water return lines from pressure relief valves, test valve and start-up valves are collected in a common return manifold to be returned to the water storage tank or drain in one single pipe.

The pump unit operates one or more high-pressure pumps connected to the water mist pipe system to meet the system design requirements. The system is activated on pressure drop.

SEM-SAFE® high-pressure water mist pump unit - Product version 2.0, 2 to 4 pumps and 5 to 8 pumps

Should the flow demand increase due to the release of more nozzles, additional pumps will automatically start sequentially. The required pumps necessary to maintain flow and operating pressure in the system will operate. The high-pressure water mist system remains activated until authorized personnel stop the system manually. The unit can be installed directly on solid floor. No need for anti vibration lining.

**Standards**

The pump unit is designed according to the Danfoss design manual incorporating the following standards:

NFPA 750 - edition 2015

EN 12845:2015 – Fixed Fire Fighting Systems – Automatic Sprinkler Systems – Design, Installation and Maintenance

CEN TS 14972:2011 – Fixed Fire Fighting Systems – Water Mist Systems – Design and Installation

EN 60204-1:2018 - Safety of machinery - Electrical equipment of machines

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Pump unit specification

Rated power voltage [VAC]	3 x 400 ¹⁾	Design pressure [bar]	140
Frequency [Hz]	50 ¹⁾	Overpressure protection [bar]	140
Ingress protection	IP 55	Operating pressure [bar]	up to 130 ³⁾
Media temperature	+2 to +50 °C	Inlet pressure [bar]	0.1 to 4
Ambient operating temperature	+2 to +45 °C ⁴⁾	Return manifold max pressure [bar]	5
Storage temperature	+2 to +50 °C	High-pressure pilot pump [bar]	15-40

Power requirement at 100% flow										
Pump unit item number	Max. flow [L/min]	Max. flow m ³ / hr	High-pressure pumps	Prepared for one booster pump range [Amps] ²⁾	Power consumption [Amps]	Max. peak current [Amps]	Softstarter	Motor protection type	Pump unit product code	
700100	224	13.4	2	6-10	124	448	No ³⁾	Circuit breaker t-m	HPE-20-080-30-0000-HP-U-CB	
Fuse							HPE-20-080-30-0000-HP-U-F			
700102						236	Yes	Circuit breaker t-m	HPE-20-080-30-0000-HP-U-S-CB	
								Fuse	HPE-20-080-30-0000-HP-U-S-F	
700104	336	20.2	3	9-14	185	549	No ³⁾	Circuit breaker t-m	HPE-30-080-30-0000-HP-U-CB	
Fuse							HPE-30-080-30-0000-HP-U-F			
700106						297	Yes	Circuit breaker t-m	HPE-30-080-30-0000-HP-U-S-CB	
								Fuse	HPE-30-080-30-0000-HP-U-S-F	
700108	448	26.9	4	9-14	241	605	No ³⁾	Circuit breaker t-m	HPE-40-080-30-0000-HP-U-CB	
Fuse							HPE-40-080-30-0000-HP-U-F			
700110						353	Yes	Circuit breaker t-m	HPE-40-080-30-0000-HP-U-S-CB	
								Fuse	HPE-40-080-30-0000-HP-U-S-F	
700112	560	33.6	5	13-18	301	665	No ³⁾	Circuit breaker t-m	HPE-50-080-30-0000-HP-U-CB	
Fuse							HPE-50-080-30-0000-HP-U-F			
700114						413	Yes	Circuit breaker t-m	HPE-50-080-30-0000-HP-U-S-CB	
								Fuse	HPE-50-080-30-0000-HP-U-S-F	
700116	672	40.3	6	17-23	362	726	No ³⁾	Circuit breaker t-m	HPE-60-080-30-0000-HP-U-CB	
Fuse							HPE-60-080-30-0000-HP-U-F			
700118						474	Yes	Circuit breaker t-m	HPE-60-080-30-0000-HP-U-S-CB	
								Fuse	HPE-60-080-30-0000-HP-U-S-F	
700120	784	47.0	7	17-23	418	782	No ³⁾	Circuit breaker t-m	HPE-70-080-30-0000-HP-U-CB	
Fuse							HPE-70-080-30-0000-HP-U-F			
700122						530	Yes	Circuit breaker t-m	HPE-70-080-30-0000-HP-U-S-CB	
								Fuse	HPE-70-080-30-0000-HP-U-S-F	
700124	896	53.8	8	17-23	474	838	No ³⁾	Circuit breaker t-m	HPE-80-080-30-0000-HP-U-CB	
Fuse							HPE-80-080-30-0000-HP-U-F			
700126						586	Yes	Circuit breaker t-m	HPE-80-080-30-0000-HP-U-S-CB	
								Fuse	HPE-80-080-30-0000-HP-U-S-F	

¹⁾ Other voltages and frequencies available on request

²⁾ Other amp. ranges for booster pumps available on request

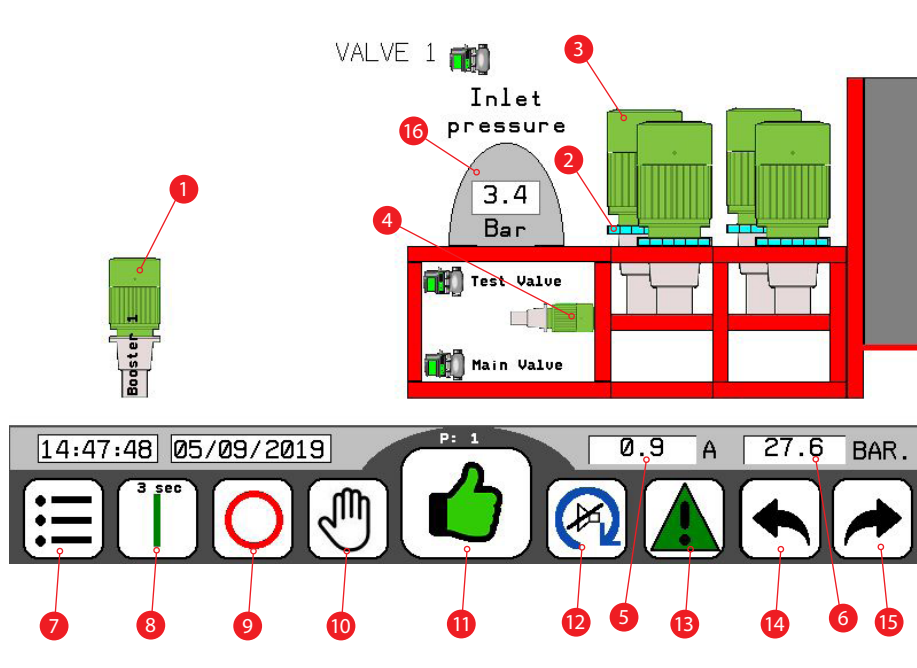
³⁾ Pump start up time no longer than 0.3 seconds

⁴⁾ Available for use at up to 50 °C ambient operating temperature, with reduced performance

⁵⁾ Due to mechanical operation of regulating valves, actual operating pressure will fluctuate, depending on system consumption, up to 20 bar above the set operating pressure, though not exceeding the design pressure.

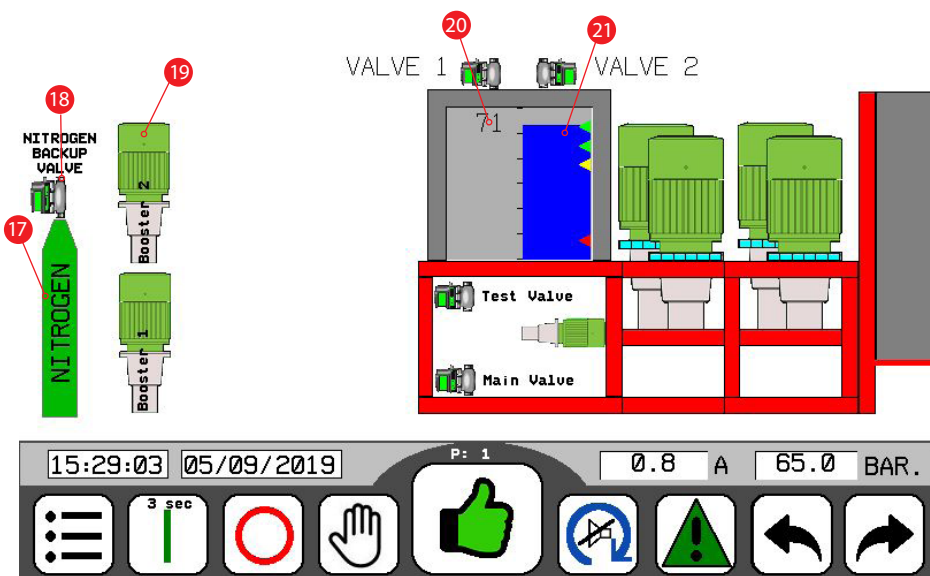
SEM-SAFE® high-pressure water mist pump unit - Product version 2.0, 2 to 4 pumps and 5 to 8 pumps

Graphical User Interface (GUI)



- 1 Booster pump status indicator
- 2 Space heater status indicators
- 3 High-pressure pump status indicators
- 4 Pilot pump status indicator
- 5 Unit power consumption
- 6 System pressure
- 7 Menu button
- 8 Start button
- 9 Stop button
- 10 Manual start shortcut
- 11 System ready indicator
- 12 Acknowledge alarm
- 13 Alarm list shortcut
- 14 Page navigation
- 15 Page navigation
- 16 Inlet pressure

Graphical User Interface (GUI) optional items (available on request)



- 17 Nitrogen back-up cylinder
- 18 Nitrogen back-up valve
- 19 Extra booster pump
- 20 Tank level indicator
- 21 Water tank

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I/O connections

Terminal name	Description
Supply connections	
Main supply	Main incoming power supply
Emergency supply ¹⁾	Secondary incoming power supply with automatic change over in the event of main supply failure
Aux. equipment connections	
Power output 230V	Power supply for aux. equipment 230VAC max. 460W
Internal 24VDC supply	Internal 24VDC power supply. Option to connect external supply
Booster pump 1 ²⁾	400VAC connection for booster pump motor
Booster pump 2 ³⁾	
Space heater BP 1	230VAC connection for booster pump space heater
Space heater BP 2 ³⁾	
Water filling valve 1	24VDC output signal for valves controlling water supply for inlet manifold or tank
Water filling valve 2	
Priming device valve 1	24VDC output signal for booster pump priming devices
Priming device valve 2	
Nitrogen valve	24VDC output signal for release of nitrogen backup battery
I/O for automatic fire detection system	
Inputs	
Start unit	External signal for activating unit
Stop unit	External signal for stopping unit
Open nitrogen valve	External signal for release of backup nitrogen battery
Outputs	
Common fault	Pot. free output for general fault
Pump running	Pot. free output for one or more HPPs running
System activated	Pot. free output for system started
Main supply OK	Pot. free output for main and emergency supply status
Nitrogen low-pressure	Pot. free output for backup nitrogen battery low pressure status
Low-pressure under 6 bar	Pot. free output for pressure in high pressure manifold under 6 bar
Nitrogen released	Pot. free output for backup nitrogen battery released status
General I/O	
Inputs	
Booster pump 1 OK	Input for external booster control box status
Booster pump 2 OK	
24VDC OK	Input for internal or external battery switch status
UPS fault	Input for internal or external UPS fault status
EMS box OK	Input for emergency supply box status
COB OK	Input for external change over box status
Nitrogen low-pressure	Input for low pressure in nitrogen backup battery status

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Outputs	
Buzzer	Pot. free output for buzzer with 24VDC supply
FW low-pressure / level	Pot. free output for low inlet pressure or tank low level alarm
System startup	Pot. free output for system started
System ready	Pot. free output for system ready
Buzzer	Pot. free output for external buzzer
Watchdog ok	Pot. free output for watchdog ok coms check between PLC and GUI
HPP X running ⁴⁾	Pot. free output for high-pressure pump running
HPP X fault ⁴⁾	Pot. free output for fault on HPP
Pilot pump 1 running	Pot. free output for pilot pump running
Pilot pump 1 fault	Pot. free output for fault on pilot pump
Pilot pump 2 running ⁵⁾	Pot. free output for pilot pump running
Pilot pump 2 fault ⁵⁾	Pot. free output for fault on pilot pump
Booster pump 1 running	Pot. free output for booster pump running or start external booster pump
Booster pump 1 fault	Pot. free output for fault on internal booster pump 1
Booster pump 2 running	Pot. free output for booster pump running or start external booster pump
Booster pump 2 fault	Pot. free output for fault on internal booster pump 2
All motor starts and CB OK	Pot. free output for fault on any motor protection or circuit breaker
Emergency stop OK	Pot. free output for emergency stop status
Overflow OK	Pot. free output for high level in buffer tank
Low-pressure/level OK	Pot. free output for low inlet pressure shut down or tank low level shut down
Supply main OK	Pot. free output for main supply status
Supply emg. OK	Pot. free output for emergency supply status
EMS + COB OK	Pot. free output for emergency supply box and change over box status
Leaking alarm OK	Pot. free output for leaking alarm on high pressure system
Main + test valve OK	Pot. free output for main and test valve position status
Backup nitrogen released	Pot. free output for backup nitrogen released status

¹⁾ Function available on request

²⁾ Prepared for booster according to table

³⁾ Supply for second booster pump available on request

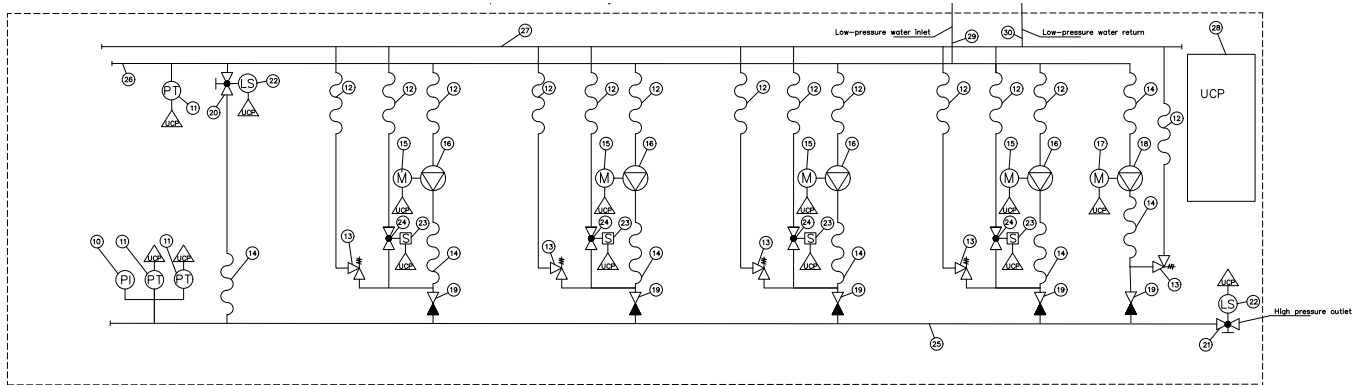
⁴⁾ One set of outputs per high-pressure pump

⁵⁾ Supply for second pilot pump available on request

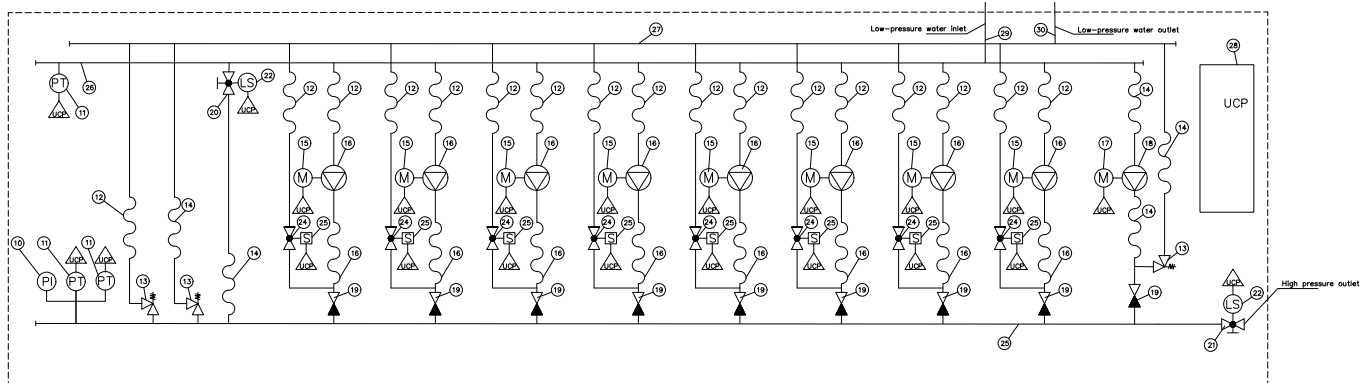
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Principle diagram

2 to 4 pumps with bypass for softstarters



5 to 8 pumps with bypass for softstarters

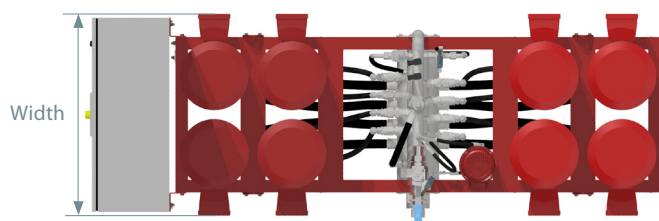
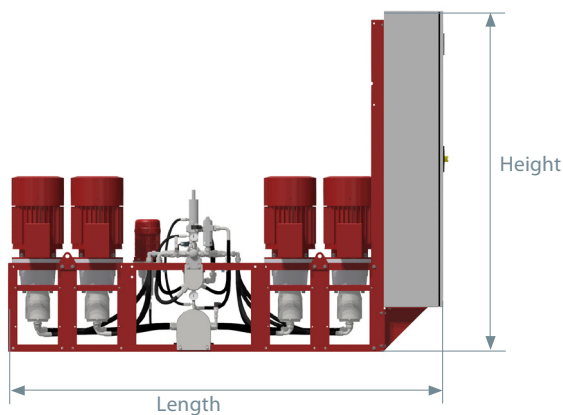


- 10 Pressure gauge
- 11 Pressure transmitter
- 12 Low-pressure flexible hose
- 13 Pressure relief valve
- 14 High-pressure flexible hose
- 15 Electrical motor for high-pressure water mist pump
- 16 High-pressure water mist pump
- 17 Electric motor for pilot pump
- 18 High-pressure pilot pump
- 19 Non-return valve
- 20 Test valve
- 21 Main valve
- 22 Limit switch
- 23 Coil for softstarter
- 24 Solenoid valve for softstarter
- 25 High-pressure manifold
- 26 Inlet manifold
- 27 Outlet manifold
- 28 User control panel (UCP)
- 29 Water from water reservoir
- 30 Water return to water reservoir

SEM-SAFE® high-pressure water mist pump unit - Product version 2.0, 2 to 4 pumps and 5 to 8 pumps

Installation information

Pump unit item number	Height [mm]	Length [mm]	Width [mm]	Low-pressure inlet manifold [BSPP]	High-pressure outlet manifold [BSPP]	Low-pressure outlet manifold [BSPP]
700100	1700	1826	1040	3"	1¼"	2"
700101	1900	1826	1040	3"	1¼"	2"
700102	1900	1826	1040	3"	1¼"	2"
700103	1900	1826	1040	3"	1¼"	2"
700104	1700	2226	1040	3"	1¼"	2"
700105	1900	2226	1040	3"	1¼"	2"
700106	1900	2226	1040	3"	1¼"	2"
700107	1900	2226	1040	3"	1¼"	2"
700108	1900	2226	1040	3"	1¼"	2"
700109	1900	2226	1040	3"	1¼"	2"
700110	1900	2226	1040	3"	1¼"	2"
700111	1900	2226	1040	3"	1¼"	2"
700112	1900	2565	1040	4"	2"	2"
700113	1900	2565	1040	4"	2"	2"
700114	1900	2565	1040	4"	2"	2"
700115	1900	2565	1040	4"	2"	2"
700116	2100	2565	1040	4"	2"	2"
700117	2100	2565	1040	4"	2"	2"
700118	2100	2565	1040	4"	2"	2"
700119	2100	2565	1040	4"	2"	2"
700120	2100	2965	1040	4"	2"	2"
700121	2300	2965	1040	4"	2"	2"
700122	2300	2965	1040	4"	2"	2"
700123	2300	2965	1040	4"	2"	2"
700124	2300	2965	1040	4"	2"	2"
700125	2300	2965	1040	4"	2"	2"
700126	2300	2965	1040	4"	2"	2"
700127	2300	2965	1040	4"	2"	2"



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Options

Options	Description
Voltage 690 V 60 Hz, 690 V 50 Hz, 440 V 50 Hz/60 Hz, 400 V 60 Hz	
Motor 22 kW IE1	Used for applications with operating pressure up to 95 bar
Water tank 800 L inlet 2 x 1.5" BSPP (1-4 pumps)	Used when buffer water tank is required
Water tank 1200 L inlet 2x2" Bsp (5-8 pumps)	Used when buffer water tank is required
PAH 63 pump	Reduces waterflow and kW consumption pr. pump
Low-pressure pilot pump 6-15 bar	Used for small systems (0.75 kW motor)
Service valve on pump inlet	Used if Danfoss PAH needs to be isolated from the unit
Standby pump (PAH63 and PAH80)	Used when standby pump is required
Service online module	
3.1 Certificate	In accordance with EN 10204



Water quality

Please find the information about water quality in data sheet no. 901-90-00006.



How to order

For ordering the SEM-SAFE® high-pressure water mist pump units, send your order via email to the Customer Centre department at firesafety.customer@danfoss.com.

Please enclose your reference number, delivery address and contact information for the recipient.

Also state your needed delivery date. Shortly afterwards, you will receive an order confirmation – or a phone call in case of questions – from our Customer Centre.

If in doubt, please contact Customer Centre at Danfoss Fire Safety A/S.



Warranty

Warranty in accordance with Danfoss Fire Safety A/S general terms and conditions.



Health & safety precautions

Danfoss Fire Safety A/S health and safety procedures and environmental policies shall be strictly followed.

Furthermore it is the installer's responsibility to ensure that territorial legislation and on site safety regulations are followed during installation and testing.

Care must be taken that installation, test, commission and service of the system are only carried out by appropriately trained competent personnel, and that all relevant procedures are followed to the satisfaction of the authority having jurisdiction.