

Finnsonic General Technical Specification TS19

1. General

The purpose of this document is to specify the generally used design practices, materials, components and documentation in FinnSonic machines. However, the final choice of components is done at the design stage, and is not limited by this specification.

2. Standards and norms

The machines conform to following European Council Directives, standards and changes related to them:

- EC Machine Directive 2006/42/EC and changes related to it.
- Electromagnetic Compatibility Directive 2014/30/EC.
- Low Voltage Directive 2014/35/EC.
- Standards: EN ISO 12100, EN ISO 13849-1:2008, EN 12921-1 A1:2010, SFS-EN 60204-1:2018.

3. Materials

Tanks, framework and cover plates are of stainless steel grade AISI 304. Ultrasonic submersible transducers and the valves that are in contact with washing liquids are of stainless steel grade AISI 316. Heating elements are of SS2378 and the element flanges are of SS2346. Filter vessels of stainless steel or plastics. Basket transporter is of aluminum profile, stainless steel, mild steel and plastics. In large machines the lower frame and basket transporter frame are of paint finished mild steel. Conveyor frame of paint finished mild steel and conveyor rolls of galvanized material. Standard color is RAL 7012 (gray), RAL 2009 (orange). In automated machines the encapsulation is made of aluminium frame with stainless steel AISI304 side panels. Alternatively the encapsulation is made of stainless steel AISI304. Windows are clear plexy glass.

Unless otherwise stated, the machine is designed for non-aggressive neutral or alkaline detergents. Pumps are for detergents that do not crystallize, and are provided with Viton or EPDM seals. Pumps, hoses and gaskets to aggressive liquids or solvents are selected specifically for the purpose.

4. Mechanical and pneumatical components

Standard component manufacturers are listed in Appendix TS-1. Components not included in the above mentioned appendix are chosen freely by FinnSonic and they can vary from case to case.

5. Electrical and control system

5.1 Voltages

Supply voltage 400/230VAC, 50 Hz, 3-phase, neutral and ground.
Field devices and control devices 24 VDC.

5.2 Electrical components

Standard electrical component manufacturers are listed in Appendix TS-2. Components not included in the above mentioned appendix are chosen freely by FinnSonic and they can vary from case to case.

5.3 Control system

The control system for automatic machines is based on PLC system type Siemens S7, HMI min. 7 inches. Other PLC types by separate agreement.

The control system language is English. Translation of the control system texts to other language is done by the Distributor.

5.4 Enclosures and cabinets

Control system devices like relays, PLC components and ultrasonic generators, are located in a standard industrial control cabinet. Cabinet protection by enclosure is IP55. The cabinet is of painted steel construction, color RAL 7035 Light grey. The cabinet is provided with forced ventilation fan and filter. Control equipment like push buttons, pilot lights or Human-Machine Interface is placed to cabinet door. Space reservations for possible future expansions must be agreed separately.

5.5 Marking of cables and conductors

According to Appendix TS-4.

6. Design and construction

The machines are designed and constructed using normal FinnSonic practices. Tanks are of welded construction with tilted or V-shaped bottom. Heated tanks are insulated with polyurethane foam or mineral wool. Tanks are of self-supporting construction or mounted on a profile frame.

7. Documentation

The documentation included in delivery consists of the Operation and Maintenance Instructions, the content of which is listed in Appendix TS-3.

Drawings are made with CAD-programs (e.g. SolidWorks, AutoCAD or ProENGINEER). Electrical diagrams are made with CADS/AutoCAD. An example of the drawing format of electrical diagrams is shown in Appendixes TS-5 and TS-6.

Technical documentation like drawings, parts lists and technical data are in English language. The electrical documentation is a comprehensive description of the FinnSonic cleaning system features. Individual machine configuration is available from the electrical documentation.

As a standard all documentation is delivered in A4 paper format, except mechanical assembly drawings and flow diagrams that may vary between A4 and A3.

User instructions are delivered in English. Translation of the user documents to other languages is done by the Distributor. Component manufacturers' service instructions and other technical papers are supplied in their original format in one copy only to end customer documentation. FinnSonic shall not translate such secondary papers, even though they are included in our documentation.

Each machine is supplied with 1 hard copy of user instructions for the end customer. Layout, parts lists, electrical diagrams and cabling drawings are delivered in hard copy, except ranges V011 and V36.

All documents except section 10 component literature are available in FinnSonic extranet for distributor.

The installation documents are delivered with the machine. Final documents are delivered within two weeks from the machine delivery.

8. Packaging

As a standard the machine is packaged to wooden pallets and wrapped to plastics. Other packaging, like seaworthy packaging, can be done by separate agreement.

The machine is shipped in as big parts as possible to minimize installation costs and time.

The customer must specify the maximum dimensions of a part that can be transported to the installation site. Narrow passages, small lifts, stairways, corners etc. in the customer's facilities may affect machine design and construction. This must be checked and agreed upon in the quotation phase.

9. Installation requirements

The machines are designed to be installed to following ambient conditions:

Voltage	400/230 VAC \pm 10 %, 50 Hz
Compressed air	6 - 8 bar, dry and filtered
Water	2 - 6 bar
Max. particle size in water	200 μ
Ambient temperature	5 - 30° C
Max. air humidity	85 % at 20° C 50 % at 30° C

Installation limits in a typical automated machine are:

- Mains connectors in the electrical control cabinet
- Water, drain and compressed air connections at the machine
- Ventilation connections on top or side of the machine.

Standard Component Manufacturers Used in FinnSonic Machines

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Appendix TS-1

Pneumatic components

Cylinders, valves and accessories	Festo
Air service units	Festo

Pumps

Stainless centrifugal pumps	Grundfos
Magnet driven pumps	Iwaki
Pneumatic membrane pumps	Wagner, Aro, Dellmeco
Dosing pumps	Dosatron, Prominent
Vacuum pumps	Busch

Filter housings:

AISI316 10", 20" cartridge vessels	Amazon
AISI316 bag filter vessels	Amazon
PP, PVC, PVDF, 10"	Wolftechnik

Sensors and measuring devices:

Pressure gauges	Wika
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Standard Electrical Component Manufacturers Used in FinnSonic Machines

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Appendix TS-2

Heating elements	Backer
PLC-system	Siemens
Human-Machine Interface	Siemens, Weintek
Photocells	IFM
Circuit breakers	Schneider Electric, Siemens
Indication lamps	Schneider Electric
Light towers	Schneider Electric
Push buttons	Schneider Electric
Switches	Schneider Electric
Main switches	ABB
Contactors	Schneider Electric, Siemens
Motor protective switches	Schneider Electric, Siemens
Relays	Omron, Releco, Weidmuller
Safety relays	Phoenix
Magnetic Safety switches	Mechan, Bernstein
Interlocks	Schmersal
Timers (normal)	Jumo, Syrelec, Tele
Timers (panel mountable)	Syrelec, Jumo
Inductive sensors	Datalogic, IFM
Encoders	Pepperl & Fuchs
7 day timers	Theben
Frequency converters	Siemens
Temperature regulators	Omron, Jumo
DC-power supplies	Chinfa; Weidmuller
Control cabinets	Rittal
Terminal blocks	Phoenix, Weidmuller
Transformers	Trafox
Light curtains	Datalogic, Sick

FinnSonic Instructions for Operation and Maintenance

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Appendix TS-3

The following list gives a short description of the operation and maintenance instructions that are included in FinnSonic deliveries.

- General information of the company and the machine
- Safety instructions
- Commissioning instructions
- Operation instructions
- Service instructions/intervals
- Technical data and connection requirements of the machine
- CE Declaration of Conformity

Technical drawings:

- Electrical drawings
- Dimensional drawings
- Layout and other mechanical drawings (optional)
- Flow diagram (optional)
- Pneumatic diagram (optional)

Marking of Electrical Equipment and Cabling

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Appendix TS-4

The marking is done in accordance with paragraphs 10.2.1, 15.2 and 19.7 in standard EN 60204-1:2018. FinnSonic's standard marking methods for different items are listed below.

Marking of parts and components

Parts and components, which are mounted at the machine, like motors, transducers, heating elements, connection boxes, valves etc are marked in accordance with the item designation and numbering used in the diagrams. Marking material is self-adhesive tape.

Parts and components, that are mounted inside the control cabinets, like relays, contactors, fuses, indication lights, switches etc are marked in accordance with the item designation and numbering used in the diagrams. Marking material is self-adhesive tape, which is fixed on each device and near the device.

Marking of cables and conductors

Marking of cables and conductors is divided into two levels. Level 1 marking is used normally. Level 2 is an improved marking method, and it is used only if separately agreed.

Appendix TS-5 shows the marking principles of the two levels and Appendix TS-6 shows how the identification is done in the diagrams. Marking material is plastic collars, sleeves, rings or self-adhesive tape.

Conductors and cables are not marked in ranges V03, V031 and V011.

Level 1 marking (normal method):

Cables and respective terminal blocks both in control cabinets and terminal boxes are marked as follows:

- Cables are marked at both ends with cable numbers
- Terminal blocks are marked with numbers
- Trunk cable conductors are marked when they are connected to terminal blocks

Conductors internal to the enclosures or modules (between the devices, components and terminal blocks) are not marked. Identification of conductors and terminations inside the enclosures is based on terminal numbers of each device. These numbers are also shown on diagrams.

Level 2 marking (optional method):

In addition to what is said for level 1 marking above, wires internal to the enclosures or modules are marked as follows:

Wires are marked at both ends with device or terminal group number followed by respective terminal number. Thus each and every termination can be easily identified even when wires are loose.

Cable connections

27.4.2015 MKA
OPK

Firm: FinnSonic
Machine: W X-960/88 VD MBT 100

Proj. no.: 5140060
Drawing no.: 514006040

Customer no.:

Location	ID	Conn.	Cable	Type	Wire	Color	ID	Conn.	To location
+TB50	X15	148	B18W1	DEVICE CABLE	1		B18	1	PT-100 TANK 5
+TB50	X15	149			2		B18	2	
+CC	X20	+	X51W1	7G0,75	1		X51	+	
+CC	X20	-			2		X51	-	
+CC	X20	201			3		X51	201	
+CC	X20	202			4		X51	202	
+CC	X20	203			5		X51	203	
+CC	X20	204			6		X51	204	
+CC	X20	GNYE			gnye		X51	GNYE	
+TB51	X51	1	S88W1	DEVICE CABLE	bk		S88	BK	
+TB51	X51	3			wh		S88	WH	
+TB51	X51	2			rd		S88	RD	
+TB51	X51	4			bu		S88	BU	
+TB51	X51	201	S89W1	DEVICE CABLE	bk		S89	BK	
+TB51	X51	1			wh		S89	WH	
+TB51	X51	202			rd		S89	RD	
+TB51	X51	2			bu		S89	BU	
+TB51	X51	3	S90W1	DEVICE CABLE	bk		S90	BK	
+TB51	X51	203			wh		S90	WH	
+TB51	X51	4			rd		S90	RD	
+TB51	X51	204			bu		S90	BU	
+TB51					gnye				
+TB51	X51	+	S007W1	DEVICE CABLE	bk		S0007	BK	END LIMIT BACKWARD
+TB51	X51	305			rd		S0007	RD	
+TB51	X51	307			wh		S0007	WH	
+CC	X20	+	X52W1	7G0,75	1		X52	+	
+CC	X20	-			2		X52	-	
+CC	X20	205			3		X52	205	
+CC	X20	206			4		X52	206	
+CC	X20	207			5		X52	207	
+CC	X20	208			6		X52	208	
+CC	X20				gnye				
+TB52	X52	+	S0011W1	DEVICE CABLE	bk		S0011	BK	END LIMIT BACKWARD
+TB52	X52	313			rd		S0011	RD	
+TB52	X52	315			wh		S0011	WH	
+TB52	X52	205	S91W1	DEVICE CABLE	bk		S91	BK	
+TB52	X52	1			wh		S91	WH	
+TB52	X52	206			rd		S91	RD	
+TB52	X52	2			bu		S91	BU	
+TB52					gnye				
+TB52	X52	1	S92W1	DEVICE CABLE	bk		S92	BK	
+TB52	X52	3			rd		S92	RD	
+TB52	X52	2			wh		S92	WH	
+TB52	X52	4			bu		S92	BU	
+TB52					gnye				
+TB52	X52	3	S93W1	5G0,75	bk		S93	BK	
+TB52	X52	207			wh		S93	WH	
+TB52	X52	4			rd		S93	RD	
+TB52	X52	208			bu		S93	BU	
+TB52					gnye				
+CC	X20	+	X53W1	7G0,75	1		X53	+	
+CC	X20	-			2		X53	-	
+CC	X20	194			3		X53	194	
+CC	X20	195			4		X53	195	
+CC	X20	196			5		X53	196	
+CC	X20	197			6		X53	197	
+CC	X20				gnye				

Marking of cables and conductors

TS-5







