

April 2022

Spence™ NFT 650 Series Steam Trap



WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in property damage and personal injury or death.

The NFT 650 Series Steam Trap must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and Emerson instructions.

If leak develops in the system, service to the unit may be required. Failure to correct trouble could result in a hazardous condition.

Installation, operation and maintenance procedures performed by unqualified personnel may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Only a qualified person shall install or service the NFT 650 Series Steam Trap.

Introduction

Scope of the Manual

This manual provides instructions for installation, maintenance and parts information for the NFT 650 Series.

Product Description

NFT 650 Series are float and thermostatic steam traps. Float is free of levers, linkages or other mechanical connections. This float is weighted to maintain orientation and acts as the valve being free to modulate condensate through the seat ring. Air vent is balanced-pressure design with stainless steel welded encapsulated bellows capable of discharging air and non-condensable gases continuously

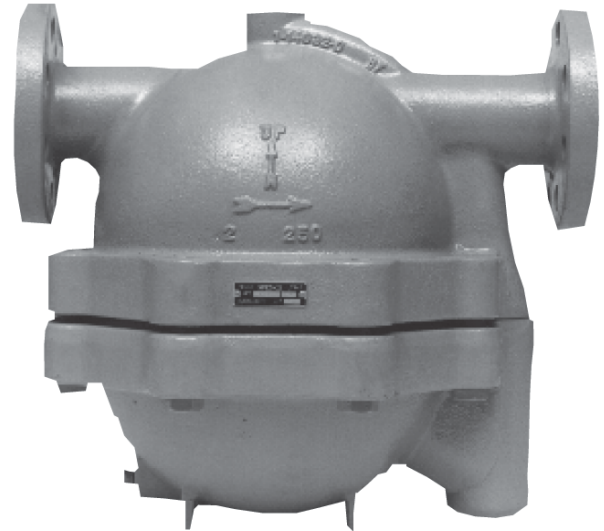


Figure 1. NFT 650 Series Steam Trap

within 15°F / -9.4°C of saturated temperature. Trap contains integral strainer and stainless steel exhaust port sleeve.

Principle of Operation

On startup, the thermostatic air vent (caged stainless welded bellows) is open, allowing air to flow freely through the vent valve orifice. When condensate flows into the trap, the float rises, allowing condensate to be discharged. Once air and non-condensables have been evacuated, hot condensate will cause the thermostatic vent to close. Condensate will continue to be discharged as long as condensation occurs. During normal operation, an increase in the load causes the liquid level in the trap to rise. The float then rises and rolls off the seat ring, allowing more condensate to flow out. The float sinks as the condensate load decreases, moving nearer to the seat ring, decreasing the effective size of the orifice and allowing less condensate to discharge. This provides smooth, continuous operation that reacts instantly to load variation while maintaining a water seal over the seat ring to prevent live steam loss.



NFT 650 Series

Specifications

The specifications section on this page provide the ratings and other specifications for the NFT 650 Series.

Available Configurations

- Type NFT 651: Low capacity
- Type NFT 652: Medium capacity
- Type NFT 653: High capacity

Body Sizes

- NPS 1/2, 3/4, 1, 1-1/2 and 2 /
- DN 15, 20, 25, 40 and 50

End Connection Style

- NPT, Socket Weld, CL300 RF and CL600 RF

Maximum Allowable Pressure⁽¹⁾

- 650 psig / 44.8 barg

Maximum Operating Pressure⁽¹⁾

- See Table 1

Maximum Allowable Temperature⁽¹⁾

- 750°F / 400°C

Materials of Construction

- Body and Cover:** ASTM A216 WCB Carbon steel
- Cover Gasket:** Spiral Wound 304 Stainless steel with graphite filler
- All Internal:** Stainless steel
- Air Vent:** Balanced-Pressure Stainless steel

Options

- SLR Orifice
- Blowdown Valve
- Continuous Bleed Air Vent Maximum Pressure

1. The pressure/temperature limits in this Instruction Manual and any applicable standard or code limitation should not be exceeded.

Table 1. Maximum Operating Pressure

ORIFICE	MAXIMUM OPERATING PRESSURE	
	psig	barg
20	20	1.4
50	50	3.5
100	100	6.9
175	175	12.1
300	300	20.7
400	400	27.6
600	600	41.4

Installation

Install the NFT 650 Series Steam Trap upright and in a horizontal line with the arrow on the body pointing in the direction of flow. Allowable inclination is 5° or less horizontally and 5° or less at right angles to the plane of the pipe line.

Maintenance

Due to normal wear that may occur, inspect the parts periodically and replace if necessary. The frequency of inspection depends on the severity of service conditions.

1. Disassemble the steam trap. Remove the body bolts and place the lower body on a safe place.
2. Inspect the float and lower seat ring for damage and clean or replace as necessary. Clean the float with a rag and steel wool.
3. Clean the screen using a wire brush.
4. Replace bellows if needed. Use needle nose pliers or similar tool. Insert them into two of the three holes located in the bellows assembly and unscrew it from the upper body.

Note

When reassembling, use thread locker on the bellows assembly threads.

5. After inspection/repair, reassemble trap, replacing body gasket and torquing bolts as specified. See Table 2.



CAUTION

Inspection of the thermostatic bellows is not recommended as disassembly generally damages the unit.

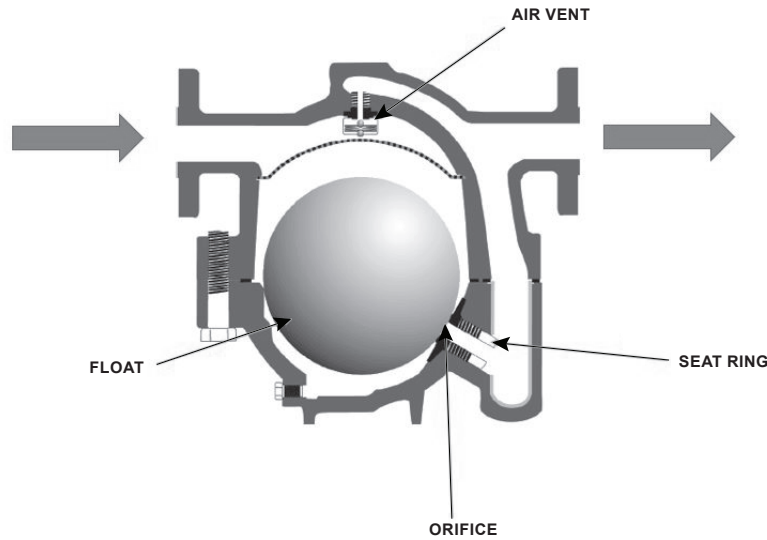


Figure 2. NFT 650 Series Stream Trap Operational Schematic

Table 2. NFT 650 Series Stream Trap Torque Values

TRAP TYPE	BODY BOLTS		SEAT RING	
	Ft-lb	N.m	Ft-lb	N.m
NFT 651	60 to 70	81 to 95	11 to 12	14 to 16
NFT 652	265 to 310	359 to 420	21.5 to 23.5	29 to 32
NFT 653	265 to 310	359 to 420	37 to 41	50 to 56

Parts Ordering

When corresponding with your local Sales Office about NFT 650 Series Steam Trap, always reference the assembly number. When ordering replacement parts, specify the complete character part number from the following parts list.

Parts List

Key	Description	Part Number	Key	Description	Part Number
1	Body, Cast steel	See following table	6	Sleeve, Copper	
2	Air Vent Gasket, Copper			Type NFT 651	WAL05-15774-00
	Type NFT 651	WAL05-15771-00		Type NFT 652	WAL05-15775-00
	Types NFT 652 and NFT 653	WAL05-14627-00		Type NFT 653	WAL05-15776-00
3	Air Vent, Steel		7*	Seat Ring, 316 Stainless steel	See following table
	Type NFT 651	WAL05-15751-00	8	Lower Body, Cast steel	
	Types NFT 652 and NFT 653	WAL05-15752-00		Type NFT 651	WAL04-15712-00
4	Vent Gasket, 304 Stainless steel			Type NFT 652	WAL04-15725-00
	Type NFT 651	WAL05-15778-00		Type NFT 653	WAL04-15734-00
	Type NFT 652	WAL05-15780-00	9*	Seat Ring Gasket, Copper	
	Type NFT 653	WAL05-15782-00		Type NFT 651	WAL05-14614-00
5	Body Gasket, 304 Stainless steel			Type NFT 652	WAL05-14627-00
	Type NFT 651	WAL05-15777-00		Type NFT 653	WAL05-14646-00
	Type NFT 652	WAL05-15779-00	10	Float, 316 Stainless steel	
	Type NFT 653	WAL05-15781-00		Type NFT 651	WAL05-15943-00
				Type NFT 652	WAL05-15946-00
				Type NFT 653	WAL05-14638-00
			11	Pipe Plug, 1/4 NPT	WAL04-03772-00
			12	Cap Screw, Steel	
				Type NFT 651	WAL05-15783-00
				Type NFT 652	WAL05-15784-00
				Type NFT 653	WAL05-15785-00
			13	Retainer Ring, Steel	
				Type NFT 651	WAL05-15772-00
				Type NFT 652	WAL05-14662-00
				Type NFT 653	WAL05-14640-00
			14	Screen, 304 Stainless steel	
				Type NFT 651	WAL05-15773-00
				Type NFT 652	WAL05-14621-00
				Type NFT 653	WAL05-14639-00

*Recommended spare parts.

NFT 650 Series

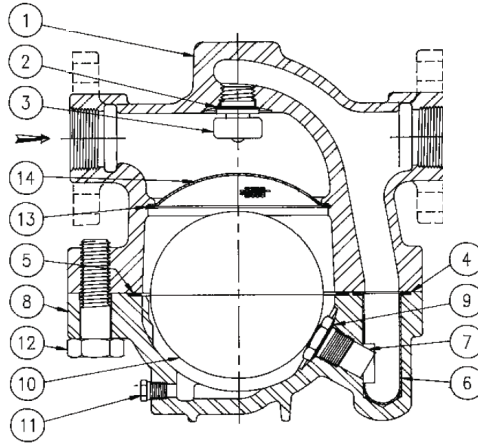


Figure 3. NFT 650 Series Steam Trap Assembly

Key 1, NFT 650 Series Body Part Number

END CONNECTION	PART NUMBER							
	TYPE 651			TYPE 652			TYPE 653	
	NPS 1/2 / DN 15	NPS 3/4 / DN 20	NPS 1 / DN 25	NPS 1 / DN 25	NPS 1-1/2 / DN 40	NPS 2 / DN 40	NPS 1-1/2 / DN 40	NPS 2 / DN 40
Screwed	WAL04-15700-00	WAL04-15701-00	WAL04-15702-00	WAL04-15713-00	WAL04-15714-00	WAL04-15715-00	WAL04-15726-00	WAL04-15727-00
CL300 RF	-----	-----	-----	WAL04-15717-00	WAL04-15720-00	WAL04-15723-00	WAL04-15729-00	WAL04-15732-00
CL600 RF	-----	-----	-----	WAL04-15718-00	WAL04-15721-00	WAL04-15724-00	WAL04-15730-00	WAL04-15733-00

Key 7, NFT 650 Series Seat Ring Part Number

TRAP TYPE	PART NUMBER								
	Differential Pressure, ΔP (psig / barg)								
	20 / 1.38	50 / 3.45	100 / 6.90	150 / 10.3	175 / 12.1	250 / 17.2	300 / 20.7	400 / 27.6	600 / 41.4
NFT 651	WAL04-15750-00	WAL04-15751-00	WAL04-15752-00	WAL04-15753-00	WAL04-15754-00	WAL04-15755-00	WAL04-15756-00	WAL04-15757-00	WAL04-15758-00
NFT 652	WAL04-15759-00	WAL04-15760-00	WAL04-15761-00	WAL04-15762-00	WAL04-15763-00	WAL04-15764-00	WAL04-15765-00	WAL04-15766-00	WAL04-15767-00
NFT 653	WAL04-14645-00	WAL04-15696-00	WAL04-14644-00	WAL04-15692-00	WAL04-15688-00	WAL04-14643-00	WAL04-15768-00	WAL04-15769-00	WAL04-15770-00

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