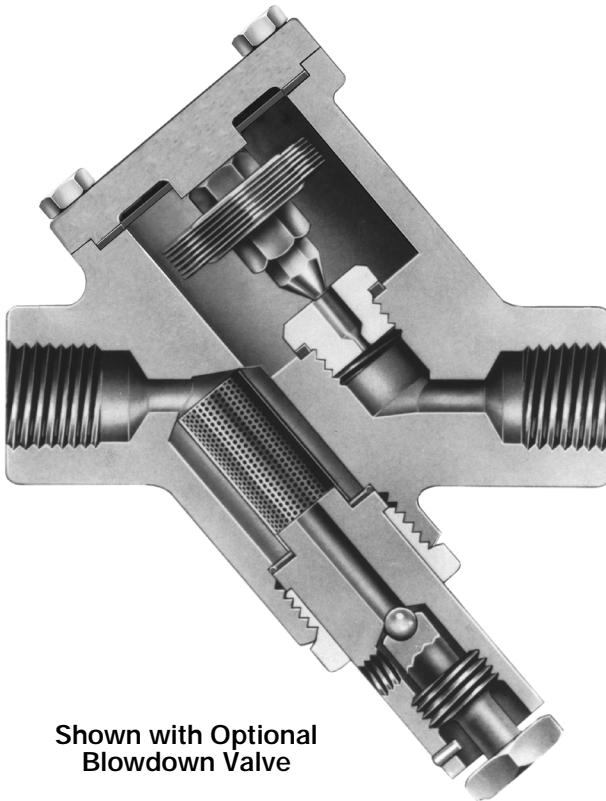


# N650 SERIES THERMOSTATIC STEAM TRAPS

Pressures To 650 PSIG (44.8 barg)  
Temperatures to 750°F (400°C)



Shown with Optional  
Blowdown Valve

## Applications

- Unit Heaters
- Air Vents
- Steam Tracing
- Drip Legs
- Platen Presses
- Plating Tanks
- Sterilizers
- Tire Presses
- Cooking Equipment
- Laundry Equipment
- Other Process Equipment

## Options See page 8

- B - Blowdown Valve
- ISO - ISO Filled Actuator\*
- SK - Skirted Seat\*
- SLR - SLR Orifice
- SW - Socketweld

\*Not available on N651

**Positive Shutoff** — Valve and seats are lapped in matched sets, providing tight shutoff for light and no-load conditions which results in improved energy savings.

**Freeze Proof** — Self draining when installed vertically.

**Compact—Easy to Install** — Ample extension for pipe wrench provided.

**Easily Maintained** — Actuator element and valve are attached to cover to facilitate inspection and servicing. Optional stainless blowdown valve permits easy strainer cleaning while in service.

**Directional Discharge** — Pipe and thread erosion prevented by directing condensate to center of discharge pipe.

**Hardened Stainless Steel Valve and Seat** — Long life. Lapped as a matched set for water tight seal.

**Temperature Sensitive Actuators** — One moving part. Stainless Steel, fail open, welded actuator for maximum corrosion, thermal and hydraulic shock resistance. Optional fail closed convoluted Monel bellows for caustic corrosion resistance.

**Positive Shutoff and Long Life** — Integral Stainless Steel Strainer helps prevent debris from depositing onto valve and seat.

**Guaranteed** — Traps are guaranteed against defects in materials or workmanship. Traps with Welded Thermal Actuator—3 years. Traps with Monel Bellows—1 year

## Models

- **N651**—Y pattern body w/strainer and blowdown port tapped & plugged; welded SS actuator& low capacity
- **N652**—Reduced capacity
- **N652M**—Convoluted monel actuator on N652
- **N653**—Standard capacity
- **N653M**—Convoluted monel actuator on N653
- **N654**—High capacity
- **N654M**—Convoluted monel actuator on N654

Canadian Registration # 0E0591.9

## Operating Principle

Thermal actuator is filled at its free length with a liquid having a lower boiling point than water. On start-up, valve is normally open. When steam enters trap, thermal actuator fill vaporizes to a pressure higher than line pressure. This forces valve into seat orifice to prevent any further flow. As condensate collects, it takes heat from thermal actuator, lowering internal

pressure. Line pressure will then compress thermal actuator to open valve and discharge condensate. Valve opening automatically adjusts to load conditions from minimum on very light loads to full lift at maximum load. Optional blowdown valve allows fast and easy cleaning of internal strainer without removing trap from operation.

# N650 SERIES THERMOSTATIC STEAM TRAPS

## Typical Specification

Steam trap shall be of balanced pressure design with monel convoluted actuator or stainless steel welded actuator capable of discharging condensate within 10°F of saturated temperature. Where greater sensitivity is required or protection from flash steam locking, a SLR orifice will be available to allow condensate and flash steam evacuation at or near saturated temperatures. Where subcooling of condensate is desired alternate thermostatic actuator will be available to allow condensate evacuation at or near 40°F below saturated temperatures. Thermostatic actuator shall employ a conical valve lapped in matched sets with the seat ring assuring tight shut off. A minimum of three orifice sizes shall be available allowing for custom capacity sizing. Trap shall be forged carbon steel Y pattern body with strainer and available blow down valve suitable for pressures to 650 psig and available in 1/2" and 3/4" NPT or socketweld.

## Maximum Operating Conditions

### Traps with Monel Convoluted Actuator

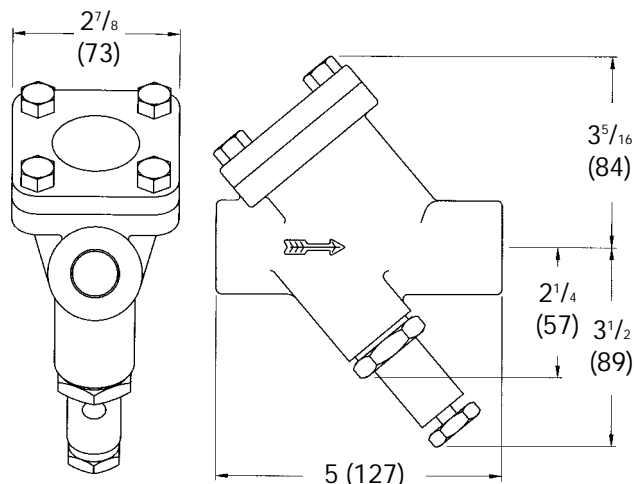
PMO: Max. Operating Pressure	300 psig	(20.7 barg)
TMO: Max. Operating Temperature	500°F	(260°C)
PMA: Max. Allowable Pressure	650 psig	(44.8 barg)
TMA: Max. Allowable Temperature	750°F	(400°C)

### Traps with Welded Stainless Actuator

PMO: Max. Operating Pressure	500 psig	(34.5 barg)
TMO: Max. Operating Temperature	600°F	(316°C)
PMA: Max. Allowable Pressure	650 psig	(44.8 barg)
TMA: Max. Allowable Temperature	750°F	(400°C)

### Traps with Welded Stainless Actuator, ISO

PMO: Max. Operating Pressure	650 psig	(44.8 barg)
TMO: Max. Operating Temperature	650°F	(343°C)
PMA: Max. Allowable Pressure	650 psig	(44.8 barg)
TMA: Max. Allowable Temperature	750°F	(400°C)



SHOWN WITH OPTIONAL BLOWDOWN VALVE  
WEIGHT: 5 LBS. (2.3 KG)

Connections:  
1/2" or 3/4" NPT or socketweld

## Materials of Construction

Body & Cover:	ASTM A105 Forged Steel
Actuator:	Welded SS or Convoluted Monel
Cover Gasket:	304 stainless spiral wound w/graphite fill
Strainer:	.033 perf. 304 Stainless Steel
Blowdown Valve:	416 Stainless Steel
Valve & Seat:	Hardened 416 Stainless Steel

## Maximum Capacity—lbs/hr 10°F Below Saturation (Kg/hr 5°C Below Saturation)

Trap	Orifice  Inch (mm)	Differential PSIG (barg)																
		5 (0.34)	10 (0.7)	20 (1.4)	50 (3.5)	100 (6.9)	125 (8.62)	150 (10.3)	200 (13.8)	250 (17.2)	300 (20.7)	350 (24.1)	400 (27.6)	450 (31.0)	500 (34.5)	550 (37.9)	600 (41.4)	650 (44.8)
N651	5/64 (2)	84 (38)	119 (54)	168 (76)	265 (120)	348 (158)	375 (170)	398 (181)	439 (199)	472 (214)	502 (228)	529 (240)	553 (251)	575 (261)	595 (270)	615 (280)	635 (289)	650 (295)
N652 N652M†	1/8 (3)	216 (98)	265 (120)	375 (170)	592 (269)	778 (354)	838 (381)	890 (405)	980 (445)	1055 (480)	1121 (510)	1180 (536)	1235 (561)	1284 (584)	1331 (604)	1377 (625)	1425 (646)	1471 (667)
N653 N653M†	1/4 (6)	550 (249)	825 (374)	1210 (549)	1975 (896)	2825 (1281)	3140 (1424)	3425 (1554)	3650 (1656)	3960 (1796)	4100 (1860)	4230 (1919)	4420 (2005)	4600 (2086)	4760 (2161)	4910 (2232)	5060 (2297)	5190 (2359)
N654 N654M†	5/16 (8)	860 (390)	1220 (554)	1725 (783)	2725 (1237)	3575 (1623)	3850 (1748)	4090 (1857)	4505 (2045)	4850 (2202)	5155 (2340)	5425 (2463)	5675 (2576)	5900 (2679)	6110 (2774)	6310 (2868)	6480 (2945)	6625 (3011)

†Maximum pressure with Monel Actuators is 300 PSIG (20.7 bar).

Nicholson recommends ISO filled Actuator above 500 psi (34.5 bar) and for superheated steam.

Nicholson recommends skirted seat above 300 psi (20.7 bar).