

**DELETE THIS PAGE AFTER PRINTING**  
**OR GENERATING PDF**



# Nortec SAM-e

## Engineering Manual

Includes technical specifications, guidelines, and options for selection and application of Nortec SAM-e and Nortec Mini SAM-e Short Absorption Manifolds

***Thank you for choosing Condair.***

**Proprietary Notice**

This document and the information disclosed herein are proprietary data of Condair. Neither this document nor the information contained herein shall be reproduced used, or disclosed to others without the written authorization of Condair., except to the extent required for installation or maintenance of recipient's equipment. All references to the Condair name should be taken as referring to Condair.

**Liability Notice**

Condair does not accept any liability for installations of humidity equipment installed by unqualified personnel or the use of parts/components/equipment that are not authorized or approved by Condair.

**Copyright Notice**

Copyright 2020, Condair. All rights reserved.

# Contents

---

## **1 General**

- 1 Features
- 3 Determining the Steam Absorption Distance
- 7 Static Air Pressure
- 7 Condensate Losses
- 8 Correct Choice of Product Applications

## **15 Product Selection**

- 16 Step 1 Header Selection
- 24 Step 2 Steam Tube Selection
- 27 Step 3 Nortec SAM-e Steam Inlet Configuration Selection

## **30 Select Options**

## **35 Installation Drawings**

## **45 Specification**

## **51 Appendix Inlet Adapter Configurations**

## Nortec Short Absorption Manifold (SAM-e)

The Nortec SAM-e is Condair's best performing steam absorption system for use in Air Handling Units and duct systems where short steam absorption distance is critical.

Precisely controlled clean steam is distributed uniformly into the air stream by the Nortec SAM-e without any condensate spray. Steam distribution takes place via distributor tubes with integrated nozzles. The steam is kept dry as condensate is drained through the main header.

The stainless steel distribution tubes are typically mounted vertically but may also be mounted horizontally (10° slope) for vertical airflow applications. The distribution tubes come equipped with evenly-spaced stainless steel nozzles, providing optimum steam distribution.

The nozzles extend into the center of the distribution tube ensuring only condensate-free steam is released. Condensate drains out of the distribution tubes through the header, eliminating the need for jacketed tubes. A permanent bond between the nozzle and distribution tube is made when the nozzle is pressed into the tube. The nozzles and tubes have the same thermal expansion characteristics guaranteeing a permanent union. The precise manufactured orifices ensure consistent output from each nozzle.

### Features

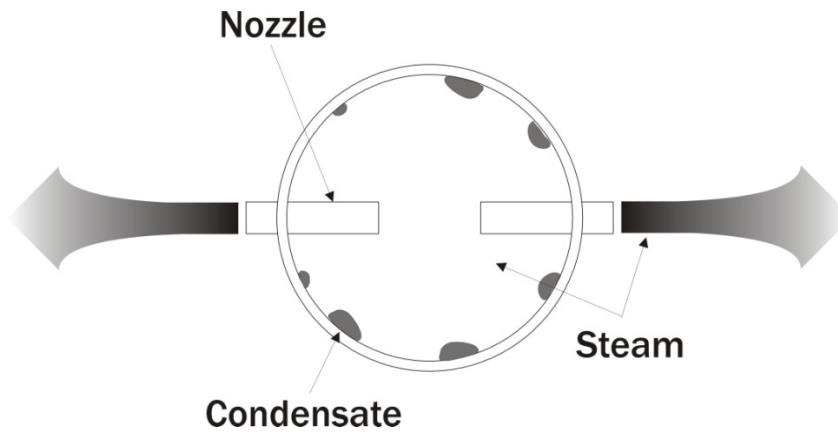
- Inlets/Outlets located on same side, one access point required.
- All stainless steel distributors and nozzles ensure permanent bond.
- Stainless steel header with rubber grommet seals for easy installation of distribution tubes.
- Tubes available in 409 or 304 stainless steel to fit every budget.
- Available with optional stainless steel insulating shielding for increased energy efficiency and decreased condensate losses.
- Adjustable mounting frame available for quick and easy installation.
- Available with 3", 6", 9", or 12" center to center distributor spacing – (Nortec SAM-e).
- Available in 3" and 6" center to center distributor spacing - (Nortec Mini SAM-e).
- Atmospheric or pressure steam source.
- Ten-year limited warranty (two years on tube coupling seals).



**Note:** Nortec SAM-e Header / Separator assembly distributes the steam evenly along its length and allows condensate to settle for easy removal through the trap.



**Figure 1: Nortec SAM-e**



**Figure 2: Cross-section of distributor pipe**

## Determining the Steam Absorption Distance



**Note:** Visit [www.condair.com](http://www.condair.com) to download our Humidification Engineering & Loadsizing Program (H.E.L.P.) to help calculate absorption distances.

A certain amount of time is required for complete absorption when injecting steam into the air.

During this time, steam moves a fixed distance from the distribution manifold before it is fully absorbed into a moving air stream.

The absorption distance is the distance required for steam to be fully absorbed by the airstream. Identifying this distance is essential to ensure that unabsorbed steam does not condense on downstream components.

The system should be designed to eliminate the possibility of wetting internal components by positioning the manifold in an optimum location and by maximizing the available distance for steam absorption.

Shorter absorption is not always desirable. Sizing a Nortec SAM-e to produce unnecessarily short absorption distances may result in increased condensate losses and require a larger humidifier to compensate. It is important to balance available absorption distance with Nortec SAM-e capacity.

### Additional Information

Data is based on velocities between 200 fpm (1 m/s) and 2500 fpm (12.7 m/s).

Available absorption distance: the distance between Nortec SAM-e and first obstruction (coil, elbow, damper, etc.) that steam may contact. Traces of steam may pass this obstruction, but will not condense, leaving obstructions dry.

Absorption distance is a function of various conditions including; duct temperature, duct humidity level, duct static pressure, and air flow rate. Changes in duct geometry, flow rates, or flow conditions will require recalculating Nortec SAM-e performance. It is always recommended to size Nortec SAM-e to “worst case” conditions.

## Static Air Pressure

Table 1 shows the static pressure loss created by a Nortec SAM-e in various velocities.

**Table 1: Air Pressure Loss in AHU / Duct**

| Air Velocity<br>[ fpm (m/s) ] | Air Pressure Loss [ in(mm) of water column ] |             |                    |              |
|-------------------------------|--|-------------|--------------------|--------------|
|                               | Nortec SAM-e Tube Spacing                    |             |                    |              |
|                               | 3" (762 mm)                                  | 6" (152 mm) | 9" (229 mm)        | 12" (305 mm) |
| 500 (2.5)                     | 0.01 (0.3)                                   | 0.01 (0.3)  | No measurable data |              |
| 750 (3.8)                     | 0.03 (0.8)                                   | 0.01 (0.3)  |                    |              |
| 1000 (5.1)                    | 0.05 (1.3)                                   | 0.02 (0.5)  |                    |              |
| 1250 (6.4)                    | 0.07 (1.8)                                   | 0.03 (0.8)  |                    |              |
| 1500 (7.6)                    | 0.09 (2.3)                                   | 0.04 (1.0)  | 0.01 (0.3)         | 0.01 (0.3)   |
| 1750 (8.9)                    | 0.10 (2.5)                                   | 0.06 (1.5)  | 0.01 (0.3)         | 0.01 (0.3)   |
| 2000 (10.2)                   | 0.12 (3.0)                                   | 0.08 (2.0)  | 0.01 (0.3)         | 0.01 (0.3)   |

## Condensate Losses

Some of the steam generated by Condair humidifiers will condense due to Nortec SAM-e. To compensate for this loss in capacity, calculated humidification load must be increased accordingly. Please refer to Table 2.

Condair recommends the installation of a condensate drain on the steam-line run prior to entering the Nortec SAM-e. This will prevent condensate from the lines from entering the Nortec SAM-e.

**Table 2: Condensate Loss for Un-insulated Nortec SAM-e**

| Air Velocity<br>[ fpm (m/s) ] | Condensate Losses [ % of Maximum Capacity ] |              |                   |              |
|-------------------------------|---|--------------|-------------------|--------------|
|                               | Atmospheric Steam                           |              | Pressurized Steam |              |
|                               | 55°F (13 °C)                                | 70°F (21 °C) | 55°F (13 °C)      | 70°F (21 °C) |
| 500 (2.5)                     | 15%   | 12%          | 8%                | 5%           |
| 1000 (5.1)                    | 20%   | 15%          | 10%               | 7%           |

**Note:** These values may increase or decrease due to many unknown conditions or variables. This is only a guideline.





The Nortec SAM-e is available with optional stainless steel insulation for headers and tubes. Insulation is desirable to reduce air-stream heat gain, reduce condensate losses, and improve energy efficiency. Please refer to Table 3 when estimating condensate losses with insulated Nortec SAM-e's.

**Table 3: Condensate Loss for Insulated Nortec SAM-e**

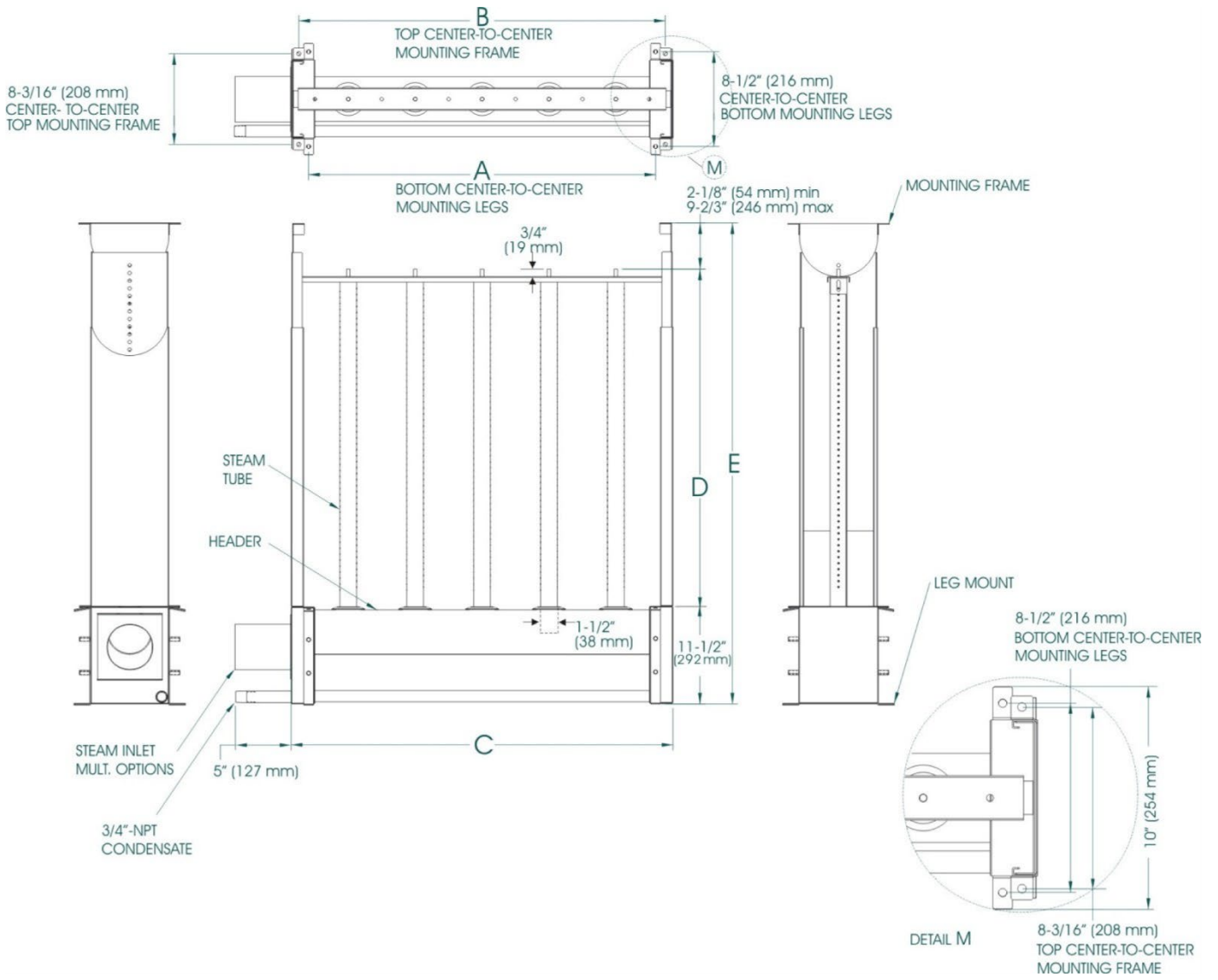
| Air Velocity<br>[ fpm (m/s) ] | Condensate Losses [ % of Maximum Capacity ] |              |                   |              |
|-------------------------------|---|--------------|-------------------|--------------|
|                               | Atmospheric Steam                           |              | Pressurized Steam |              |
|                               | 55°F (13 °C)                                | 70°F (21 °C) | 55°F (13 °C)      | 70°F (21 °C) |
| 500 (2.5)                     | 5%  | 4%           | 6%                | 3%           |
| 1000 (5.1)                    | 10%   | 8%           | 8%                | 5%           |



**Note:** These values may increase or decrease due to many unknown conditions or variables. This is only a guideline.

### Correct Choice of Product Applications (within Nortec SAM-e)

The Nortec SAM-e has been designed exclusively for use in building ventilation duct systems where short absorption is critical. Condair offers various humidification technologies to suit virtually all applications and can recommend the most appropriate system for each case.



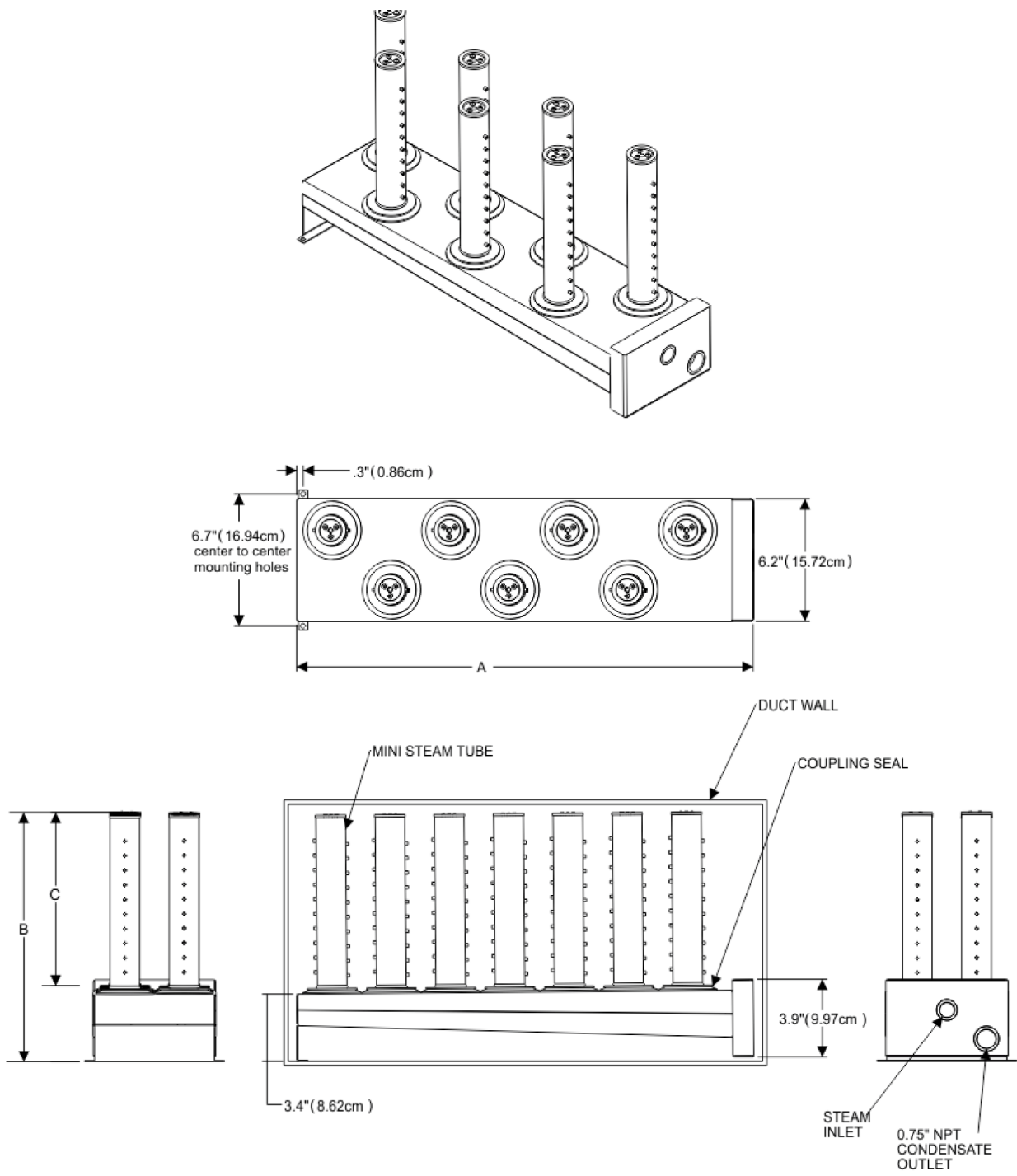
**Figure 3: General Nortec SAM-e Dimensions**

**Table 4: Nortec SAM-e Dimensions - Width**

| Duct Width |      | Dimension A<br>Frame Width - Bottom |      | Dimension B<br>Frame Width - Top |      | Dimension C<br>Header Assembly Width |     |
|------------|------|-------------------------------------|------|----------------------------------|------|--------------------------------------|-----|
| in         | mm   | in                                  | mm   | in                               | mm   | in                                   | mm  |
| 18         | 457  | 13.1                                | 333  | 14.9                             | 378  | 16.3                                 | 413 |
| 24         | 610  | 19.1                                | 486  | 20.9                             | 530  | 22.3                                 | 57  |
| 30         | 762  | 25.1                                | 638  | 26.9                             | 683  | 28.3                                 | 72  |
| 36         | 914  | 31.1                                | 791  | 32.9                             | 835  | 34.3                                 | 87  |
| 42         | 1067 | 37.1                                | 943  | 38.9                             | 987  | 40.3                                 | 102 |
| 48         | 1219 | 43.1                                | 1095 | 44.9                             | 1140 | 46.3                                 | 117 |
| 54         | 1372 | 49.1                                | 1248 | 50.9                             | 1292 | 52.3                                 | 133 |
| 60         | 1524 | 55.1                                | 1400 | 56.9                             | 1445 | 58.3                                 | 148 |
| 66         | 1676 | 61.1                                | 1553 | 62.9                             | 1597 | 64.3                                 | 163 |
| 72         | 1829 | 67.1                                | 1705 | 68.9                             | 1749 | 70.3                                 | 178 |
| 78         | 1981 | 73.1                                | 1857 | 74.9                             | 1902 | 76.3                                 | 194 |
| 84         | 2134 | 79.1                                | 2010 | 80.9                             | 2054 | 82.3                                 | 209 |
| 90         | 2286 | 85.1                                | 2162 | 86.9                             | 2207 | 88.3                                 | 224 |
| 96         | 2438 | 91.1                                | 2315 | 92.9                             | 2359 | 94.3                                 | 239 |
| 102        | 2591 | 97.1                                | 2467 | 98.9                             | 2511 | 100.3                                | 255 |
| 108        | 2743 | 103.1                               | 2619 | 104.9                            | 2664 | 106.3                                | 270 |
| 114        | 2896 | 109.1                               | 2772 | 110.9                            | 2816 | 112.3                                | 285 |
| 120        | 3048 | 115.1                               | 2924 | 116.9                            | 2969 | 118.3                                | 300 |
| 126        | 3200 | 121.1                               | 3077 | 122.9                            | 3121 | 124.3                                | 316 |
| 132        | 3353 | 127.1                               | 3229 | 128.9                            | 3273 | 130.3                                | 331 |
| 138        | 3505 | 133.1                               | 3381 | 134.9                            | 3426 | 136.3                                | 346 |
| 144        | 3658 | 139.1                               | 3534 | 140.9                            | 3578 | 142.3                                | 361 |

**Table 5: Nortec SAM-e Dimensions – Height**

| Duct Height |      | Dimension D<br>Steam Tube Height |      | Dimension E Min.<br>Minimum Overall Height |      | Dimension E Max.<br>Maximum Overall Height |      |
|-------------|------|----------------------------------|------|--|------|--|------|
| in          | mm   | in                               | mm   | in   | mm   | in   | mm   |
| 18          | 457  | 5.5                              | 140  | 17   | 432  | 24.7                                       | 627  |
| 24          | 610  | 11.5                             | 292  | 23   | 584  | 30.7                                       | 779  |
| 30          | 762  | 17.5                             | 445  | 29   | 737  | 36.7                                       | 931  |
| 36          | 914  | 23.5                             | 597  | 35   | 889  | 42.7                                       | 1084 |
| 42          | 1067 | 29.5                             | 749  | 41   | 1041 | 48.7                                       | 1236 |
| 48          | 1219 | 35.5                             | 902  | 47   | 1194 | 54.7                                       | 1389 |
| 54          | 1372 | 41.5                             | 1054 | 53   | 1346 | 60.7                                       | 1541 |
| 60          | 1524 | 47.5                             | 1207 | 59   | 1499 | 66.7                                       | 1693 |
| 66          | 1676 | 53.5                             | 1359 | 65   | 1651 | 72.7                                       | 1846 |
| 72          | 1829 | 59.5                             | 1511 | 71   | 1803 | 78.7                                       | 1998 |
| 78          | 1981 | 65.5                             | 1664 | 77   | 1956 | 84.7                                       | 2151 |
| 84          | 2134 | 71.5                             | 1816 | 83   | 2108 | 90.7                                       | 2303 |
| 90          | 2286 | 77.5                             | 1969 | 89   | 2261 | 96.7                                       | 2455 |
| 96          | 2438 | 83.5                             | 2121 | 95   | 2413 | 102.7                                      | 2608 |
| 102         | 2591 | 89.5                             | 2273 | 101  | 2565 | 108.7                                      | 2760 |
| 108         | 2743 | 95.5                             | 2426 | 107  | 2718 | 114.7                                      | 2913 |
| 114         | 2896 | 101.5                            | 2578 | 113  | 2870 | 120.7                                      | 3065 |
| 120         | 3048 | 107.5                            | 2731 | 119  | 3023 | 126.7                                      | 3217 |
| 126         | 3200 | 113.5                            | 2883 | 125  | 3175 | 132.7                                      | 3370 |
| 132         | 3353 | 119.5                            | 3035 | 131  | 3327 | 138.7                                      | 3522 |
| 138         | 3505 | 125.5                            | 3188 | 137  | 3480 | 144.7                                      | 3675 |
| 144         | 3658 | 131.5                            | 3340 | 143  | 3632 | 150.7                                      | 3827 |



**Figure 4: General Nortec Mini SAM-e Dimensions**

**Table 6: Nortec Mini SAM-e Dimensions – Width**

| Duct Width |     | Dimension A             |     |
|------------|-----|-------------------------|-----|
|            |     | Nortec Mini SAM-e Width |     |
| in         | mm  | in                      | mm  |
| 12         | 305 | 11.1                    | 281 |
| 18         | 457 | 17.1                    | 433 |
| 24         | 610 | 23.1                    | 586 |

**Table 7: Nortec Mini SAM-e Dimensions – Height**

| Duct Height |     | Dimension B<br>Nortec Mini SAM-e Height |     | Dimension C<br>Mini Steam Tube Height |     |
|-------------|-----|---|-----|---------------------------------------|-----|
|             |     | in                                      | mm  | in                                    | mm  |
| 8           | 203 | 7.9                                     | 200 | 4.4                                   | 113 |
| 10          | 254 | 9.9                                     | 251 | 6.4                                   | 164 |
| 12          | 305 | 11.9                                    | 302 | 8.4                                   | 214 |
| 14          | 356 | 13.9                                    | 352 | 10.4                                  | 265 |
| 16          | 406 | 15.9                                    | 403 | 12.4                                  | 316 |
| 18          | 457 | 17.9                                    | 454 | 14.4                                  | 367 |
| 20          | 508 | 19.9                                    | 505 | 16.4                                  | 418 |
| 22          | 559 | 21.9                                    | 556 | 18.4                                  | 468 |
| 24          | 610 | 23.9                                    | 606 | 20.4                                  | 519 |

# Product Selection

---

## Step 1 – Nortec SAM-e Header Selection

Condair offers a ranges of manifolds to cover various capacities and duct sizes. The absorption distance and capacity required determines the center-to-center spacing between each steam tube. There are four options: 3” (76 mm) or 6” (152 mm) or 9” (229 mm) or 12” (305 mm). Nortec Mini SAM-e’s are only available with 3” and 6” spacing. The smaller the spacing, the more tubes the header can accommodate, thus giving a better absorption distance and greater capacity, but at the cost of higher condensate losses.

The header / separator remain the same for atmospheric or pressurized steam, and for vertical or horizontal flow applications.

Atmospheric manifolds with a capacity over 801 lb/hr (362 kg/hr) include a second steam inlet on the header. Consult factory submittal drawings for specific details.

Select the header part number associated with your duct or air handling unit’s width.

For example, if duct width is 80” (2032 mm), select part number 1503279 for 3” (76 mm) center-to-center spacing.

Some smaller duct sizes are too small to accommodate a full-size Nortec SAM-e, and a Nortec Mini SAM-e must be used. As a rule-of-thumb, when duct width is less than 30” (762mm), a Nortec Mini SAM-e is the best choice.

### Air Handling Unit (AHU) Installation

In some *LiveSteam* installations where there is no available room to install steam components such as F&T traps, separator, etc., a stand may be ordered. Stands are available in 12- or 20- inch heights, and allow traps and components to be installed in the duct along with the Nortec SAM-e. If a stand is required, the overall height of the Nortec SAM-e must be reduced by the height of the selected stand. This enables proper steam tube selection. Nortec SAM-e width must also be reduced to allow components to fit in the duct beside the Nortec SAM-e. Please refer to *LiveSteam Engineering Manual* for component sizes.

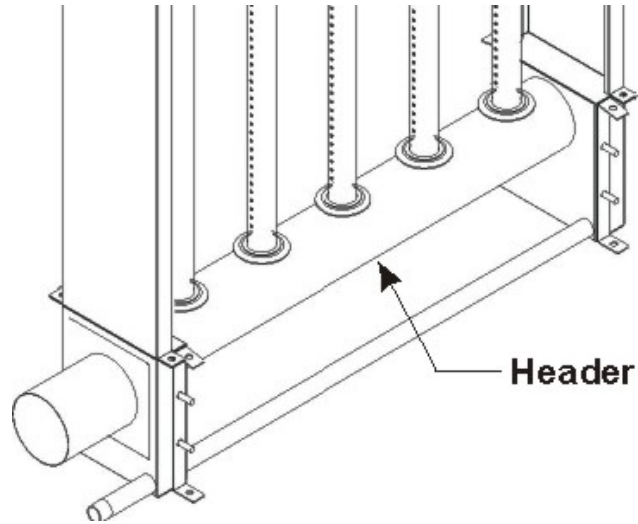
**Table 8: Nortec SAM-e Stand Kits**

| Dimension A<br>[ in (mm) ] | Part Number |
|----------------------------|-------------|
| 12" (305)                  | 1509947     |
| 20" (508)                  | 1509948     |

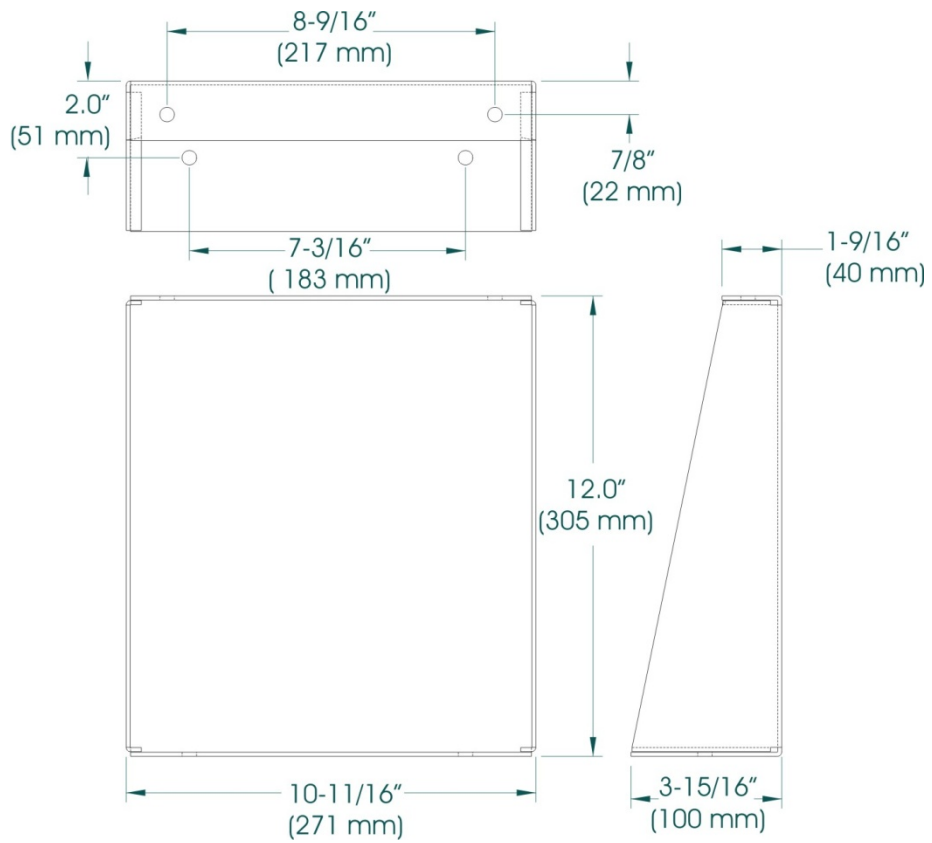
**Note:** Refer to Nortec SAM-e submittal drawings for more information. All stand kits are complete with both left and right stands and required fasteners.







**Figure 5: Header / Separator Assembly**



**Figure 6: Nortec SAM-e Stand**

**Table 9: Nortec SAM-e Header / Separator Assembly, Atmospheric Steam – 3” Centers**

| <b>ATMOSPHERIC STEAM – 3” HEADERS</b> |                           |                               |   |               |                |               |
|---------------------------------------|---------------------------|-------------------------------|---|---------------|----------------|---------------|
| <b>Duct Width<br/>[ in (mm) ]</b>     | <b>Steam<br/>Tube Qty</b> | <b>Header<br/>Part Number</b> | <b>Maximum Capacity Atmospheric Steam [ lb/hr (kg/hr) ]</b> |               |                |               |
|                                       |                           |                               | <b>Type A</b>   | <b>Type B</b> | <b>Type B+</b> | <b>Type C</b> |
| 18 (457)                              | 3                         | 1503269                       | 45 (20)   | 105 (48)      | 165 (75)       | 225 (102)     |
| 24 (610)                              | 5                         | 1503270                       | 75 (34)   | 175 (79)      | 275 (125)      | 375 (170)     |
| 30 (762)                              | 7                         | 1503271                       | 105 (48)  | 245 (111)     | 385 (175)      | 525 (238)     |
| 36 (914)                              | 9                         | 1503272                       | 135 (61)  | 315 (143)     | 495 (225)      | 675 (306)     |
| 42 (1067)                             | 11                        | 1503273                       | 165 (75)  | 385 (174)     | 605 (274)      | 800 (363)     |
|                                       | <i>Double Inlet</i>       | 1503291                       | -   | -             | -              | 825 (374)     |
| 48 (1219)                             | 13                        | 1503274                       | 195 (88)  | 455 (206)     | 715 (324)      | 800 (363)     |
|                                       | <i>Double Inlet</i>       | 1503292                       | -   | -             | -              | 975 (442)     |
| 54 (1372)                             | 15                        | 1503275                       | 225 (102)   | 525 (238)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503293                       | -   | -             | 825 (374)      | 1125 (510)    |
| 60 (1524)                             | 17                        | 1503276                       | 255 (116)   | 595 (270)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503294                       | -   | -             | 935 (424)      | 1200 (544)    |
| 66 (1676)                             | 19                        | 1503277                       | 285 (129)   | 665 (301)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503295                       | -   | -             | 1045 (474)     | 1200 (544)    |
| 72 (1829)                             | 21                        | 1503278                       | 315 (143)   | 735 (333)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503296                       | -   | -             | 1155 (524)     | 1200 (544)    |
| 78 (1981)                             | 23                        | 1503279                       | 345 (156)   | 800 (363)     | -              | -             |
|                                       | <i>Double Inlet</i>       | 1503297                       | -   | 805 (365)     | 1200 (544)     | -             |
| 84 (2134)                             | 25                        | 1503280                       | 375 (170)   | 800 (363)     | -              | -             |
|                                       | <i>Double Inlet</i>       | 1503298                       | -   | 875 (396)     | 1200 (544)     | -             |
| 90 (2286)                             | 27                        | 1503281                       | 405 (183)   | 800 (363)     | -              | -             |
|                                       | <i>Double Inlet</i>       | 1503299                       | -   | 945 (428)     | 1200 (544)     | -             |
| 96 (2438)                             | 29                        | 1503282                       | 435 (197)   | 800 (363)     | -              | -             |
|                                       | <i>Double Inlet</i>       | 1503300                       | -   | 1015 (460)    | 1200 (544)     | -             |
| 102 (2591)                            | 31                        | 1503283                       | 465 (211)   | 800 (363)     | -              | -             |
|                                       | <i>Double Inlet</i>       | 1503301                       | -   | 1085 (492)    | 1200 (544)     | -             |
| 108 (2743)                            | 33                        | 1503284                       | 495 (224)   | 800 (363)     | -              | -             |
|                                       | <i>Double Inlet</i>       | 1503302                       | -   | 1155 (523)    | 1200 (544)     | -             |
| 114 (3048)                            | 35                        | 1503285                       | 525 (238)   | 800 (363)     | -              | -             |
|                                       | <i>Double Inlet</i>       | 1503303                       | -   | 1200 (544)    | -              | -             |
| 120 (3048)                            | 37                        | 1503286                       | 555 (251)   | 800 (363)     | -              | -             |
|                                       | <i>Double Inlet</i>       | 1503304                       | -   | 1200 (544)    | -              | -             |
| 126 (3200)                            | 39                        | 1503287                       | 585 (265)   | 800 (363)     | -              | -             |
|                                       | <i>Double Inlet</i>       | 1503305                       | -   | 1200 (544)    | -              | -             |
| 132 (3353)                            | 41                        | 1503288                       | 615 (279)   | 800 (363)     | -              | -             |
|                                       | <i>Double Inlet</i>       | 1503306                       | -   | 1200 (544)    | -              | -             |
| 138 (3505)                            | 43                        | 1503289                       | 645 (292)   | 800 (363)     | -              | -             |
|                                       | <i>Double Inlet</i>       | 1503307                       | -   | 1200 (544)    | -              | -             |
| 144 (3658)                            | 45                        | 1503290                       | 675 (306)   | 800 (363)     | -              | -             |
|                                       | <i>Double Inlet</i>       | 1503308                       | -   | 1200 (544)    | -              | -             |
| 144+                                  | Consult Factory           |                               |   |               |                |               |

**Table 10: Nortec SAM-e Header / Separator Assembly, Pressure Steam – 3” Centers**

| <b>PRESSURE STEAM – 3” Headers</b> |                           |                               |  |               |                |               |
|------------------------------------|---------------------------|-------------------------------|--|---------------|----------------|---------------|
| <b>Duct Width<br/>[ in (mm) ]</b>  | <b>Steam Tube<br/>Qty</b> | <b>Header<br/>Part Number</b> | <b>Maximum Capacity Pressure Steam [ lb/hr (kg/hr) ]</b> |               |                |               |
|                                    |                           |                               | <b>Type A</b>  | <b>Type B</b> | <b>Type B+</b> | <b>Type C</b> |
| 18 (457)                           | 3                         | 1503269                       | 45 (20)  | 105 (48)      | 165 (75)       | 225 (102)     |
| 24 (610)                           | 5                         | 1503270                       | 75 (34)  | 175 (79)      | 275 (125)      | 375 (170)     |
| 30 (762)                           | 7                         | 1503271                       | 105 (48)   | 245 (111)     | 385 (175)      | 525 (238)     |
| 36 (914)                           | 9                         | 1503272                       | 135 (61)   | 315 (143)     | 495 (225)      | 675 (306)     |
| 42 (1067)                          | 11                        | 1503273                       | 165 (75)   | 385 (174)     | 605 (274)      | 825 (374)     |
| 48 (1219)                          | 13                        | 1503274                       | 195 (88)   | 455 (206)     | 715 (324)      | 975 (442)     |
| 54 (1372)                          | 15                        | 1503275                       | 225 (102)  | 525 (238)     | 825 (374)      | 1125 (510)    |
| 60 (1524)                          | 17                        | 1503276                       | 255 (116)  | 595 (270)     | 935 (424)      | 1275 (578)    |
| 66 (1676)                          | 19                        | 1503277                       | 285 (129)  | 665 (301)     | 1045 (474)     | 1425 (646)    |
| 72 (1829)                          | 21                        | 1503278                       | 315 (143)  | 735 (333)     | 1155 (524)     | 1575 (713)    |
| 78 (1981)                          | 23                        | 1503279                       | 345 (156)  | 805 (365)     | 1265 (574)     | 1745 (790)    |
| 84 (2134)                          | 25                        | 1503280                       | 375 (170)  | 875 (396)     | 1375 (624)     | 1875 (849)    |
| 90 (2286)                          | 27                        | 1503281                       | 405 (183)  | 945 (428)     | 1485 (674)     | 2025 (917)    |
| 96 (2438)                          | 29                        | 1503282                       | 435 (197)  | 1015 (460)    | 1595 (723)     | 2175 (985)    |
| 102 (2591)                         | 31                        | 1503283                       | 465 (211)  | 1085 (492)    | 1705 (773)     | 2325 (1053)   |
| 108 (2743)                         | 33                        | 1503284                       | 495 (224)  | 1155 (523)    | 1815 (823)     | 2475 (1121)   |
| 114 (3048)                         | 35                        | 1503285                       | 525 (238)  | 1225 (555)    | 1925 (873)     | 2625 (1189)   |
| 120 (3048)                         | 37                        | 1503286                       | 555 (251)  | 1295 (587)    | 2035 (923)     | 2775 (1257)   |
| 126 (3200)                         | 39                        | 1503287                       | 585 (265)  | 1365 (618)    | 2145 (973)     | 2925 (1325)   |
| 132 (3353)                         | 41                        | 1503288                       | 615 (279)  | 1435 (650)    | 2255 (1023)    | 3075 (1393)   |
| 138 (3505)                         | 43                        | 1503289                       | 645 (292)  | 1505 (682)    | 2365 (1073)    | 3200 (1450)   |
| 144 (3658)                         | 45                        | 1503290                       | 675 (306)  | 1575 (713)    | 2475 (1123)    | 3200 (1450)   |
| 144+ (3658+)                       | Consult Factory           |                               |  |               |                |               |

**Table 11: Nortec SAM-e Header / Separator Assembly, Atmospheric Steam – 6” Centers**

| <b>ATMOSPHERIC STEAM – 6” HEADERS</b> |                           |                               |   |               |                |               |
|---------------------------------------|---------------------------|-------------------------------|---|---------------|----------------|---------------|
| <b>Duct Width<br/>[ in (mm) ]</b>     | <b>Steam<br/>Tube Qty</b> | <b>Header<br/>Part Number</b> | <b>Maximum Capacity Atmospheric Steam [ lb/hr (kg/hr) ]</b> |               |                |               |
|                                       |                           |                               | <b>Type A</b>   | <b>Type B</b> | <b>Type B+</b> | <b>Type C</b> |
| 18 (457)                              | 2                         | 1503309                       | 30 (14)   | 70 (32)       | 110 (50)       | 150 (68)      |
| 24 (610)                              | 3                         | 1503310                       | 45 (20)   | 105 (48)      | 165 (75)       | 225 (102)     |
| 30 (762)                              | 4                         | 1503311                       | 60 (27)   | 140 (63)      | 220 (100)      | 300 (136)     |
| 36 (914)                              | 5                         | 1503312                       | 75 (34)   | 175 (79)      | 275 (125)      | 375 (170)     |
| 42 (1067)                             | 6                         | 1503313                       | 90 (41)   | 210 (95)      | 330 (150)      | 450 (204)     |
| 48 (1219)                             | 7                         | 1503314                       | 105 (48)  | 245 (111)     | 385 (175)      | 525 (238)     |
| 54 (1372)                             | 8                         | 1503315                       | 120 (54)  | 280 (127)     | 440 (200)      | 600 (272)     |
| 60 (1524)                             | 9                         | 1503316                       | 135 (61)  | 315 (143)     | 495 (225)      | 675 (306)     |
| 66 (1676)                             | 10                        | 1503317                       | 150 (68)  | 350 (159)     | 550 (249)      | 750 (340)     |
| 72 (1829)                             | 11                        | 1503318                       | 165 (75)  | 385 (174)     | 605 (274)      | 800 (363)     |
|                                       | <i>Double Inlet</i>       | 1503331                       | -   | -             | -              | 825 (374)     |
| 78 (1981)                             | 12                        | 1503319                       | 180 (82)  | 420 (190)     | 660 (299)      | 800 (363)     |
|                                       | <i>Double Inlet</i>       | 1503332                       | -   | -             | -              | 900 (408)     |
| 84 (2134)                             | 13                        | 1503320                       | 195 (88)  | 455 (206)     | 715 (324)      | 800 (363)     |
|                                       | <i>Double Inlet</i>       | 1503333                       | -   | -             | -              | 975 (442)     |
| 90 (2286)                             | 14                        | 1503321                       | 210 (95)  | 490 (222)     | 770 (349)      | 800 (363)     |
|                                       | <i>Double Inlet</i>       | 1503334                       | -   | -             | -              | 1050 (476)    |
| 96 (2438)                             | 15                        | 1503322                       | 225 (102)   | 525 (238)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503335                       | -   | -             | 825 (374)      | 1125 (510)    |
| 102 (2591)                            | 16                        | 1503323                       | 240 (109)   | 560 (254)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503336                       | -   | -             | 880 (399)      | 1200 (544)    |
| 108 (2743)                            | 17                        | 1503324                       | 255 (116)   | 595 (270)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503337                       | -   | -             | 935 (424)      | 1200 (544)    |
| 114 (3048)                            | 18                        | 1503325                       | 270 (122)   | 630 (271)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503338                       | -   | -             | 990 (449)      | 1200 (544)    |
| 120 (3048)                            | 19                        | 1503326                       | 285 (129)   | 665 (301)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503339                       | -   | -             | 1045 (474)     | 1200 (544)    |
| 126 (3200)                            | 20                        | 1503327                       | 300 (136)   | 700 (317)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503340                       | -   | -             | 1100 (499)     | 1200 (544)    |
| 132 (3353)                            | 21                        | 1503328                       | 315 (143)   | 735 (333)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503341                       | -   | -             | 1155 (524)     | 1200 (544)    |
| 138 (3505)                            | 22                        | 1503329                       | 330 (149)   | 770 (349)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503342                       | -   | -             | 1200 (544)     | -             |
| 144 (3658)                            | 23                        | 1503330                       | 345 (156)   | 805 (365)     | 800 (363)      | -             |
|                                       | <i>Double Inlet</i>       | 1503343                       | -   | -             | 1200 (544)     | -             |
| 144+ (3658+)                          | Consult Factory           |                               |   |               |                |               |

**Table 12: Nortec SAM-e Header / Separator Assembly, Pressure Steam – 6” Centers**

| <b>PRESSURE STEAM – 6” Headers</b> |                           |                               |  |               |                |               |
|------------------------------------|---------------------------|-------------------------------|--|---------------|----------------|---------------|
| <b>Duct Width<br/>[ in (mm) ]</b>  | <b>Steam Tube<br/>Qty</b> | <b>Header<br/>Part Number</b> | <b>Maximum Capacity Pressure Steam [ lb/hr (kg/hr) ]</b> |               |                |               |
|                                    |                           |                               | <b>Type A</b>  | <b>Type B</b> | <b>Type B+</b> | <b>Type C</b> |
| 18 (457)                           | 2                         | 1503309                       | 30 (14)  | 70 (32)       | 110 (50)       | 150 (68)      |
| 24 (610)                           | 3                         | 1503310                       | 45 (20)  | 105 (48)      | 165 (75)       | 225 (102)     |
| 30 (762)                           | 4                         | 1503311                       | 60 (27)  | 140 (63)      | 220 (100)      | 300 (136)     |
| 36 (914)                           | 5                         | 1503312                       | 75 (34)  | 175 (79)      | 275 (125)      | 375 (170)     |
| 42 (1067)                          | 6                         | 1503313                       | 90 (41)  | 210 (95)      | 330 (150)      | 450 (204)     |
| 48 (1219)                          | 7                         | 1503314                       | 105 (48)   | 245 (111)     | 385 (175)      | 525 (238)     |
| 54 (1372)                          | 8                         | 1503315                       | 120 (54)   | 280 (127)     | 440 (200)      | 600 (272)     |
| 60 (1524)                          | 9                         | 1503316                       | 135 (61)   | 315 (143)     | 495 (225)      | 675 (306)     |
| 66 (1676)                          | 10                        | 1503317                       | 150 (68)   | 350 (159)     | 550 (249)      | 750 (340)     |
| 72 (1829)                          | 11                        | 1503318                       | 165 (75)   | 385 (174)     | 605 (274)      | 825 (374)     |
| 78 (1981)                          | 12                        | 1503319                       | 180 (82)   | 420 (190)     | 660 (299)      | 900 (408)     |
| 84 (2134)                          | 13                        | 1503320                       | 195 (88)   | 455 (206)     | 715 (324)      | 975 (442)     |
| 90 (2286)                          | 14                        | 1503321                       | 210 (95)   | 490 (222)     | 770 (349)      | 1050 (476)    |
| 96 (2438)                          | 15                        | 1503322                       | 225 (102)  | 525 (238)     | 825 (374)      | 1125 (510)    |
| 102 (2591)                         | 16                        | 1503323                       | 240 (109)  | 560 (254)     | 880 (399)      | 1200 (544)    |
| 108 (2743)                         | 17                        | 1503324                       | 255 (116)  | 595 (270)     | 935 (424)      | 1275 (578)    |
| 114 (3048)                         | 18                        | 1503325                       | 270 (122)  | 630 (271)     | 990 (449)      | 1350 (612)    |
| 120 (3048)                         | 19                        | 1503326                       | 285 (129)  | 665 (301)     | 1045 (474)     | 1425 (646)    |
| 126 (3200)                         | 20                        | 1503327                       | 300 (136)  | 700 (317)     | 1100 (499)     | 1500 (680)    |
| 132 (3353)                         | 21                        | 1503328                       | 315 (143)  | 735 (333)     | 1155 (524)     | 1575 (713)    |
| 138 (3505)                         | 22                        | 1503329                       | 330 (149)  | 770 (349)     | 1210 (549)     | 1650 (748)    |
| 144 (3658)                         | 23                        | 1503330                       | 345 (156)  | 805 (365)     | 1265 (574)     | 1725 (782)    |
| 144+ (3658+)                       | Consult Factory           |                               |  |               |                |               |

**Table 13: Nortec SAM-e Header / Separator Assembly, Atmospheric Steam – 9” Centers**

| <b>ATMOSPHERIC STEAM – 9” HEADERS</b> |                     |                       |  |           |            |            |
|---------------------------------------|---------------------|-----------------------|--|-----------|------------|------------|
| Duct Width<br>[ in (mm) ]             | Steam<br>Tube Qty   | Header<br>Part Number | Maximum Capacity Atmospheric Steam [ lb/hr (kg/hr) ] |           |            |            |
|                                       |                     |                       | Type A   | Type B    | Type B+    | Type C     |
| 36 (914)                              | 3                   | 1506789               | 45 (20)  | 105 (48)  | 165 (75)   | 225 (102)  |
| 48 (1219)                             | 5                   | 1506790               | 75 (34)  | 175 (79)  | 275 (125)  | 375 (170)  |
| 60 (1524)                             | 6                   | 1506791               | 105 (48)   | 245 (111) | 385 (175)  | 525 (238)  |
| 72 (1829)                             | 7                   | 1506792               | 135 (61)   | 315 (143) | 495 (225)  | 675 (306)  |
| 84 (2134)                             | 9                   | 1506794               | 165 (75)   | 385 (174) | 605 (274)  | 800 (363)  |
| 96 (2438)                             | 10                  | 1506795               | 195 (88)   | 455 (206) | 715 (324)  | 800 (363)  |
| 108 (2743)                            | 11                  | 1506796               | 225 (102)  | 525 (238) | 800 (363)  | -          |
|                                       | <i>Double Inlet</i> | 1506807               | -  | -         | 825 (374)  | 1125 (510) |
| 120 (3048)                            | 13                  | 1507729               | 255 (116)  | 595 (270) | 800 (363)  | -          |
|                                       | <i>Double Inlet</i> | 1506808               | -  | -         | 935 (424)  | 1200 (544) |
| 132 (3353)                            | 14                  | 1507730               | 285 (129)  | 665 (301) | 800 (363)  | -          |
|                                       | <i>Double Inlet</i> | 1506809               | -  | -         | 1045 (474) | 1200 (544) |
| 144 (3658)                            | 15                  | 1507731               | 315 (143)  | 735 (333) | 800 (363)  | -          |
|                                       | <i>Double Inlet</i> | 1507732               | -  | -         | 1155 (524) | 1200 (544) |
| 144+ (3658+)                          | Consult Factory     |                       |  |           |            |            |

**Table 14: Nortec SAM-e Header / Separator Assembly, Pressure Steam – 9” Centers**

| <b>PRESSURE STEAM – 9” Headers</b> |                   |                       |   |           |           |            |
|------------------------------------|-------------------|-----------------------|---|-----------|-----------|------------|
| Duct Width<br>[ in (mm) ]          | Steam Tube<br>Qty | Header<br>Part Number | Maximum Capacity Pressure Steam [ lb/hr (kg/hr) ] |           |           |            |
|                                    |                   |                       | Type A  | Type B    | Type B+   | Type C     |
| 36 (914)                           | 3                 | 1506789               | 45 (20)   | 105 (48)  | 165 (75)  | 225 (102)  |
| 48 (1219)                          | 5                 | 1506790               | 75 (34)   | 175 (79)  | 275 (125) | 375 (170)  |
| 60 (1524)                          | 6                 | 1506791               | 105 (48)  | 245 (111) | 385 (175) | 525 (238)  |
| 72 (1829)                          | 7                 | 1506792               | 135 (61)  | 315 (143) | 495 (225) | 675 (306)  |
| 84 (2134)                          | 9                 | 1506794               | 165 (75)  | 385 (174) | 605 (274) | 825 (374)  |
| 96 (2438)                          | 10                | 1506795               | 195 (88)  | 455 (206) | 715 (324) | 975 (442)  |
| 108 (2743)                         | 11                | 1506796               | 225 (102)   | 525 (238) | 800 (363) | 1125 (510) |
| 120 (3048)                         | 13                | 1507729               | 255 (116)   | 595 (270) | 800 (363) | 1275 (578) |
| 132 (3353)                         | 14                | 1507730               | 285 (129)   | 665 (301) | 800 (363) | 1425 (646) |
| 144 (3658)                         | 15                | 1507731               | 315 (143)   | 735 (333) | 800 (363) | 1575 (713) |
| 144+ (3658+)                       | Consult Factory   |                       |   |           |           |            |

**Table 15: Nortec SAM-e Header / Separator Assembly, Atmospheric Steam – 12” Centers**

| <b>ATMOSPHERIC STEAM – 12” HEADERS</b> |                     |                       |  |           |           |           |
|--|---------------------|-----------------------|--|-----------|-----------|-----------|
| Duct Width<br>[ in (mm) ]              | Steam<br>Tube Qty   | Header<br>Part Number | Maximum Capacity Atmospheric Steam [ lb/hr (kg/hr) ] |           |           |           |
|  |                     |                       | Type A   | Type B    | Type B+   | Type C    |
| 36 (914)                               | 3                   | 1506797               | 45 (20)  | 105 (48)  | 165 (75)  | 225 (102) |
| 48 (1219)                              | 4                   | 1506798               | 60 (27)  | 140 (63)  | 220 (100) | 300 (136) |
| 60 (1524)                              | 5                   | 1506799               | 75 (34)  | 175 (79)  | 275 (125) | 375 (170) |
| 72 (1829)                              | 6                   | 1506800               | 90 (41)  | 210 (95)  | 330 (150) | 450 (204) |
| 84 (2134)                              | 7                   | 1506801               | 105 (48)   | 245 (111) | 385 (175) | 525 (238) |
| 96 (2438)                              | 8                   | 1506802               | 120 (54)   | 280 (127) | 440 (200) | 600 (272) |
| 108 (2743)                             | 9                   | 1506803               | 135 (61)   | 315 (143) | 495 (225) | 675 (306) |
| 120 (3048)                             | 10                  | 1506804               | 150 (68)   | 350 (159) | 550 (249) | 750 (340) |
| 132 (3353)                             | 11                  | 1506805               | 165 (75)   | 385 (174) | 605 (274) | 800 (363) |
|  | <i>Double Inlet</i> | 1506810               | -  | -         | -         | 825 (374) |
| 144 (3658)                             | 12                  | 1506806               | 180 (82)   | 420 (190) | 660 (299) | 800 (363) |
|  | <i>Double Inlet</i> | 1506811               | -  | -         | -         | 900 (408) |
| 144+ (3658+)                           | Consult Factory     |                       |  |           |           |           |

**Table 16: Nortec SAM-e Header / Separator Assembly, Pressure Steam – 12” Centers**

| <b>PRESSURE STEAM – 12” Headers</b> |                   |                       |   |           |           |           |
|-------------------------------------|-------------------|-----------------------|---|-----------|-----------|-----------|
| Duct Width<br>[ in (mm) ]           | Steam Tube<br>Qty | Header<br>Part Number | Maximum Capacity Pressure Steam [ lb/hr (kg/hr) ] |           |           |           |
|                                     |                   |                       | Type A  | Type B    | Type B+   | Type C    |
| 36 (914)                            | 3                 | 1506797               | 45 (20)   | 105 (48)  | 165 (75)  | 225 (102) |
| 48 (1219)                           | 4                 | 1506798               | 60 (27)   | 140 (63)  | 220 (100) | 300 (136) |
| 60 (1524)                           | 5                 | 1506799               | 75 (34)   | 175 (79)  | 275 (125) | 375 (170) |
| 72 (1829)                           | 6                 | 1506800               | 90 (41)   | 210 (95)  | 330 (150) | 450 (204) |
| 84 (2134)                           | 7                 | 1506801               | 105 (48)  | 245 (111) | 385 (175) | 525 (238) |
| 96 (2438)                           | 8                 | 1506802               | 120 (54)  | 280 (127) | 440 (200) | 600 (272) |
| 108 (2743)                          | 9                 | 1506803               | 135 (61)  | 315 (143) | 495 (225) | 675 (306) |
| 120 (3048)                          | 10                | 1506804               | 150 (68)  | 350 (159) | 550 (249) | 750 (340) |
| 132 (3353)                          | 11                | 1506805               | 165 (75)  | 385 (174) | 605 (274) | 825 (374) |
| 144 (3658)                          | 12                | 1506806               | 180 (82)  | 420 (190) | 660 (299) | 900 (408) |
| 144+ (3658+)                        | Consult Factory   |                       |   |           |           |           |

## Step 2 – Steam-Tube Selection

Constructed of 1.5” (38 mm) OD 304 (or optional 409) stainless steel tubing, the steam tubes accommodate duct-heights between 18” (457 mm) and 144” (3658 mm). For smaller duct applications, a Nortec Mini SAM-e accommodate sizes from 12” (305 mm) wide x 8” (203 mm) high. Nozzles draw hot, dry steam from the center of the tube, eliminating the need for jacket-heating or a temperature switch. Condensate drains vertically down the tube walls into the header, where it is removed through the condensate drain port. Condair’s unique “slip-in” installation method makes for quick and effortless assembly.

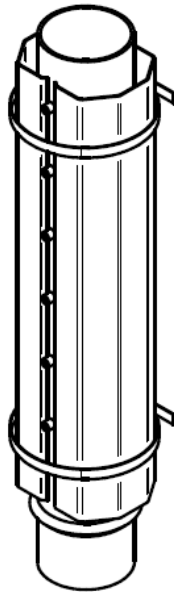
### Selection

There are four types of steam tubes, each with a different capacity. Tube capacity is limited by the number of nozzles. Tubes are selected to meet a load by multiplying the number of tubes for a given header spacing by their respective capacity.

To minimize condensate losses, ensure that total steam-tube capacity is sized to closely match calculated load requirements, as opposed to maximum humidifier capacity.

**Table 17: Steam Tube Type and Capacity**

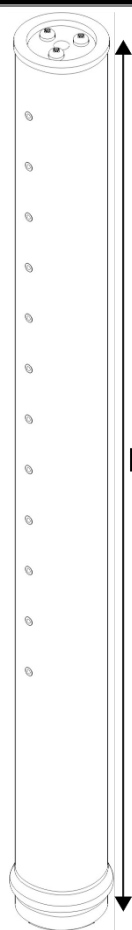
| Steam Tube Type | Capacity<br>[ lb/hr (kg/hr) ] |
|-----------------|-------------------------------|
| A               | 15 (7)                        |
| B               | 35 (16)                       |
| B+              | 55 (25)                       |
| C               | 75 (34)                       |



**Figure 11: Nortec Mini SAM-e Tube Insulation**



**Table 18: 304 Stainless Steel Tubes**

| In-Duct Height Including Header [ in (mm) ] | TYPE A<br>15 lb/hr<br>(7 kg/hr) | TYPE B<br>35 lb/hr<br>(16 kg/hr) | TYPE B+<br>55 lb/hr<br>(25 kg/hr) | TYPE C<br>75 lb/hr<br>(34 kg/hr) | Dimension L [ in (mm) ] | In-duct Optional Mounting Frame | Steam Tube Profile   |
|---|---------------------------------|----------------------------------|-----------------------------------|----------------------------------|-------------------------|---------------------------------|--|
| 18 (457)                                    | 1503388                         | N/A                              | N/A                               | N/A                              | 5.5 (140)               | 1504697                         |  |
| 24 (610)                                    | 1503389                         | 1503411                          | N/A                               | N/A                              | 11.5 (292)              |                                 |  |
| 30 (762)                                    | 1503390                         | 1503412                          | 1509391                           | N/A                              | 17.5 (445)              | 1503469                         |  |
| 36 (914)                                    | 1503391                         | 1503413                          | 1509392                           | 1503440                          | 23.5 (597)              |                                 |  |
| 42 (1067)                                   | 1503392                         | 1503414                          | 1509393                           | 1503441                          | 29.5 (749)              | 1503470                         |  |
| 48 (1219)                                   | 1503393                         | 1503415                          | 1509394                           | 1503442                          | 35.5 (902)              |                                 |  |
| 54 (1372)                                   | 1503394                         | 1503416                          | 1509395                           | 1503443                          | 41.5 (1054)             |                                 |  |
| 60 (1524)                                   | 1503395                         | 1503417                          | 1509396                           | 1503444                          | 47.5 (1207)             |                                 |  |
| 66 (1676)                                   | 1503396                         | 1503418                          | 1509397                           | 1503445                          | 53.5 (1369)             | 1503471                         |  |
| 72 (1829)                                   | 1503397                         | 1503419                          | 1509398                           | 1503446                          | 59.5 (1511)             |                                 |  |
| 78 (1981)                                   | 1503398                         | 1503420                          | 1509399                           | 1503447                          | 65.5 (1664)             |                                 |  |
| 84 (2134)                                   | 1503399                         | 1503421                          | 1509400                           | 1503448                          | 71.5 (1815)             |                                 |  |
| 90 (2286)                                   | 1503400                         | 1503422                          | 1509401                           | 1503449                          | 77.5 (1969)             |                                 |  |
| 96 (2438)                                   | 1503401                         | 1503423                          | 1509402                           | 1503450                          | 83.5 (2121)             |                                 |  |
| 102 (2591)                                  | 1503402                         | 1503424                          | 1509403                           | 1503451                          | 89.5 (2273)             | 1503472                         |  |
| 108 (2743)                                  | 1503403                         | 1503425                          | 1509404                           | 1503452                          | 95.5 (2426)             |                                 |  |
| 114 (2896)                                  | 1503404                         | 1503426                          | 1509405                           | 1503453                          | 101.5 (2578)            |                                 |  |
| 120 (3048)                                  | 1503405                         | 1503427                          | 1509406                           | 1503454                          | 107.5 (2731)            |                                 |  |
| 126 (3200)                                  | 1503406                         | 1503428                          | 1509407                           | 1503455                          | 113.5 (2883)            |                                 |  |
| 132 (3353)                                  | 1503407                         | 1503429                          | 1509408                           | 1503456                          | 119.5 (3035)            |                                 |  |
| 138 (3505)                                  | 1503408                         | 1503430                          | 1509409                           | 1503457                          | 125.5 (3188)            | 1503472                         |  |
| 144 (3658)                                  | 1503409                         | 1503431                          | 1509410                           | 1503458                          | 131.5 (3340)            |                                 |  |

## Step 3 – Nortec SAM-e Steam Inlet Configuration Selection

### Pressurized Steam (*LiveSteam*)

The steam inlet is determined by the size of the selected steam valve from the *LiveSteam Engineering Manual* (25xxxxx) or from the H.E.L.P. Software (Humidification Engineering & Loadsizing Program). From Table 19, select the steam inlet diameter.

**Table 19: Inlet Configuration for Pressure Steam Units**

| Nortec SAM-e Steam Inlet | Part Number 5" Long | Part Number 10" Long | Part Number 12" Long |
|--------------------------|---------------------|----------------------|----------------------|
| ½" NPT                   | 1503473             | 1509483              | 1509484              |
| ¾" NPT                   | 1503474             | 1509485              | 1509486              |
| 1" NPT                   | 1503475             | 1509487              | 1509488              |
| 1-¼" NPT                 | 1503476             | 1509489              | 1509490              |
| 1-½" NPT                 | 1503477             | 1509491              | 1509492              |
| 2" NPT                   | 1503478             | 1509493              | 1509494              |
| 2-½" NPT                 | 1509444             | 1509495              | 1509496              |

### Atmospheric Steam (Nortec EL, Nortec GS, Nortec SE)

The steam inlet is determined by the selected humidifier. Refer to corresponding humidifier manual to determine required steam outlet size.

**Table 20: Inlet Configuration for Atmospheric Steam Units**

| Kit | Nortec SAM-e Steam Inlet (OD) | Capacity [ lb/hr ] | Part Number 5"/10"/12" Long |
|-----|-------------------------------|--------------------|-----------------------------|
| 1   | 1-3/4"                        | 100                | 1503479/ 1509497/ 1509498   |
| 2   | 2 x 1-3/4"                    | 200                | 1503480/ 2526031/ 2526032   |
| 3   | 3 x 1-3/4"                    | 300                | 1503481/ 2526033/ 2526034   |
| 4   | 4 x 1-3/4"                    | 400                | 1503482/ 2526035/ 2526036   |
| 5   | 5 x 1-3/4"                    | 500                | 1503483/ 2526037/ 2526039   |
| 6   | 6 x 1-3/4"                    | 600                | 1503484/ 2526040/ 2526041   |
| 7   | 7 x 1-3/4"                    | 700                | 1503485/ 2526042/ 2526043   |
| 8   | 8 x 1-3/4"                    | 800                | 1503486/ 2526044/ 2526045   |
| 23  | 3"                            | 300                | 1506999/ 1509499/ 1509500   |
| 24  | 4"                            | 600                | 1507001/ 1509501/ 1509502   |
| 25  | 3" + 4"                       | 800                | 1507002/ 2526046/ 2526047   |
| 26  | 2 x 4" (Single-inlet header)  | 800                | 1507003/ 2526048/ 2526049   |
| 27  | 2 x 4" (Double-inlet header)  | 1200               | 1507004/ 2526050/ 2526051   |
| 30  | 3 x 4" (Double-inlet header)  | 1200               | 1509089/ 2526056/ 2526057   |
| 28  | 3" to 1-3/4"                  | 100                | 1509087/ 2526052/ 2526053   |
| 29  | 4" to 3"                      | 300                | 1509088/ 2526054/ 2526055   |



**Note:** For more options, refer to *Nortec SAM-e Submittal Drawings*, Form #XX-248. Refer to *Appendix 1 Adapter Configurations* for more information.

## Nortec Mini SAM-e

**Table 21: Nortec Mini SAM-e Headers / Separator Assembly – 3” Centers**

| Duct Width<br>[ in (mm) ] | Steam<br>Tube Qty | Inlet      | Header<br>Part Number | Max. Capacity Atmospheric or Pressurized Steam<br>[ lb/hr (kg/hr) ] |          |          |
|---------------------------|-------------------|------------|-----------------------|---|----------|----------|
|                           |                   |            |                       | MA  | MB       | MC       |
| 12 (305)                  | 3                 | 0.5” NPT   | 2577686               | 30 (14)   | 60 (27)  | 90 (41)  |
| 12 (305)                  | 3                 | 0.75” NPT  | 2577687               | 30 (14)   | 60 (27)  | 90 (41)  |
| 12 (305)                  | 3                 | 1” NPT     | 2577688               | 30 (14)   | 60 (27)  | 90 (41)  |
| 12 (305)                  | 3                 | 1.75” OD   | 2577689               | 30 (14)   | 60 (27)  | 90 (41)  |
| 12 (305)                  | 3                 | 2x1.75” OD | 2577690               | 30 (14)   | 60 (27)  | 90 (41)  |
| 12 (305)                  | 3                 | 3” OD      | 2577889               | 30 (14)   | 60 (27)  | 90 (41)  |
| 12 (305)                  | 3                 | 0.875” OD  | 2577691               | 30 (14)   | 60 (27)  | 90 (41)  |
| 18 (457)                  | 5                 | 0.5” NPT   | 2577698               | 50 (23)   | 100 (45) | 150 (68) |
| 18 (457)                  | 5                 | 0.75” NPT  | 2577699               | 50 (23)   | 100 (45) | 150 (68) |
| 18 (457)                  | 5                 | 1” NPT     | 2577700               | 50 (23)   | 100 (45) | 150 (68) |
| 18 (457)                  | 5                 | 1.75” OD   | 2577701               | 50 (23)   | 100 (45) | 150 (68) |
| 18 (457)                  | 5                 | 2x1.75” OD | 2577702               | 50 (23)   | 100 (45) | 150 (68) |
| 18 (457)                  | 5                 | 3” OD      | 2577891               | 50 (23)   | 100 (45) | 150 (68) |
| 18 (457)                  | 5                 | 0.875” OD  | 2577703               | 50 (23)   | 100 (45) | 150 (68) |
| 24 (609)                  | 7                 | 0.5” NPT   | 2577710               | 70 (32)   | 140 (64) | 210 (95) |
| 24 (609)                  | 7                 | 0.75” NPT  | 2577711               | 70 (32)   | 140 (64) | 210 (95) |
| 24 (609)                  | 7                 | 1” NPT     | 2577712               | 70 (32)   | 140 (64) | 210 (95) |
| 24 (609)                  | 7                 | 1.75” OD   | 2577713               | 70 (32)   | 140 (64) | 210 (95) |
| 24 (609)                  | 7                 | 2x1.75” OD | 2577714               | 70 (32)   | 140 (64) | 210 (95) |
| 24 (609)                  | 7                 | 3” OD      | 2577893               | 70 (32)   | 140 (64) | 210 (95) |
| 24 (609)                  | 7                 | 0.875” OD  | 2577715               | 70 (32)   | 140 (64) | 210 (95) |

**Table 22: Nortec Mini SAM-e Headers / Separator Assembly – 6” Centers**

| Duct Width<br>[ in (mm) ] | Steam Tube<br>Qty | Inlet      | Header<br>Part Number | Max. Capacity Atmospheric or Pressurized Steam<br>[ lb/hr (kg/hr) ] |         |          |
|---------------------------|-------------------|------------|-----------------------|---|---------|----------|
|                           |                   |            |                       | MA  | MB      | MC       |
| 12 (305)                  | 2                 | 0.5” NPT   | 2577692               | 20 (9)  | 40 (18) | 60 (27)  |
| 12 (305)                  | 2                 | 0.75” NPT  | 2577693               | 20 (9)  | 40 (18) | 60 (27)  |
| 12 (305)                  | 2                 | 1” NPT     | 2577694               | 20 (9)  | 40 (18) | 60 (27)  |
| 12 (305)                  | 2                 | 1.75” OD   | 2577695               | 20 (9)  | 40 (18) | 60 (27)  |
| 12 (305)                  | 2                 | 2x1.75” OD | 2577696               | 20 (9)  | 40 (18) | 60 (27)  |
| 12 (305)                  | 2                 | 3” OD      | 2577890               | 20 (9)  | 40 (18) | 60 (27)  |
| 12 (305)                  | 2                 | 0.875” OD  | 2577697               | 20 (9)  | 40 (18) | 60 (27)  |
| 18 (457)                  | 3                 | 0.5” NPT   | 2577704               | 30 (14)   | 60 (27) | 90 (41)  |
| 18 (457)                  | 3                 | 0.75” NPT  | 2577705               | 30 (14)   | 60 (27) | 90 (41)  |
| 18 (457)                  | 3                 | 1” NPT     | 2577706               | 30 (14)   | 60 (27) | 90 (41)  |
| 18 (457)                  | 3                 | 1.75” OD   | 2577707               | 30 (14)   | 60 (27) | 90 (41)  |
| 18 (457)                  | 3                 | 2x1.75” OD | 2577708               | 30 (14)   | 60 (27) | 90 (41)  |
| 18 (457)                  | 3                 | 3” OD      | 2577892               | 30 (14)   | 60 (27) | 90 (41)  |
| 18 (457)                  | 3                 | 0.875” OD  | 2577709               | 30 (14)   | 60 (27) | 90 (41)  |
| 24 (609)                  | 4                 | 0.5” NPT   | 2577716               | 40 (18)   | 80 (36) | 120 (54) |
| 24 (609)                  | 4                 | 0.75” NPT  | 2577717               | 40 (18)   | 80 (36) | 120 (54) |
| 24 (609)                  | 4                 | 1” NPT     | 2577718               | 40 (18)   | 80 (36) | 120 (54) |
| 24 (609)                  | 4                 | 1.75” OD   | 2577719               | 40 (18)   | 80 (36) | 120 (54) |
| 24 (609)                  | 4                 | 2x1.75” OD | 2577720               | 40 (18)   | 80 (36) | 120 (54) |
| 24 (609)                  | 4                 | 3” OD      | 2577894               | 40 (18)   | 80 (36) | 120 (54) |
| 24 (609)                  | 4                 | 0.875” OD  | 2577721               | 40 (18)   | 80 (36) | 120 (54) |

**Table 23: Nortec Mini SAM-e Tubes**

| Duct Height<br>Including Header<br>[ in (mm) ] | TYPE MA 10 lb/hr<br>(4.5 kg/hr) | TYPE MB 20 lb/hr<br>(9 kg/hr) | TYPE MC 30 lb/hr<br>(14 kg/hr) | In-duct<br>Mounting<br>Frame | “L”<br>Dimension<br>[ in (mm) ] |
|--|---------------------------------|-------------------------------|--------------------------------|------------------------------|---------------------------------|
| 8 (203)  | 1509788                         | N/A                           | N/A                            | Not Required                 | 4.5 (114)                       |
| 10 (254)                                       | 1509789                         | N/A                           | N/A                            |                              | 6.5 (165)                       |
| 12 (305)                                       | 1509790                         | 1509797                       | 1509804                        |                              | 8.5 (216)                       |
| 14 (366)                                       | 1509791                         | 1509798                       | 1509805                        |                              | 10.5 (267)                      |
| 16 (406)                                       | 1509792                         | 1509799                       | 1509806                        |                              | 12.5 (318)                      |
| 18 (457)                                       | 1509793                         | 1509800                       | 1509807                        |                              | 14.5 (368)                      |
| 20 (508)                                       | 1509794                         | 1509801                       | 1509808                        |                              | 16.5 (419)                      |
| 22 (559)                                       | 1509795                         | 1509802                       | 1509809                        |                              | 18.5 (470)                      |
| 24 (600)                                       | 1509796                         | 1509803                       | 1509810                        |                              | 20.5 (521)                      |

# Select Options

## Tube Insulation

For increased energy efficiency, reduced condensate losses, and reduced airstream heat gain, tube insulation may be added as a factory installed option. For optimal effectiveness, use tube insulation in conjunction with header insulation.

Tube insulation consists of two 304 stainless steel shields clamped onto the distributor tubes. They form an insulating air gap around the tube while leaving a small gap for the nozzles to release steam. Contact and heat-transfer between insulating shields and tube is limited by using an angled ‘knife edge’ as the only point of contact, minimizing surface area for conductive heat transfer. The air gap reduces heat losses via conduction and convection, while the reflective surface minimizes heat losses through radiation.

When ordering tube insulation, order in lengths to match selected tubes. For example:

Tubes: 11x 1503415 - Steam Tube, Nortec SAM-e, 36" Type B, 304SS (48" in-duct height)

Corresponding Insulation: 11x 2538849 - Tube Insulation, Nortec SAM-e, 36"

**Table 24: Nortec SAM-e Tube Insulation**

| Part Number | Description                 | Corresponding In-duct Height<br>(See Table 6 and 7)[ in (mm) ] |
|-------------|-----------------------------|--|
| 2538844     | Tube Insulation, SAM-e 6"   | 18 (457)   |
| 2538845     | Tube Insulation, SAM-e 12"  | 24 (610)   |
| 2538846     | Tube Insulation, SAM-e 18"  | 30 (762)   |
| 2538847     | Tube Insulation, SAM-e 24"  | 36 (914)   |
| 2538848     | Tube Insulation, SAM-e 30"  | 42 (1067)  |
| 2538849     | Tube Insulation, SAM-e 36"  | 48 (1219)  |
| 2538850     | Tube Insulation, SAM-e 42"  | 54 (1372)  |
| 2538851     | Tube Insulation, SAM-e 48"  | 60 (1524)  |
| 2538852     | Tube Insulation, SAM-e 54"  | 66 (1676)  |
| 2538853     | Tube Insulation, SAM-e 60"  | 72 (1829)  |
| 2538854     | Tube Insulation, SAM-e 66"  | 78 (1981)  |
| 2538855     | Tube Insulation, SAM-e 72"  | 84 (2134)  |
| 2538856     | Tube Insulation, SAM-e 78"  | 90 (2286)  |
| 2538857     | Tube Insulation, SAM-e 84"  | 96 (2438)  |
| 2538858     | Tube Insulation, SAM-e 90"  | 102 (2743)   |
| 2538859     | Tube Insulation, SAM-e 96"  | 108 (2743)   |
| 2538860     | Tube Insulation, SAM-e 102" | 114 (2896)   |
| 2538861     | Tube Insulation, SAM-e 108" | 120 (3048)   |
| 2538862     | Tube Insulation, SAM-e 114" | 126 (3200)   |
| 2538863     | Tube Insulation, SAM-e 120" | 132 (3353)   |
| 2538864     | Tube Insulation, SAM-e 126" | 138 (3505)   |
| 2538865     | Tube Insulation, SAM-e 132" | 144 (3658)   |

**Table 25: Nortec Mini SAM-e Tube Insulation**

| <b>Part Number</b> | <b>Description</b>              | <b>Corresponding In-duct Height<br/>(See Table 12) [ in (mm) ]</b> |
|--------------------|---------------------------------|--|
| 2538866            | Tube Insulation, Mini SAM-e 5”  | 8 (203)  |
| 2538867            | Tube Insulation, Mini SAM-e 7”  | 10 (254)   |
| 2538868            | Tube Insulation, Mini SAM-e 9”  | 12 (305)   |
| 2538869            | Tube Insulation, Mini SAM-e 11” | 14 (366)   |
| 2538870            | Tube Insulation, Mini SAM-e 13” | 16 (406)   |
| 2538871            | Tube Insulation, Mini SAM-e 15” | 18 (457)   |
| 2538872            | Tube Insulation, Mini SAM-e 17” | 20 (508)   |
| 2538873            | Tube Insulation, Mini SAM-e 19” | 22 (559)   |
| 2538874            | Tube Insulation, Mini SAM-e 21” | 24 (600)   |

## Header Insulation

For increased energy efficiency, reduced condensate losses, and reduced airstream heat gain, header insulation may be added as a factory installed option. For optimal effectiveness, use header insulation in conjunction with tube insulation.

Header insulation consists of a stainless steel shield that is clamped onto the distributor header, leaving a small gap for the steam tubes to protrude. Contact and heat-transfer between the insulating shield and the tube is prevented by using strips of synthetic foam insulation. The resulting air gap around the header reduces heat losses via conduction and convection, while the reflective surface minimizes heat loss through radiation.

When ordering header/separator insulation for the Nortec SAM-e, order insulation lengths to match header/separator lengths. For example:

Header: 1503316 – Header /Separator Nortec SAM-e 60", 6"-centers

Insulation: 2538917 – Header/Separator Insulation, Nortec SAM-e 60”

**Table 26: Nortec SAM-e Header/Separator Insulation**

| Part Number | Description                             |
|-------------|---|
| 2538910     | Header/Separator Insulation, SAM-e 18"  |
| 2538911     | Header/Separator Insulation, SAM-e 24"  |
| 2538912     | Header/Separator Insulation, SAM-e 30"  |
| 2538913     | Header/Separator Insulation, SAM-e 36"  |
| 2538914     | Header/Separator Insulation, SAM-e 42"  |
| 2538915     | Header/Separator Insulation, SAM-e 48"  |
| 2538916     | Header/Separator Insulation, SAM-e 54"  |
| 2538917     | Header/Separator Insulation, SAM-e 60"  |
| 2538918     | Header/Separator Insulation, SAM-e 66"  |
| 2538919     | Header/Separator Insulation, SAM-e 72"  |
| 2538920     | Header/Separator Insulation, SAM-e 78"  |
| 2538921     | Header/Separator Insulation, SAM-e 84"  |
| 2538922     | Header/Separator Insulation, SAM-e 90"  |
| 2538923     | Header/Separator Insulation, SAM-e 96"  |
| 2538924     | Header/Separator Insulation, SAM-e 102" |
| 2538925     | Header/Separator Insulation, SAM-e 108" |
| 2538926     | Header/Separator Insulation, SAM-e 114" |
| 2538927     | Header/Separator Insulation, SAM-e 120" |
| 2538928     | Header/Separator Insulation, SAM-e 126" |
| 2538929     | Header/Separator Insulation, SAM-e 132" |
| 2538930     | Header/Separator Insulation, SAM-e 138" |
| 2538931     | Header/Separator Insulation, SAM-e 144" |

When ordering header insulation for the Nortec SAM-e with an atmospheric header 801-1200 lb/hr (dual inlet), order insulation lengths to match header lengths. For example:

Header: 1503336 - Header/Separator Nortec SAM-e 102" Atmospheric, 801-1200 lb/hr, 6"- centers

Insulation: 2539696 – Header/Separator Insulation, 801-1200, Nortec SAM-e 108"

**Table 27: Header/Separator Insulation for Atmospheric Nortec SAM-e, 801-1200 lb/hr**

| <b>Part Number</b> | <b>Description</b>                               |
|--------------------|--|
| 2539685            | Header/Separator Insulation 801-1200, SAM-e 42"  |
| 2539686            | Header/Separator Insulation 801-1200, SAM-e 48"  |
| 2539687            | Header/Separator Insulation 801-1200, SAM-e 54"  |
| 2539688            | Header/Separator Insulation 801-1200, SAM-e 60"  |
| 2539689            | Header/Separator Insulation 801-1200, SAM-e 66"  |
| 2539690            | Header/Separator Insulation 801-1200, SAM-e 72"  |
| 2539691            | Header/Separator Insulation 801-1200, SAM-e 78"  |
| 2539692            | Header/Separator Insulation 801-1200, SAM-e 84"  |
| 2539693            | Header/Separator Insulation 801-1200, SAM-e 90"  |
| 2539694            | Header/Separator Insulation 801-1200, SAM-e 90"  |
| 2539695            | Header/Separator Insulation 801-1200, SAM-e 102" |
| 2539696            | Header/Separator Insulation 801-1200, SAM-e 108" |
| 2539697            | Header/Separator Insulation 801-1200, SAM-e 114" |
| 2539698            | Header/Separator Insulation 801-1200, SAM-e 120" |
| 2539699            | Header/Separator Insulation 801-1200, SAM-e 126" |
| 2539700            | Header/Separator Insulation 801-1200, SAM-e 132" |
| 2539701            | Header/Separator Insulation 801-1200, SAM-e 138" |
| 2539702            | Header/Separator Insulation 801-1200, SAM-e 144" |



When ordering header insulation for the Nortec Mini SAM-e, order header / separator insulation to match the length and tube spacing. For example:

Header: 2577701 – Header/Separator Nortec Mini SAM-e 18", 3"-centers, 1.75" inlet

Insulation: 2576887 – Header/Separator Insulation, Nortec Mini SAM-e 18", 3"-centers

**Table 28: Nortec Mini SAM-e Header/Separator Insulation**

| Part Number | Description   |
|-------------|---|
| 2576885     | Header/Separator Insulation, Mini SAM-e 12", 3"-centers |
| 2576887     | Header/Separator Insulation, Mini SAM-e 18", 3"-centers |
| 2576889     | Header/Separator Insulation, Mini SAM-e 24", 3"-centers |
| 2576886     | Header/Separator Insulation, Mini SAM-e 12", 6"-centers |
| 2576888     | Header/Separator Insulation, Mini SAM-e 18", 6"-centers |
| 2576890     | Header/Separator Insulation, Mini SAM-e 24", 6"-centers |

## Mounting Frames

Mounting frames are required for all vertical duct applications. They provide the necessary support to allow the Nortec SAM-e to be mounted in a vertical flow duct.

Mounting frames may also be desirable in horizontal flow duct applications with high velocities, where additional support is desired, or where it is only possible to secure the Nortec SAM-e to the ceiling and floor.

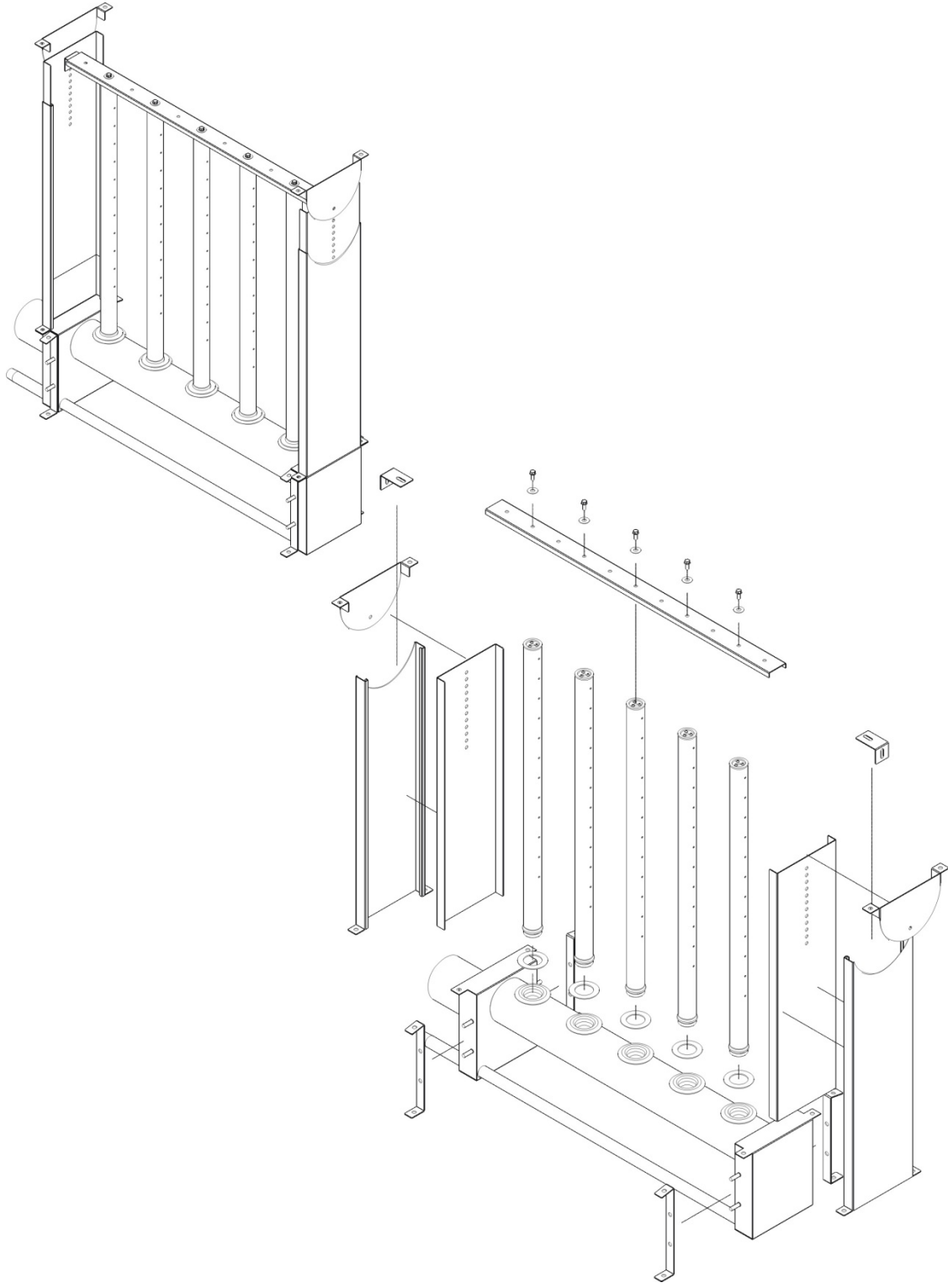
When ordering mounting frames, select the frame with a size range that includes the Nortec SAM-e tube length (see Table 6 & 7 "Dimension L"). Mounting frames are available in galvanized and 304 stainless steel.

**Table 29: Nortec SAM-e Mounting Frames**

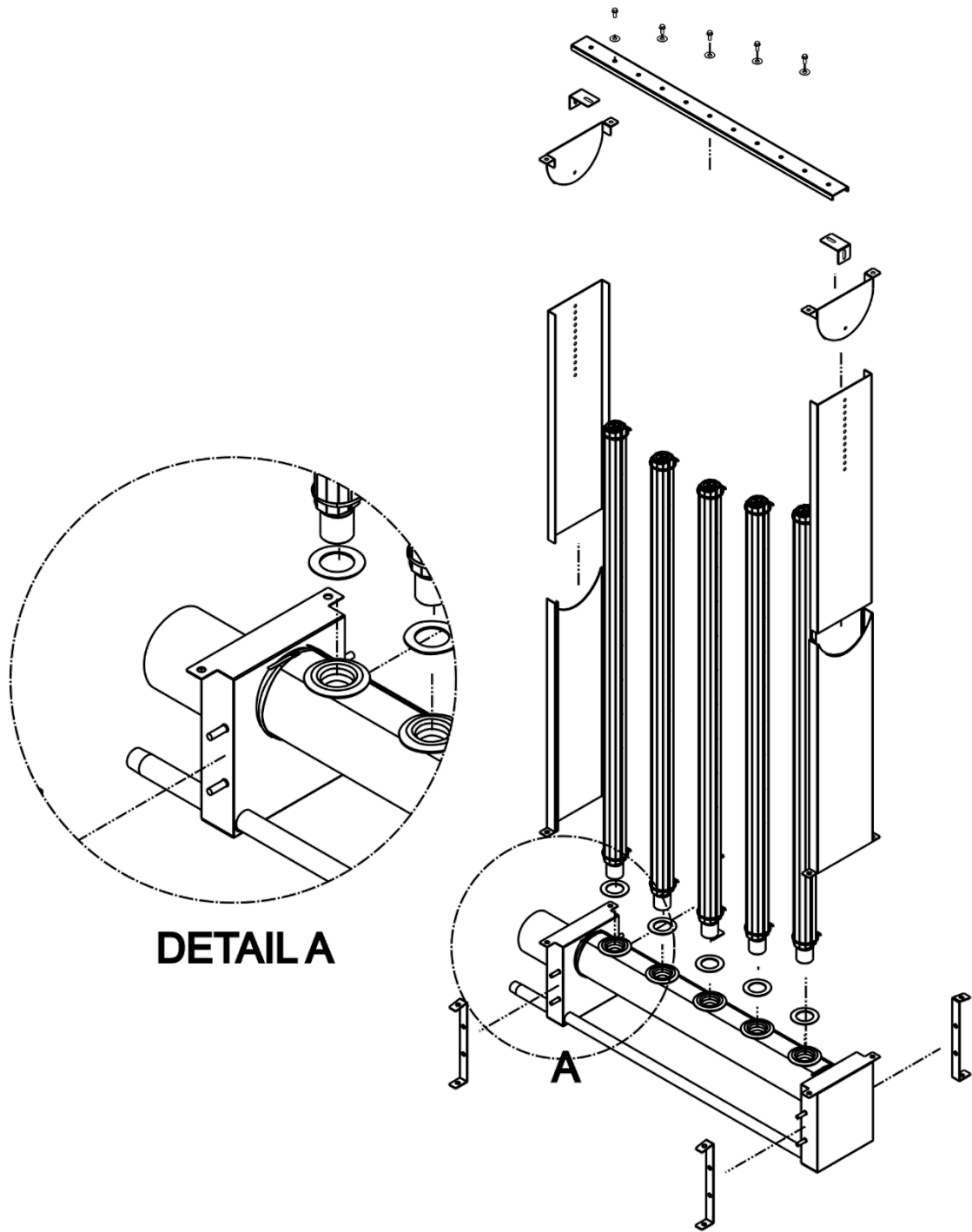
| Part Number | Description                             |
|-------------|---|
| 1504697     | Mounting frame, SAM-e, 9" to 15"        |
| 1503469     | Mounting frame, SAM-e, 16" to 27"       |
| 1503470     | Mounting frame, SAM-e, 28" to 51"       |
| 1503471     | Mounting frame, SAM-e, 52" to 99"       |
| 1503472     | Mounting frame, SAM-e, 100" to 147"     |
| 2521402     | Mounting frame, SAM-e, 9" to 15", SS    |
| 2521403     | Mounting frame, SAM-e, 16" to 27", SS   |
| 2521404     | Mounting frame, SAM-e, 28" to 51", SS   |
| 2521405     | Mounting frame, SAM-e, 52" to 99", SS   |
| 2521406     | Mounting frame, SAM-e, 100" to 147", SS |

# Installation Drawings

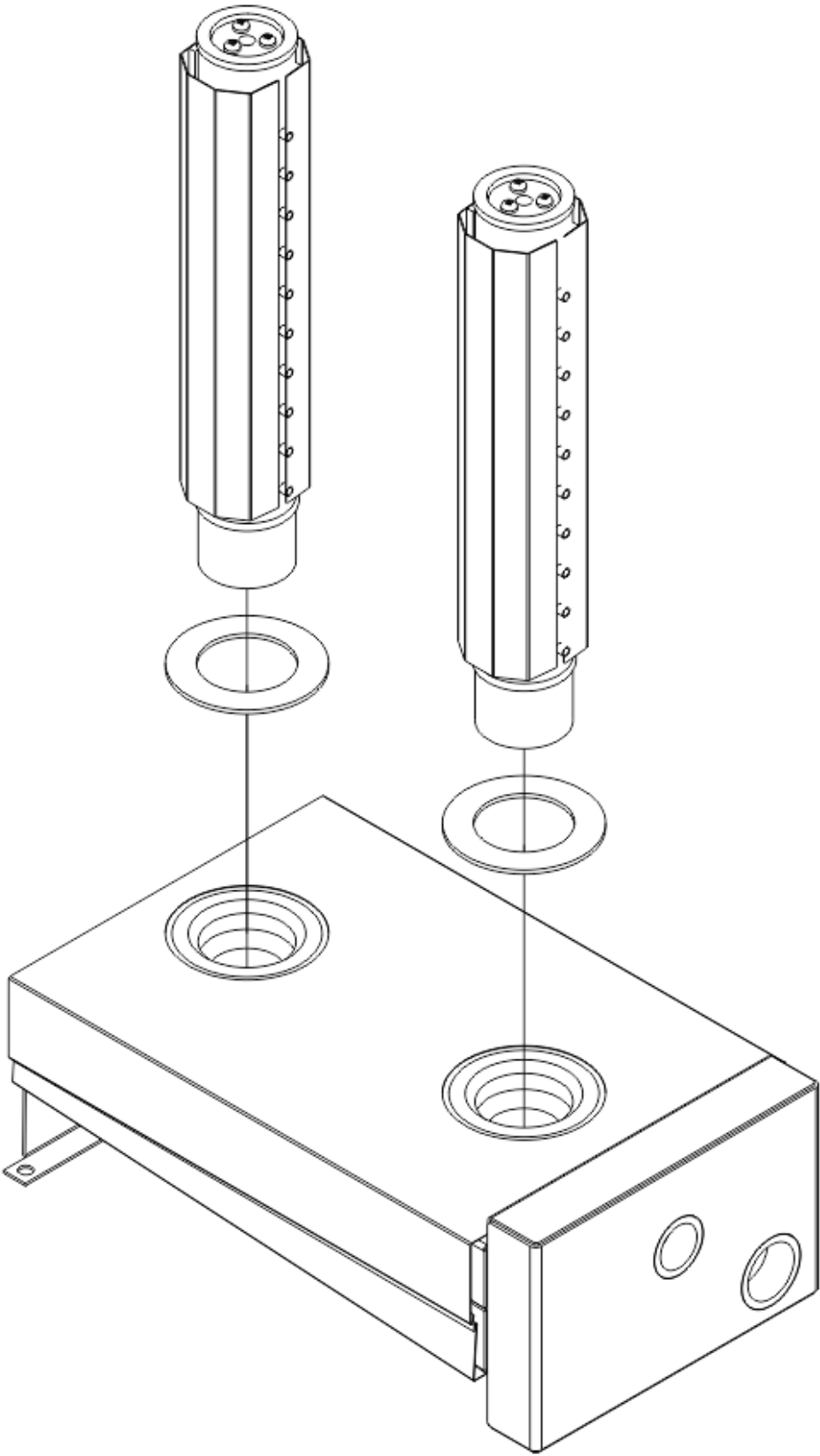
---



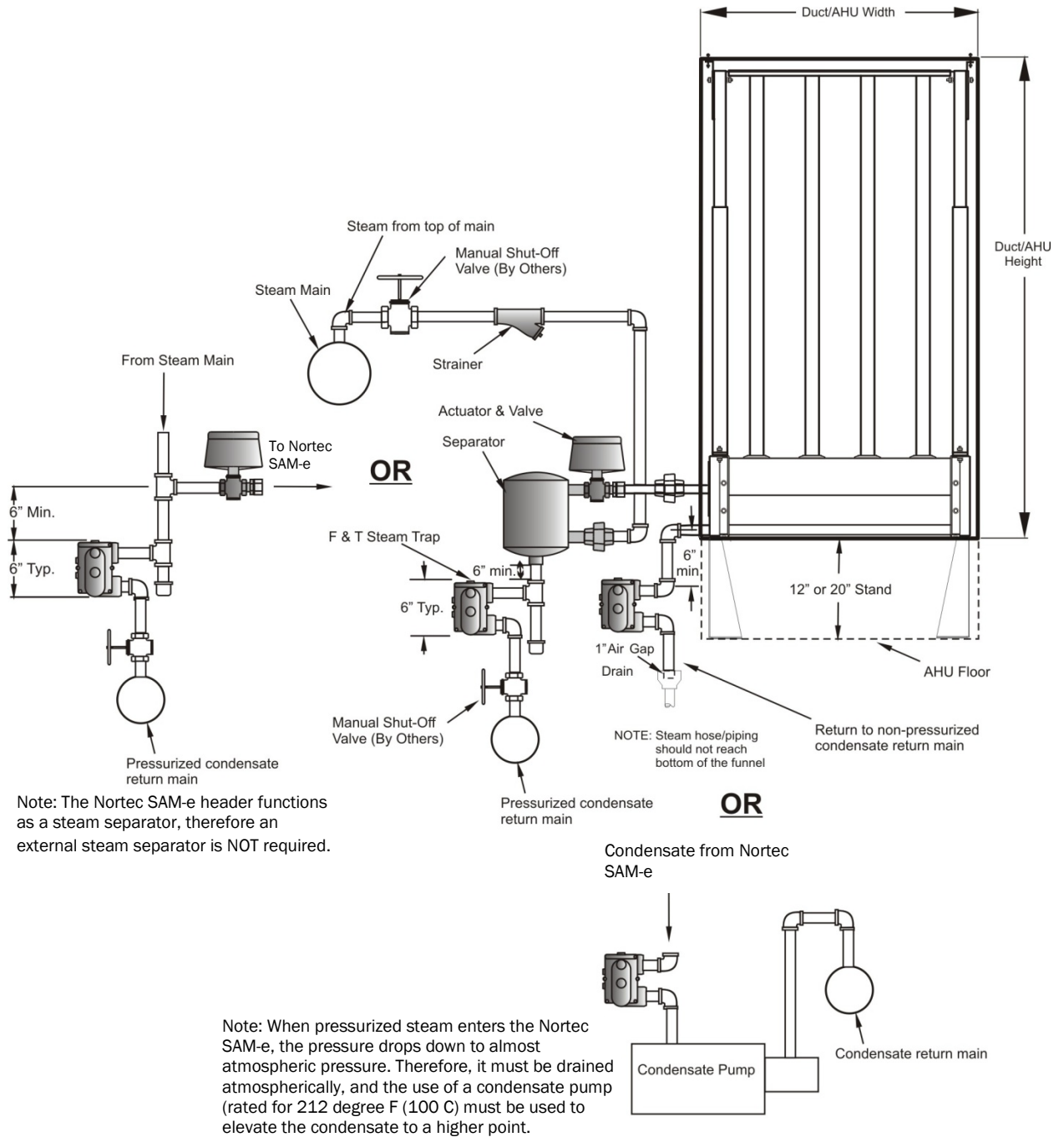
**Figure 8: Nortec SAM-e Exploded View**



**Figure 9: Nortec SAM-e Insulated Exploded View**

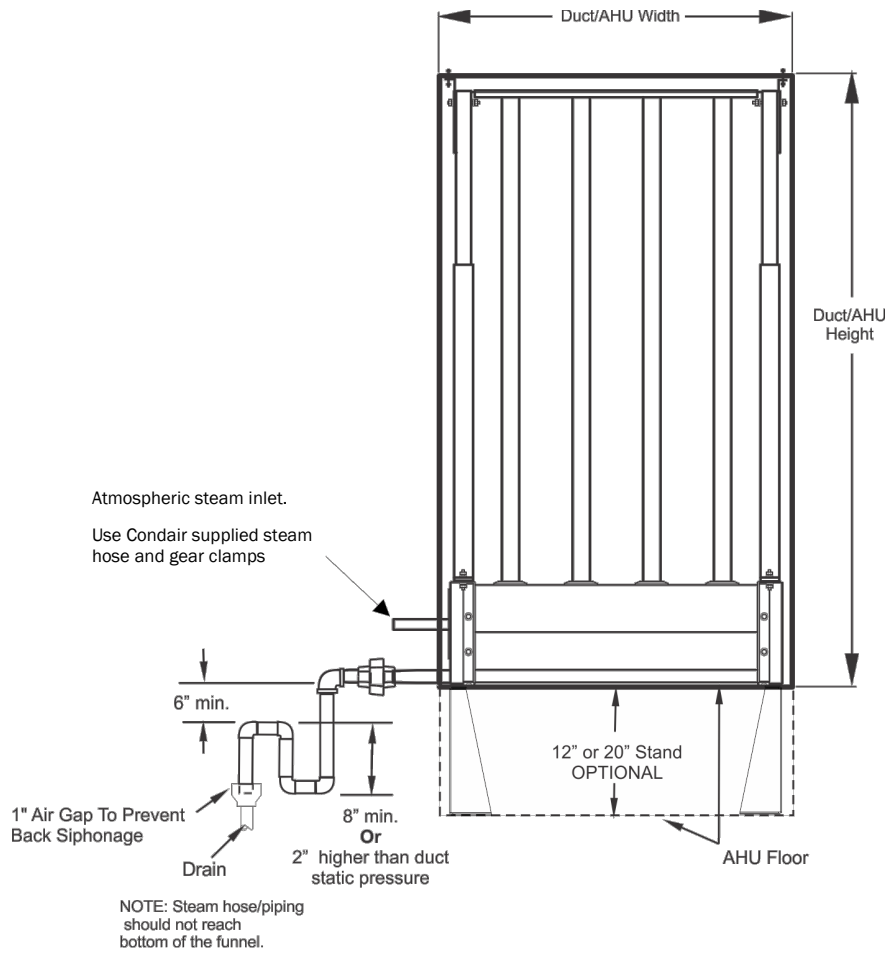


**Figure 10: Nortec Mini SAM-e Insulated Exploded View**

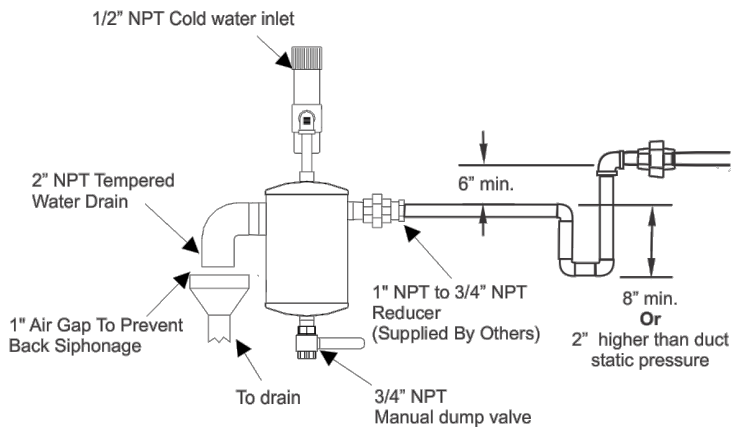


**Figure 11: Typical Nortec SAM-e Installation for Pressurized Steam Applications**

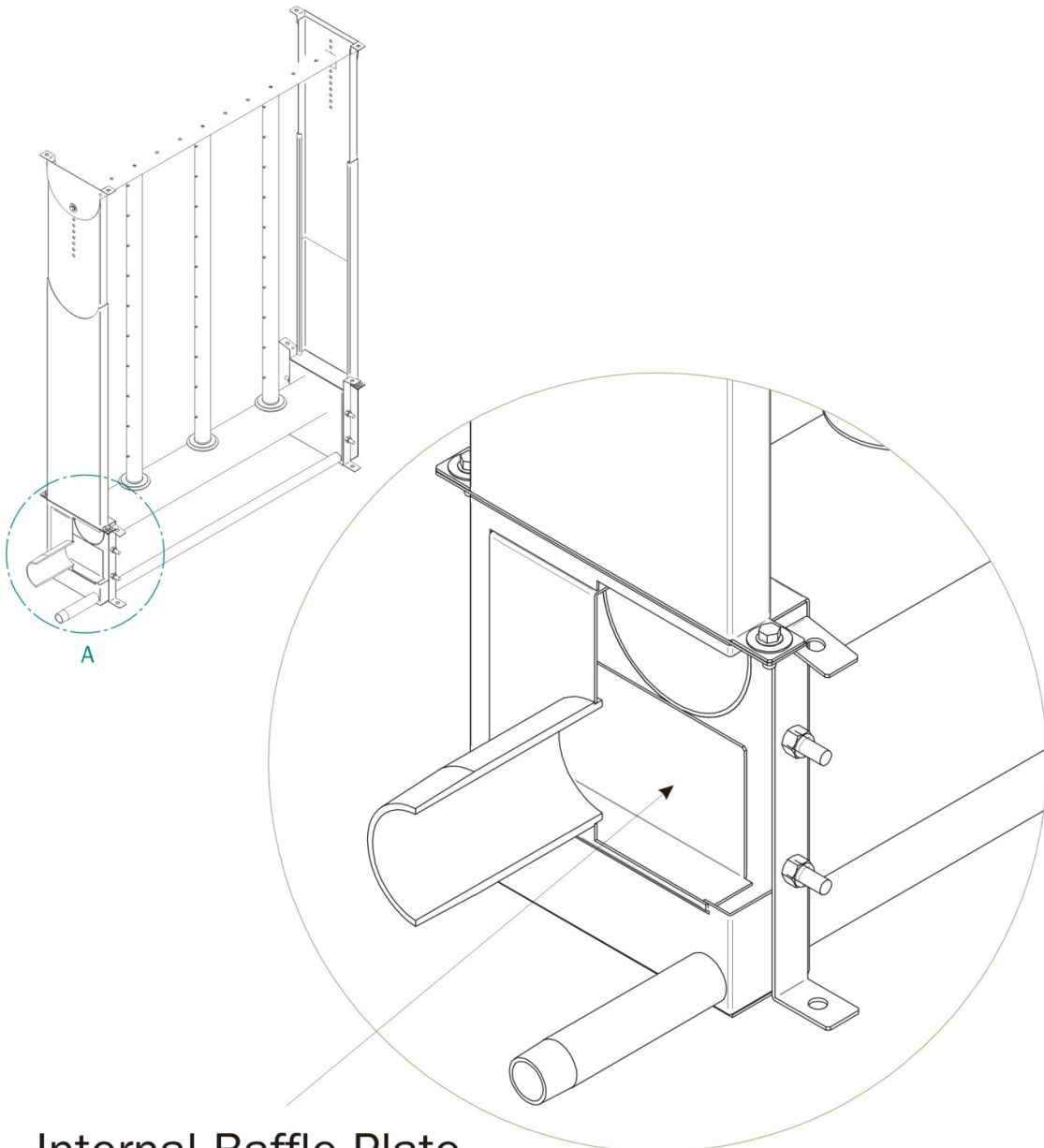
**Note:** The Nortec SAM-e header functions as a steam separator, therefore an external steam separator is not required



## Drain Water Cooler Option:



**Figure 12: Typical Nortec SAM-e Installation for Atmospheric Steam Applications**



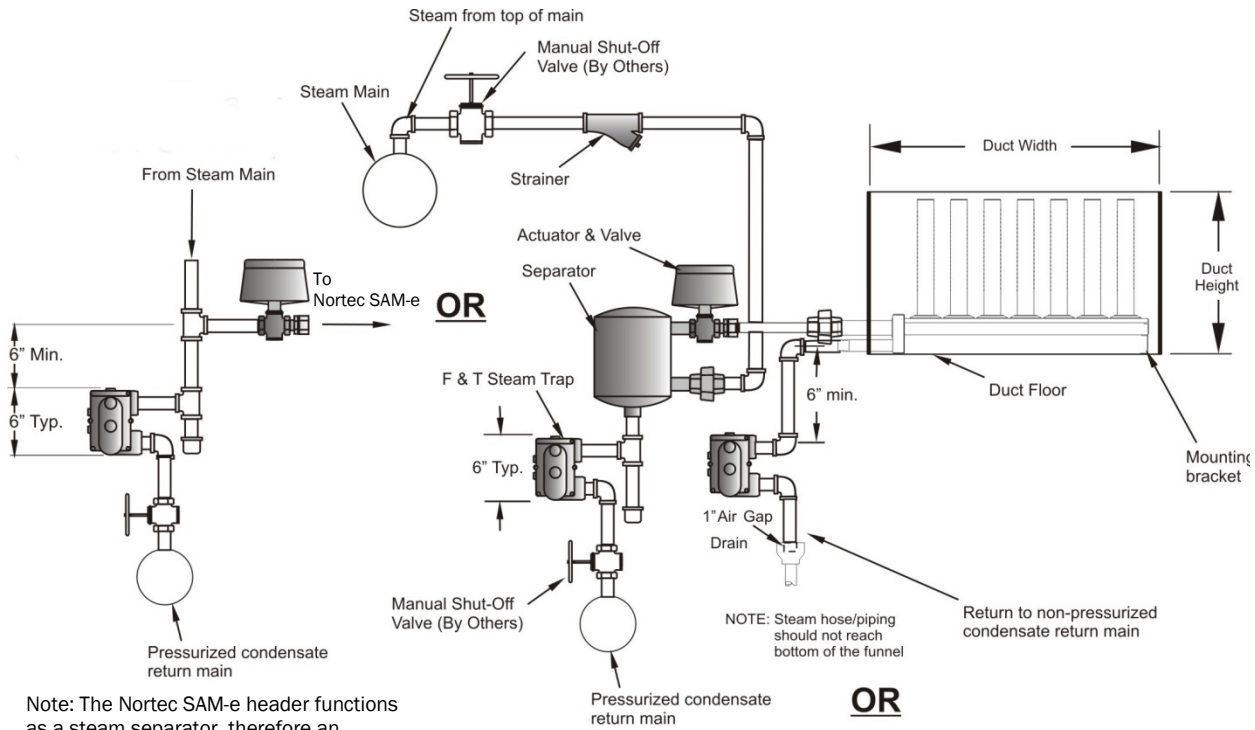
## Internal Baffle Plate

### DETAIL A

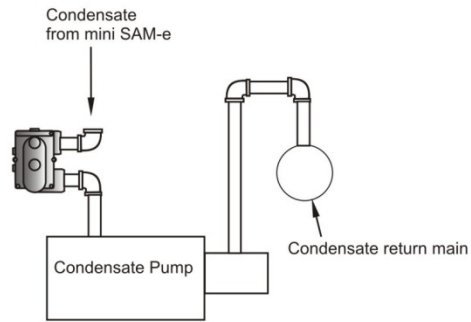
All pressurized Nortec SAM-e inlet kits come with a standard internal baffle plate. The baffle plate redirects the flow of steam causing condensate to 'fall out', eliminating the need to install an external steam separator.

**Figure 13: Nortec SAM-e Internal Baffle Plate**



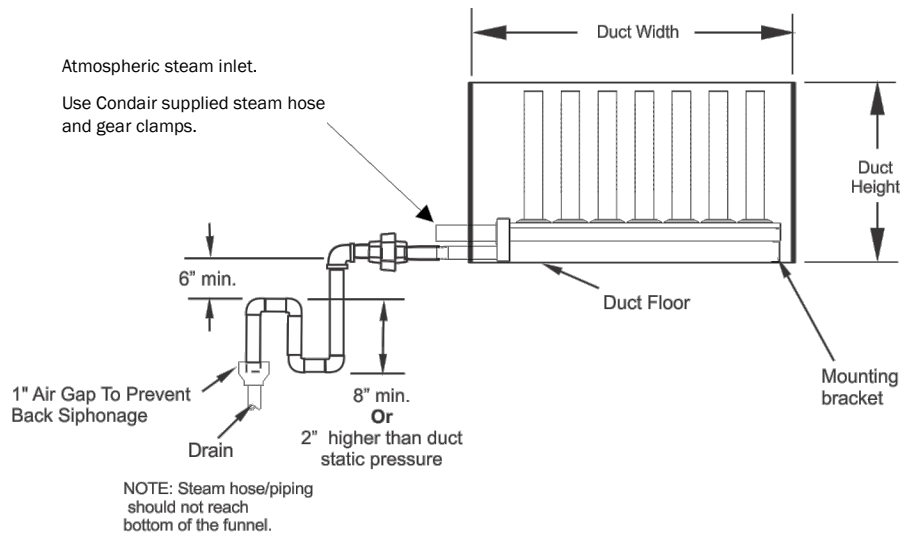


Note: The Nortec SAM-e header functions as a steam separator, therefore an external steam separator is NOT required.

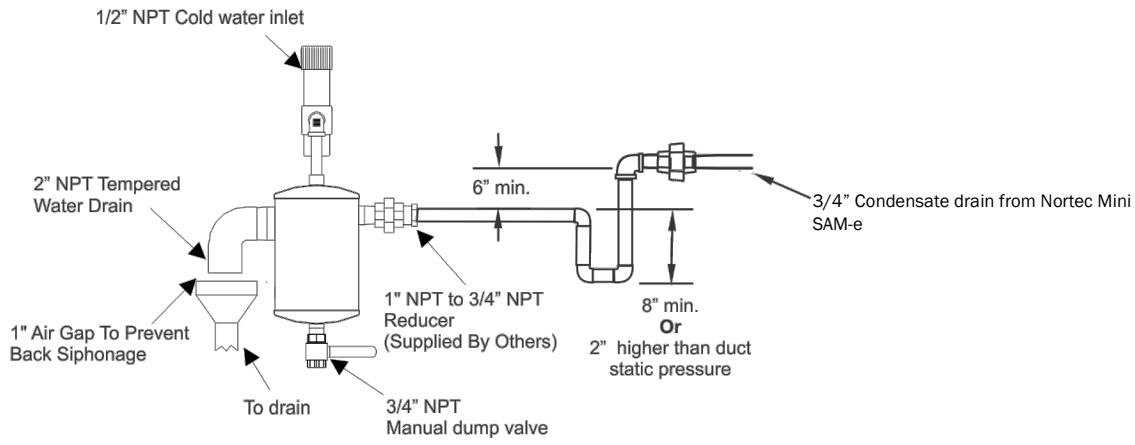


Note: When pressurized steam enters the Nortec SAM-e, the pressure drops down to almost atmospheric pressure. Therefore, it must be drained atmospherically, and the use of a condensate pump (rated for 212 degree F (100 C) must be used to elevate the condensate to a higher point.

**Figure 14: Typical Nortec Mini SAM-e Installation for Pressurized Steam Applications**



### Drain Water Cooler Option:



**Figure 15: Typical Nortec Mini SAM-e Installation for Atmospheric Steam Applications**

# Specification

---

## 1. GENERAL

### A. Work Included

- (1) Nortec Short Absorption Manifold (Humidifier Steam Dispersion Panel) - Nortec SAM-e Humidifier[s], and Mini Short Absorption Manifold (Humidifier Steam Dispersion Panel) –

Nortec Mini SAM-e Humidifier[s] as indicated on drawing[s] and as indicated on schedule[s].

- (2) Complete and operable humidification system [which meets applicable building codes].
- (3) Equipment start-up and project inspection by qualified factory trained representative.

#### **B. Quality Assurance**

- (1) Manufacturer: For each product specified, provide components by same manufacturer throughout.
- (2) Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authority having jurisdiction, and marked for intended use.
- (3) Comply with ARI 640, "Standard for Commercial and Industrial Humidifiers."
- (4) Products shall be supported with a warranty that ensures the product will be free from defects in materials and workmanship for a period of ten years after shipment (with the exception of tube coupling seals: two years only).
- (5) Commissioning of a system or systems specified in this section is part of the construction process. Documentation and testing of these systems, as well as training of the Owner's operation and maintenance personnel, is required in cooperation with the Commissioning Authority. Project Closeout is dependent on successful completion of all commissioning procedures, documentation, and issue closure. Refer to Project Closeout, Section 01700, for substantial completion details. Refer to Section 01810, Commissioning, for detailed commissioning requirements.
- (6) Products specified below are to be manufactured is an ISO 9001-2000 certified facility.

#### **C. Submittals**

- (1) Submit product data under provisions of Section 15010. Include product description, model, dimensions, component sizes, rough-in requirements, service sizes, and finishes. Include rated capacities, operating weights, furnished specialties, and accessories.
- (2) Submit manufacturer's installation instructions.
- (3) Submit operation and maintenance data.
- (4) Submit coordination drawings. Detail fabrication and installation of humidifiers. Include piping details, plans, elevations, sections, details of components, and dispersion tubes.

Detail humidifiers and adjacent equipment. Show support locations, type of support, weight on each support, and required clearances.

- (5) Submit wiring diagrams including power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
- (6) Submit minimum water quality requirements and water pressure requirements.

#### D. Extra Material

- (1) Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

#### E. References

- (1) ANSI/NFPA 70 - National Electrical Code.

#### F. Coordination

- (1) Coordinate location and installation of humidifiers in ducts and air-handling units. Revise locations and elevations to suit field conditions and to ensure proper humidifier operation.

XXXXX OR XXXXX

- (2) Coordinate location and installation of humidifier in the space it serves with the electrical, mechanical, and plumbing contractors.

## 2. PRODUCTS

### A. Short Absorption Manifold

- (1) Short Absorption Manifold designed for atmospheric steam humidifiers or pressurized steam from a boiler, to directly inject the steam into ducted air for humidification.
  - (a) Absorption distance characteristic shall prevent water accumulation on any in-duct surfaces beyond \_\_\_in (\_\_\_mm) downstream of the steam dispersion panel. (Refer to distance calculated in H.E.L.P. Software).
  - (b) Steam dispersion panel consisting of a (one) horizontal stainless steel header / separator supplying steam to a bank of closely spaced 3" (76 mm) OR 6" (152 mm) OR 9" (229 mm) OR 12" (305 mm) vertical tubes (3" (76 mm) OR 6" (152 mm) for Nortec Mini SAM-e), as necessary to meet absorption distance requirements, and to reduce condensation losses.
  - (c) Single horizontal stainless steel header to provide steam to vertical distributor tubes and to reduce condensation losses. Dual header systems creating unnecessary

condensation, or systems needing to be installed on a partition or requiring blank-off plates are not acceptable.

- (d) Header / separator design is primarily round tube to minimize pressure drop. Square headers are not acceptable. (Full-size Nortec SAM-e only).
- (e) Slim profile rectangular profile header design minimizes pressure drop. (Nortec Mini SAM-e only).
- (f) Steam inlet and condensate return located on the same side and at the bottom of the header to allow single point entry and floor mounting.
- (g) Headers are of 304 stainless steel construction.
- (h) Vertical stainless steel distribution tubes to promote condensate evacuation. Horizontal distributor tubes are not accepted.
- (i) All tubes are available in either 409 or 304 stainless steel construction.
- (j) Stainless steel nozzle inserts ensure condensate free steam is discharged from the center of the distribution tubes. Systems without nozzle inserts, or other than stainless steel, are not acceptable.
- (k) Stainless steel nozzle inserts shall have metered orifices, sized to provide even distribution of the discharged steam, spaced for optimum steam absorption.
- (l) Tubes and headers shall accommodate factory installation or field retrofit of optional insulation for increased energy efficiency.

## (2) Options

- (a) Tube and header insulation constructed from 304 stainless steel shielding for increased energy efficiency and reduced airstream heat gain. Stainless steel shields to be isolated from distributor using plenum rated synthetic foam strips. Insulation to provide air-gap to minimize conduction and convection, as well provide reflective

surface to minimize radiating heat transfer. (Patent Pending). Un-insulated headers, or simple foam insulation not accepted.

- (b) Adjustable mounting frame available for quick and easy installation. (Does not apply for Nortec Mini SAM-e).

(3) Standard of acceptance: Nortec SAM-e.

### 3. EXECUTION

#### A. Examination

- (1) Examine ducts, air-handling units, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- (2) Examine roughing-in for piping systems to verify actual locations of piping connections before humidifier installation.
- (3) Proceed with installation only after unsatisfactory conditions have been corrected.

#### B. Installation

- (1) Install humidifiers and steam dispersion panels per manufacturers' instructions.
- (2) Seal humidifier dispersion-tube duct penetrations with flange.
- (3) Install with required clearance for service and maintenance.

#### C. Testing

- (1) System verification testing is part of the commissioning process. Verification testing shall be performed by the Contractor and witnessed and documented by the Commissioning Authority. Refer to section 01810, Commissioning, for system verification tests and commissioning requirements.

XXXXX OR XXXXX

- (2) Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.
  - (a) Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - (b) Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove malfunctioning units, replace with new units, and retest.
  - (c) Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

#### D. Training

- (1) Training of the Owner's operation and maintenance personnel is required in cooperation with the Commissioning Authority. Provide competent, factory authorized personnel to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems. The instruction shall be scheduled in coordination with the Commissioning Authority after submission and approval of formal training plans. Refer to System Demonstrations, section 01670, for contractor

training requirements. Refer to section 01810, Commissioning, for further contractor training requirements.

XXXXX OR XXXXX

- (2) Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain humidifiers.
  - (a) Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.
  - (b) Review data in maintenance manuals. Refer to Division 1 Section "Contract Closeout."
  - (c) Review data in maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."
  - (d) Schedule training with Owner, through Architect, with at least seven days advance notice.



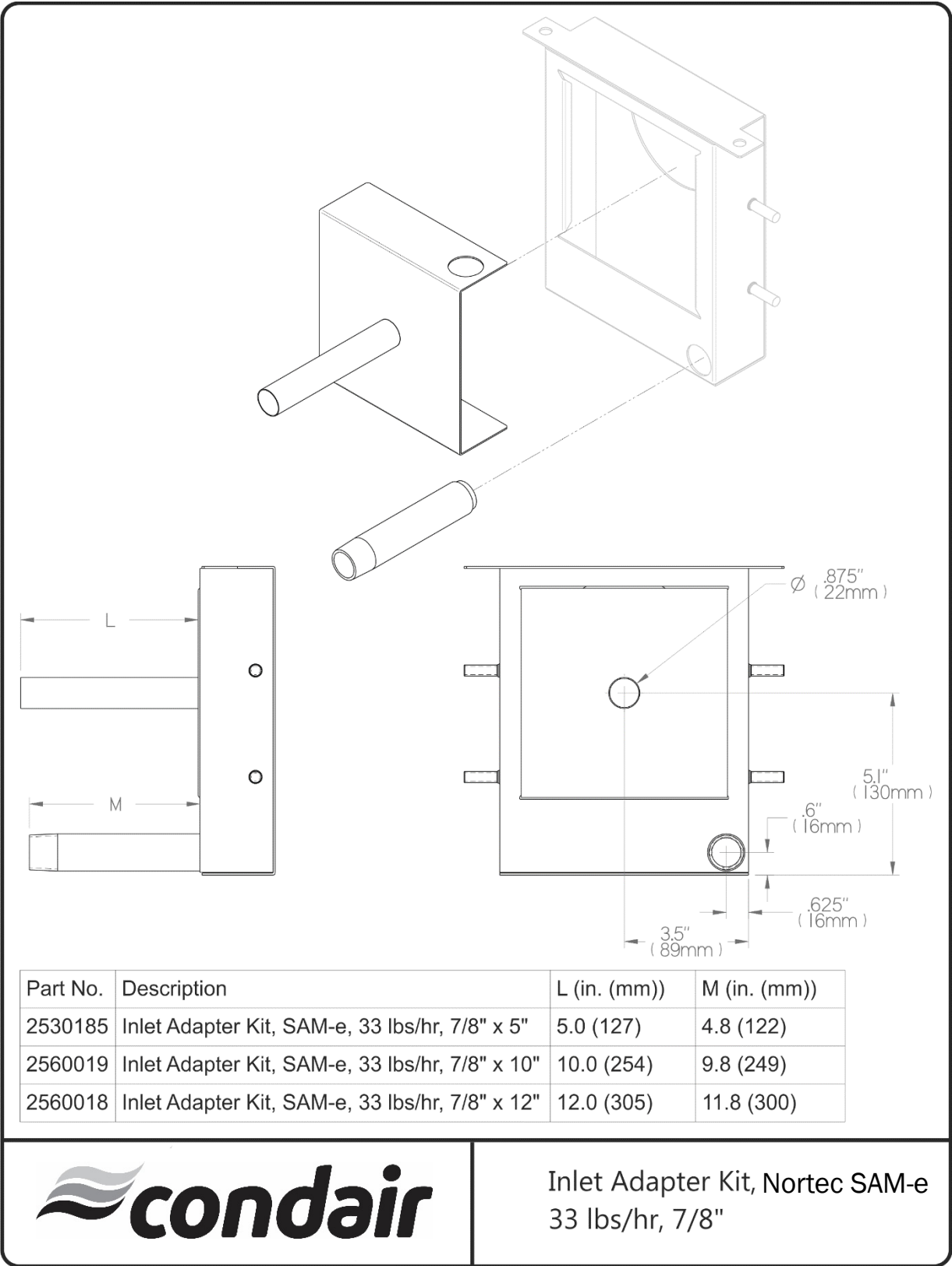
# Appendix

## Inlet Adapter Configurations

---

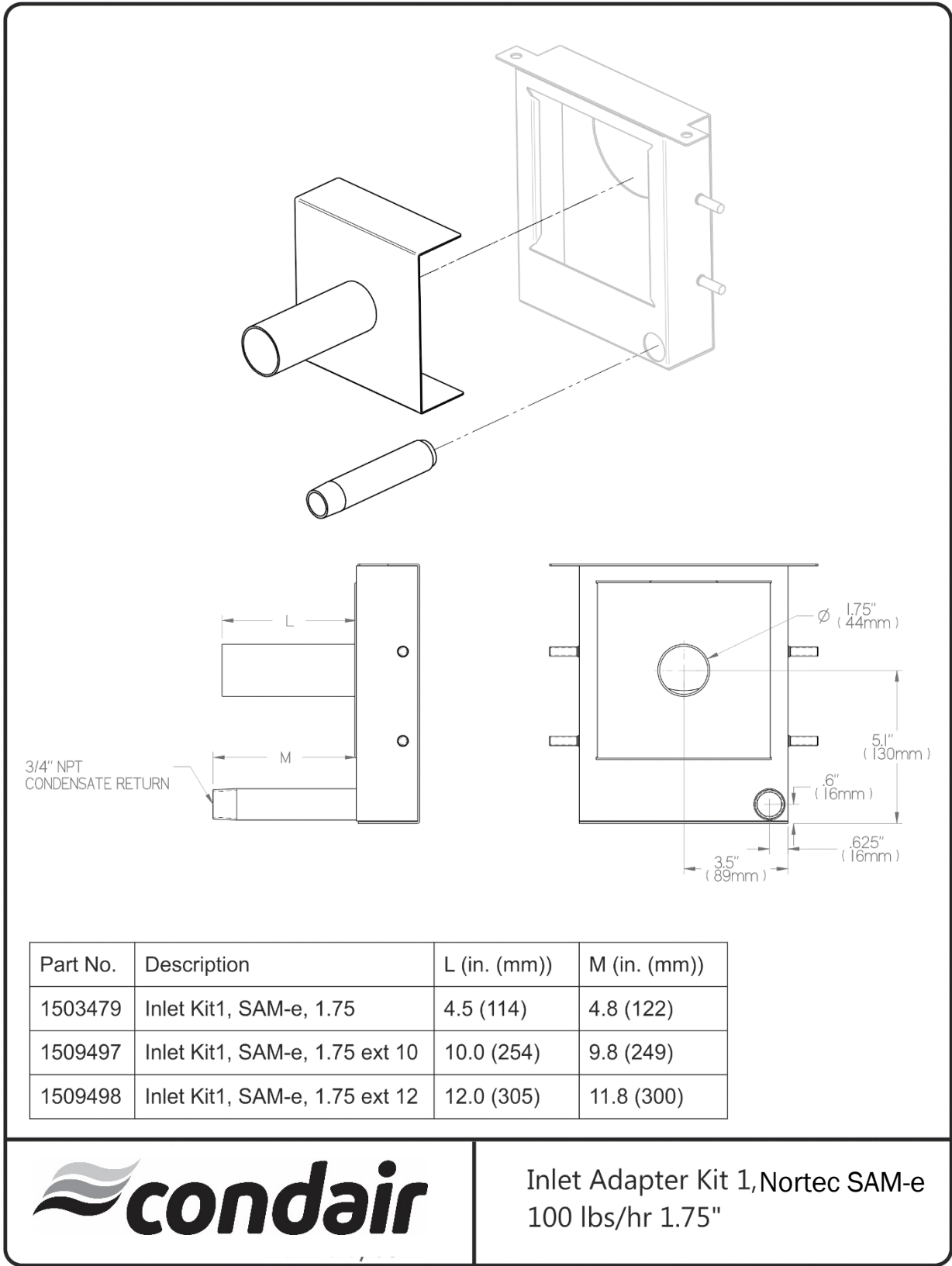


**Note:** For Atmospheric Steam humidifier applications, see table 8 and 13 for Pressure Steam applications

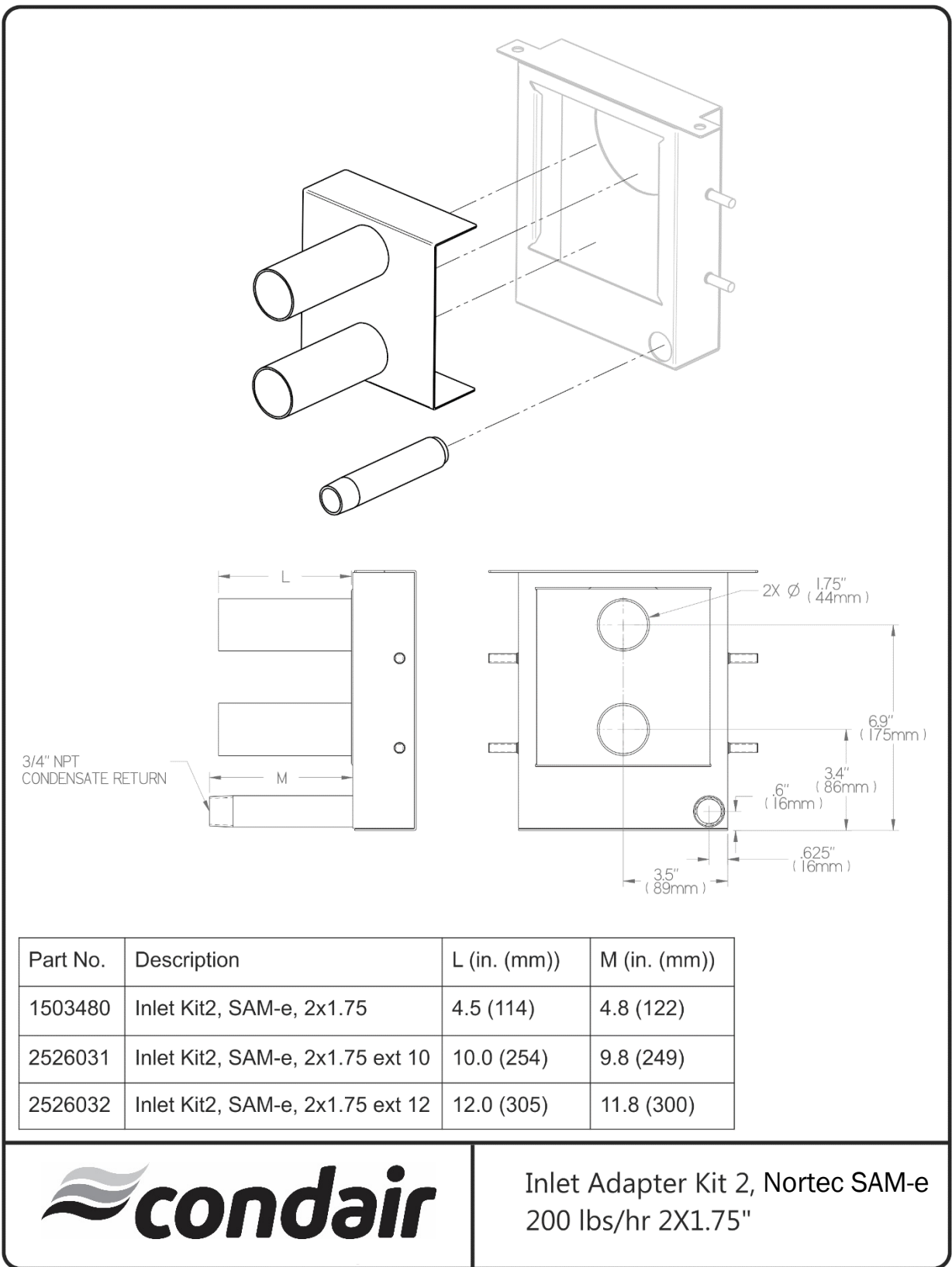


Inlet Adapter Kit, Nortec SAM-e  
33 lbs/hr, 7/8"

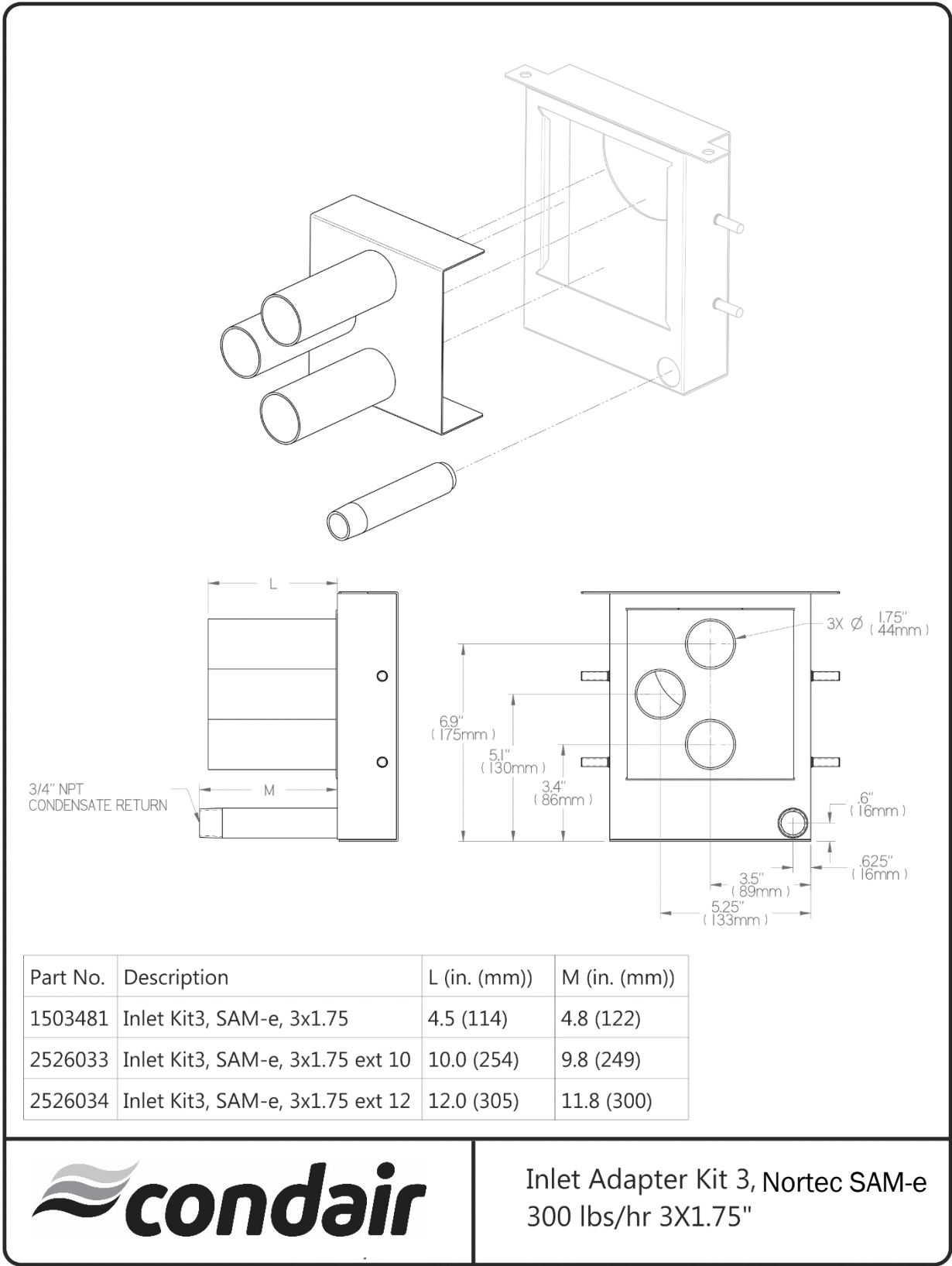
Figure 1: KIT 7/8 - Header and Adapter Configuration



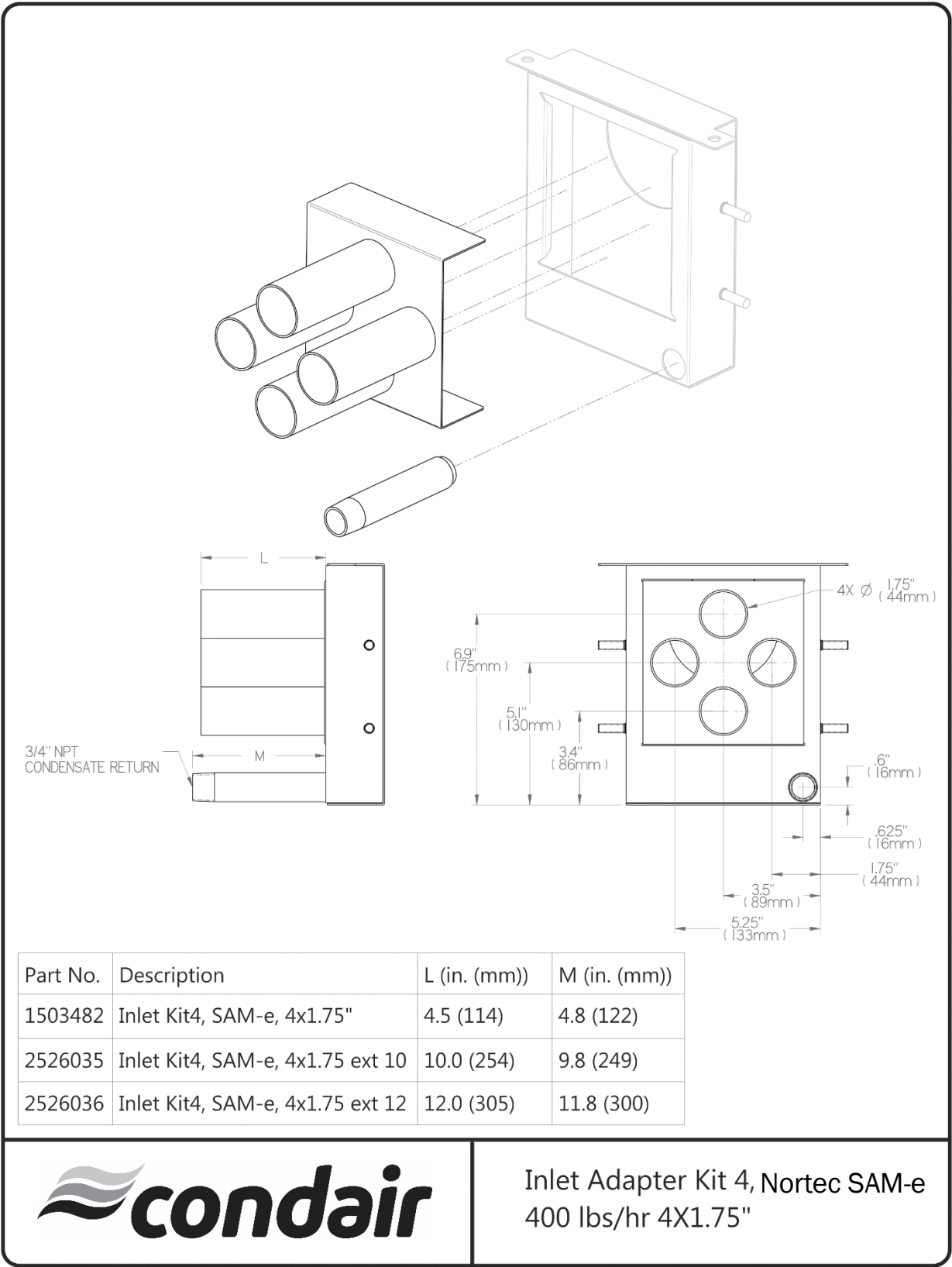
**Figure 2: Kit 1 - Header and Adapter Configuration**



**Figure 3: KIT 2 - Header and Adapter Configuration**



**Figure 4: KIT 3 - Header and Adapter Configuration**



Inlet Adapter Kit 4, Nortec SAM-e  
400 lbs/hr 4X1.75"

Figure 5: KIT 4 - Header and Adapter Configuration

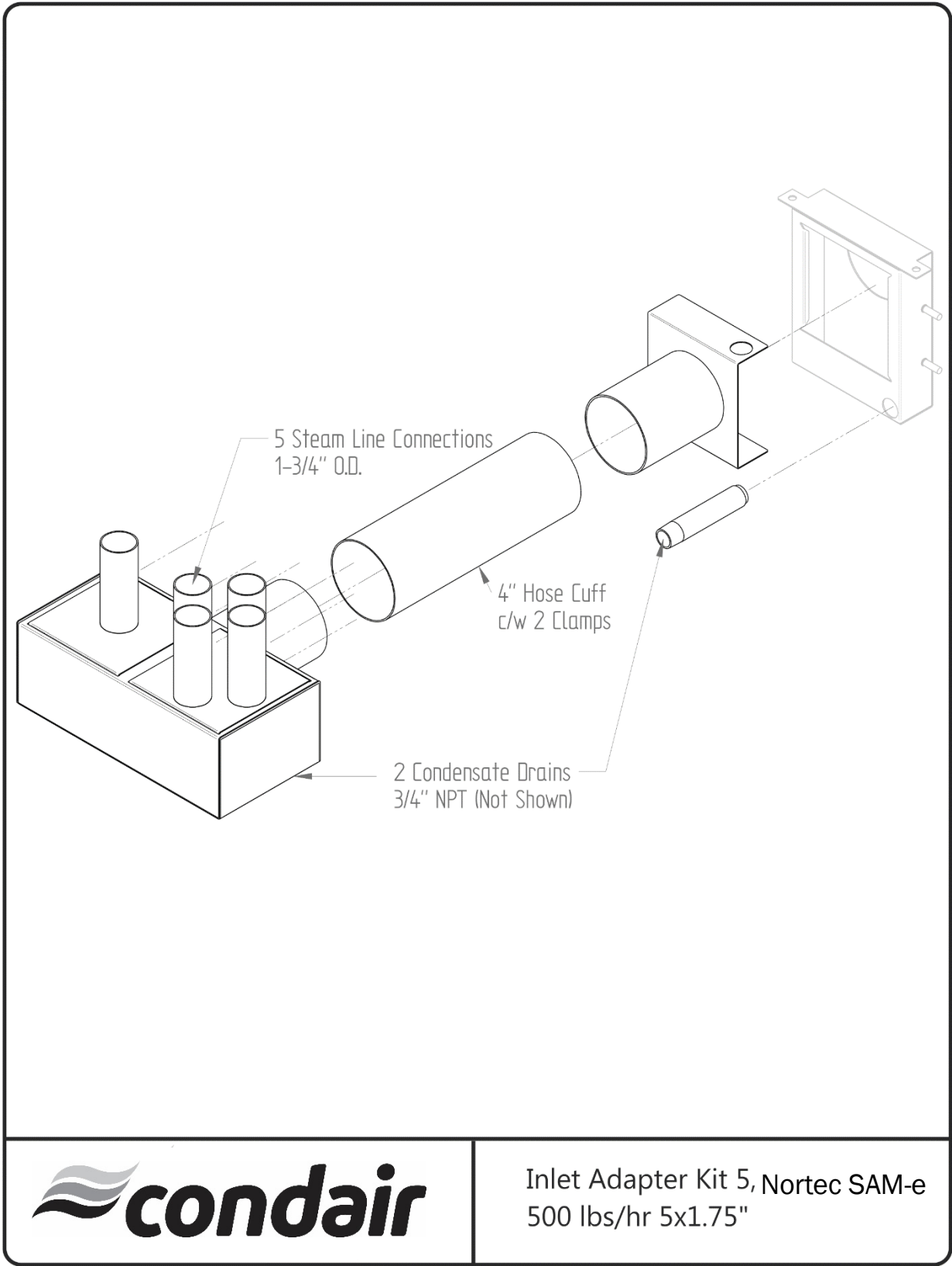
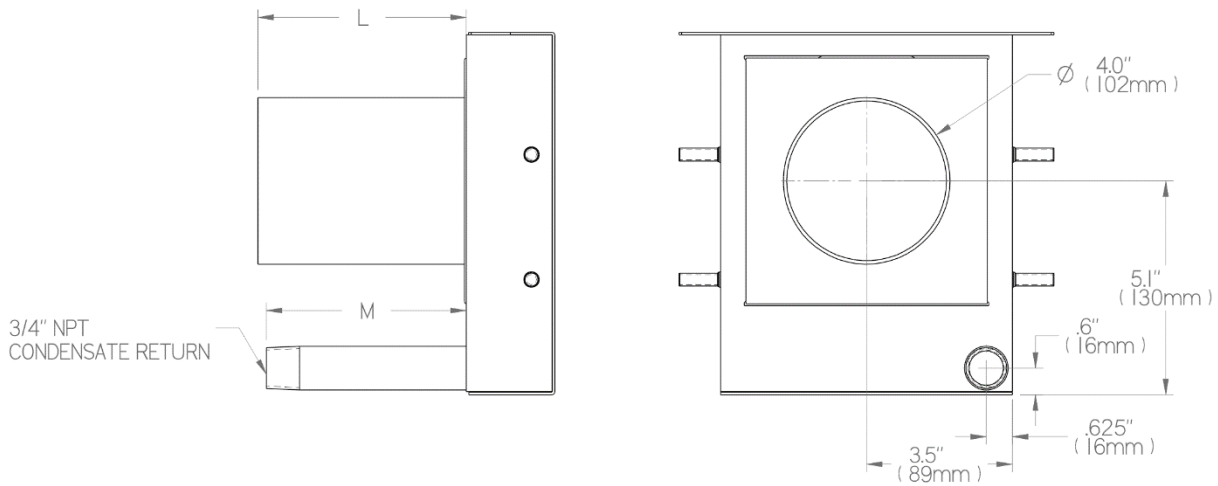
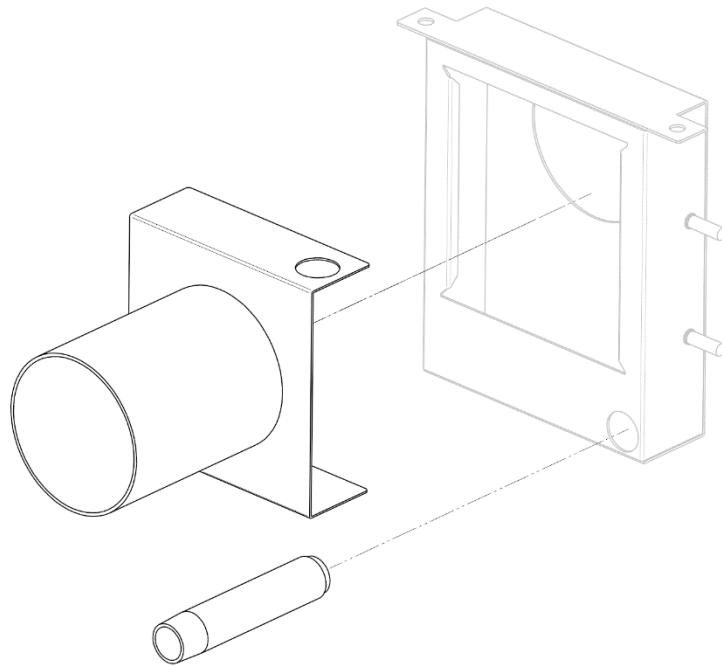


Figure 6: KIT 5 - Header and Adapter Configuration



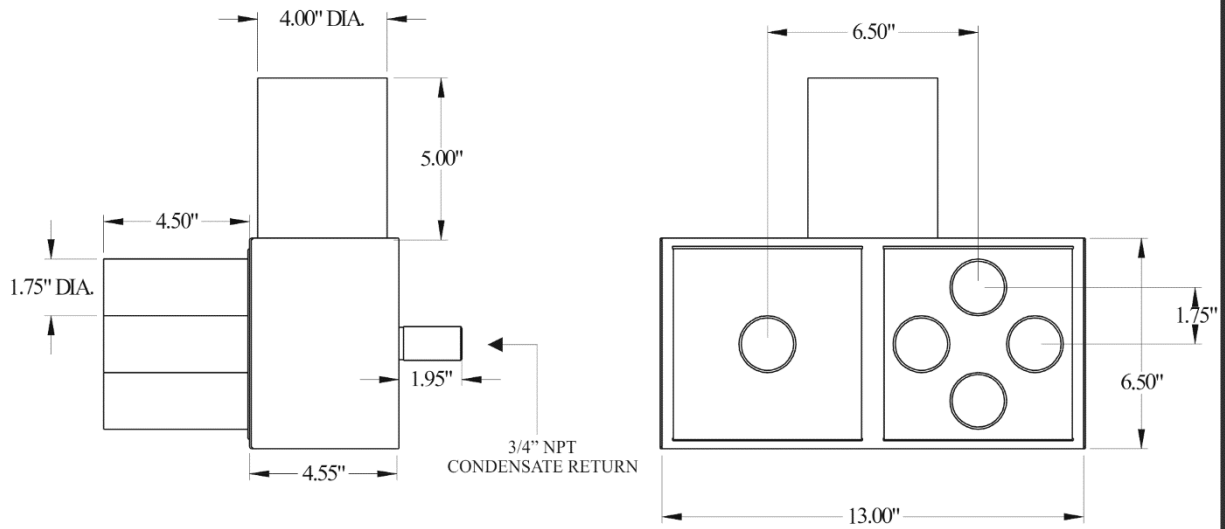
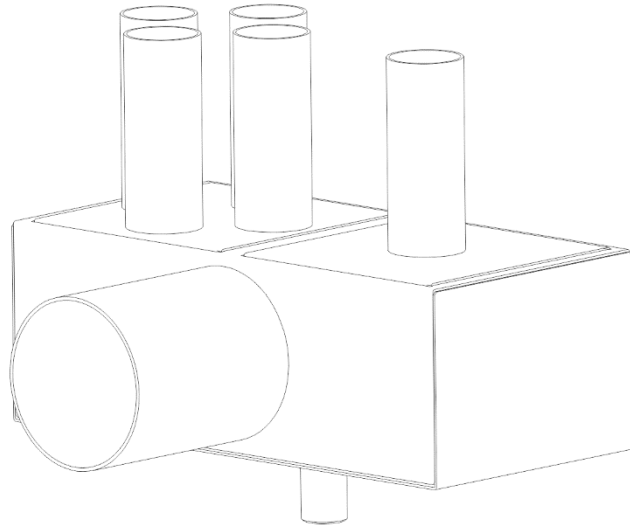
| Part No. | Description                  | L (in. (mm)) | M (in. (mm)) |
|----------|------------------------------|--------------|--------------|
| 1503483  | Kit 5, SAM-e, 5x1-3/4" x 5"  | 5.0 (127)    | 4.8 (122)    |
| 2526037  | Kit 5, SAM-e, 5x1-3/4" x 10" | 10.0 (254)   | 9.8 (249)    |
| 2526039  | Kit 5, SAM-e, 5x1-3/4" x 12" | 12.0 (305)   | 11.8 (300)   |



Inlet Adapter Kit 5

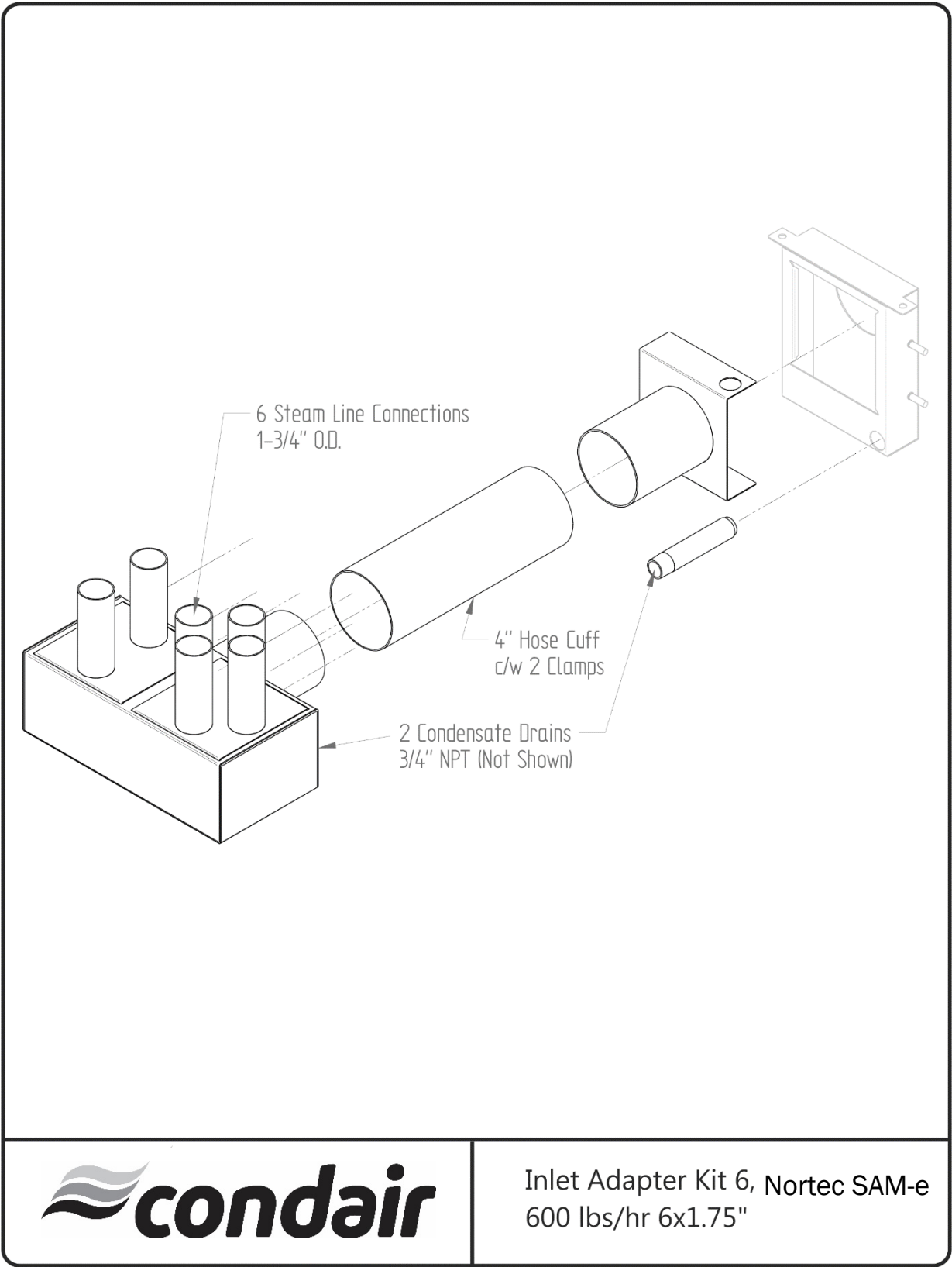
Figure 7: KIT 5 - Header and Adapter Configuration





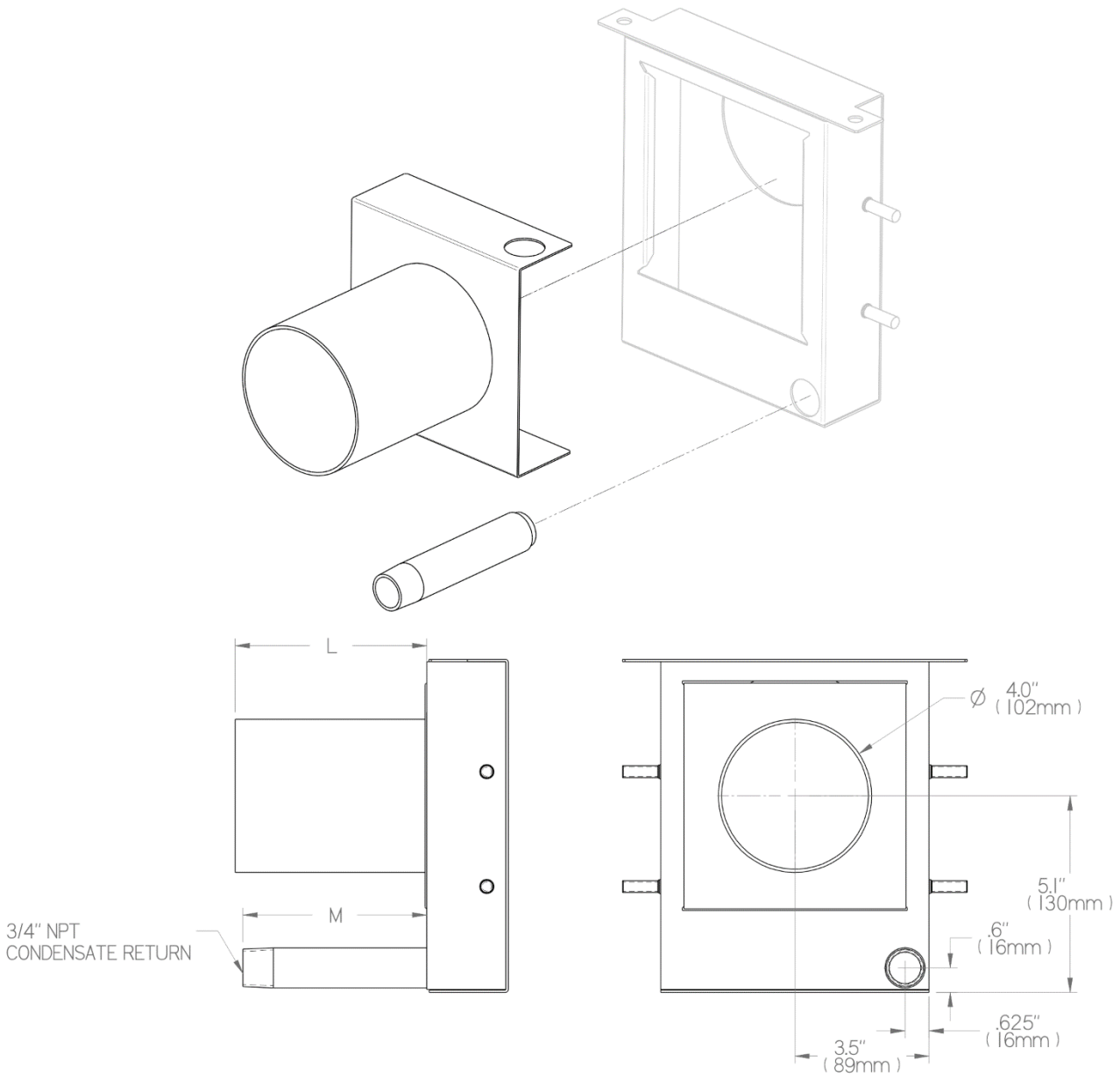
Inlet Adapter Kit 5

Figure 8: KIT 5 - Header and Adapter Configuration



Inlet Adapter Kit 6, Nortec SAM-e  
600 lbs/hr 6x1.75"

Figure 9: KIT 6 - Header and Adapter Configuration

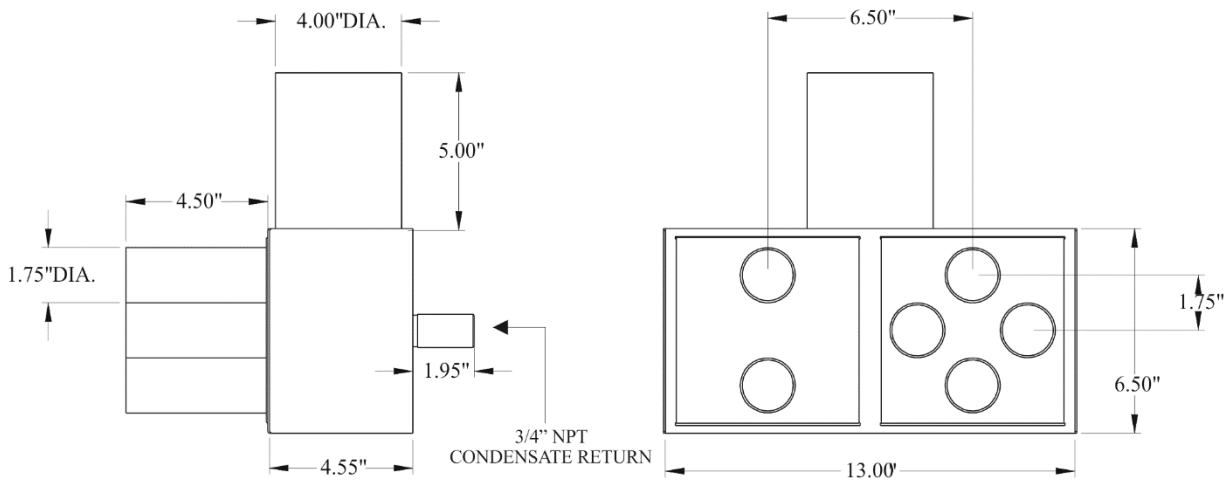
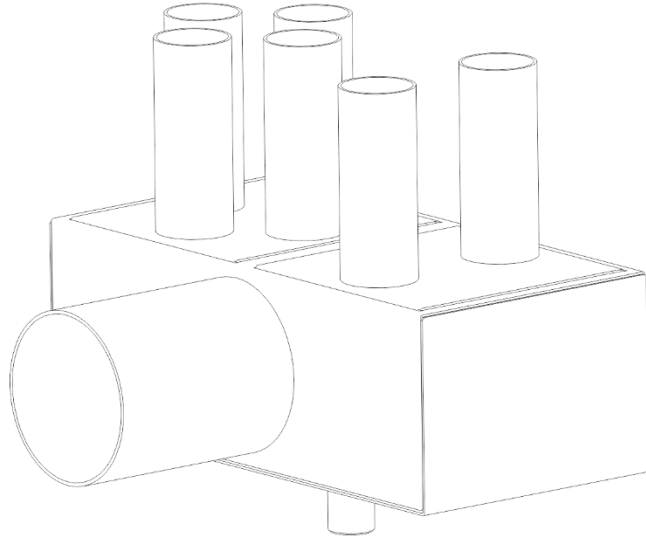


| Part No. | Description                  | L (in. (mm)) | M (in. (mm)) |
|----------|------------------------------|--------------|--------------|
| 1503484  | Kit 6, SAM-e, 6x1-3/4" x 5"  | 5.0 (127)    | 4.8 (122)    |
| 2526040  | Kit 6, SAM-e, 6x1-3/4" x 10" | 10.0 (254)   | 9.8 (249)    |
| 2526041  | Kit 6, SAM-e, 6x1-3/4" x 12" | 12.0 (305)   | 11.8 (300)   |



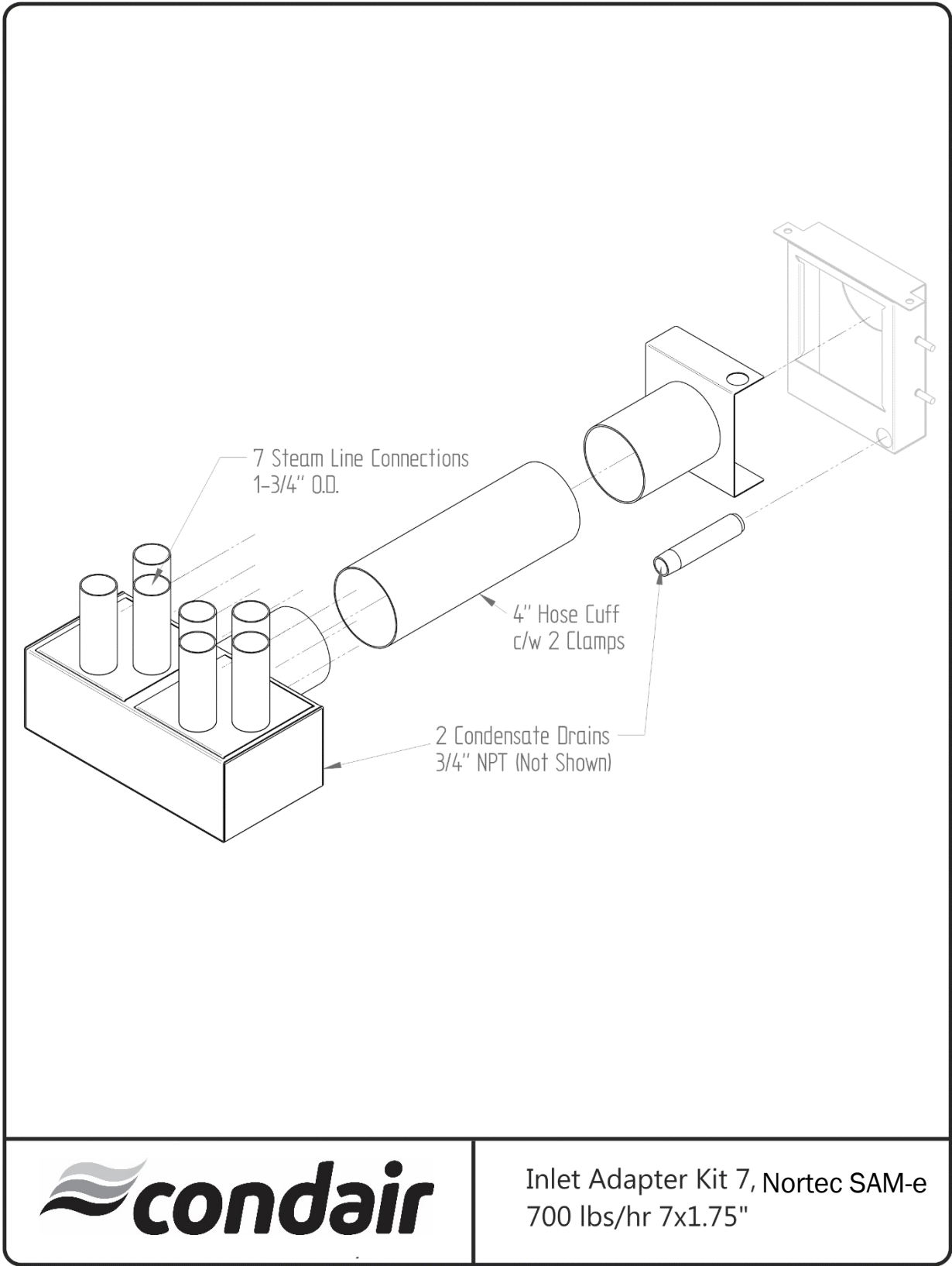
Inlet Adapter Kit 6

Figure 10: KIT 6 - Header and Adapter Configuration



Inlet Adapter Kit 6

Figure 11: KIT 6 - Header and Adapter Configuration



**Figure 12: KIT 7 - Header and Adapter Configuration**

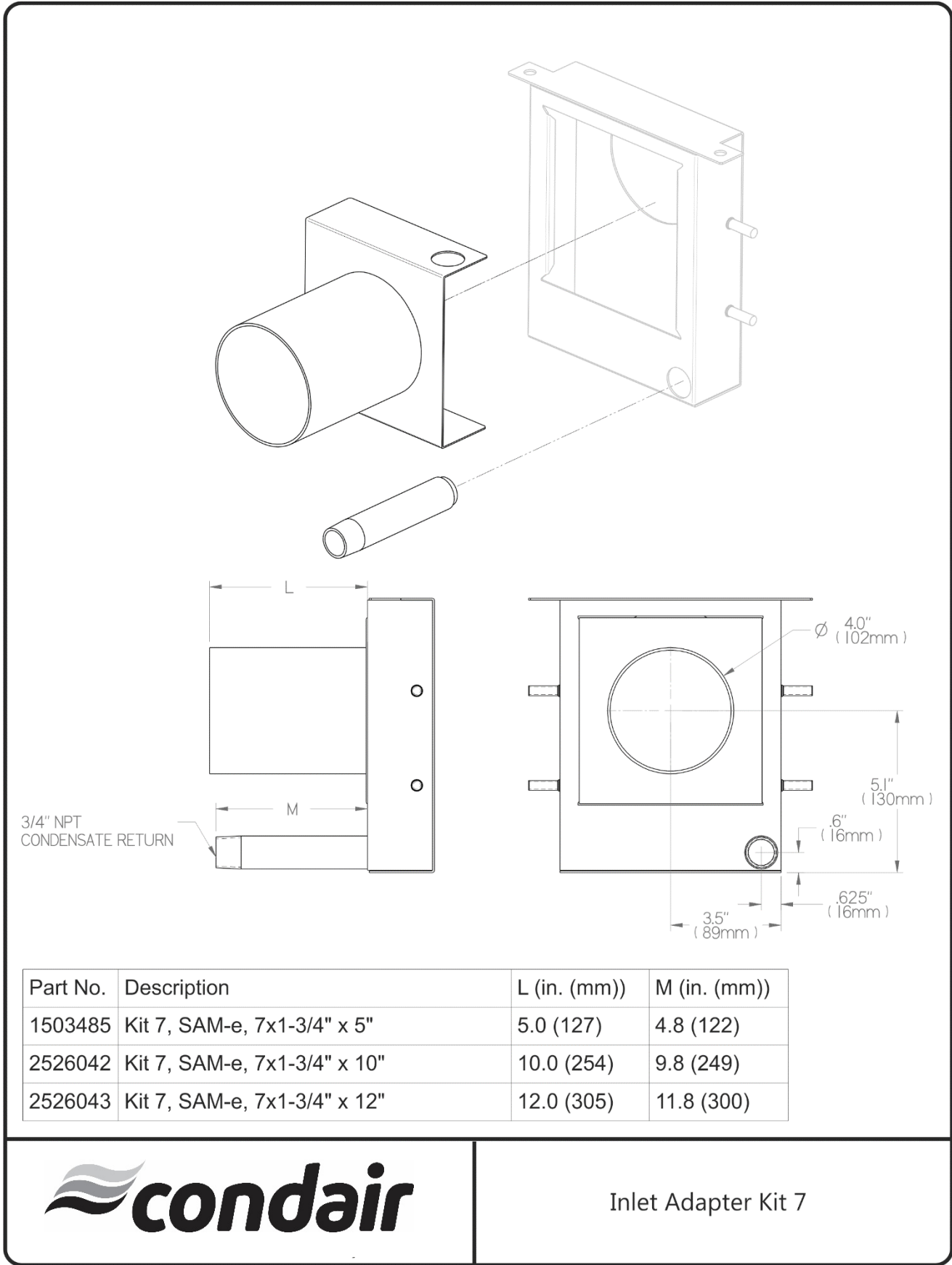
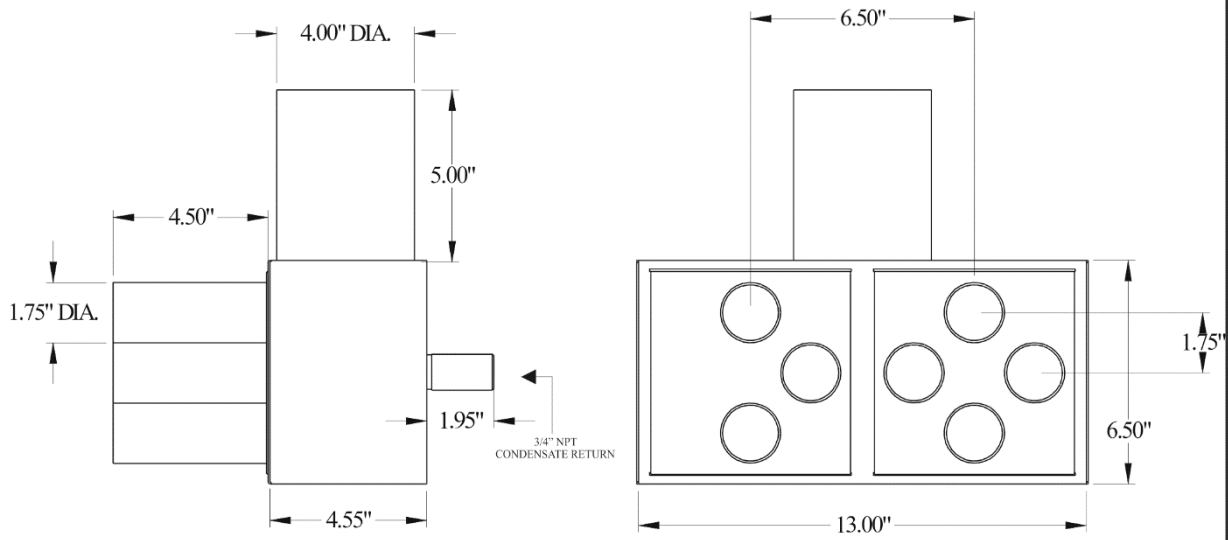
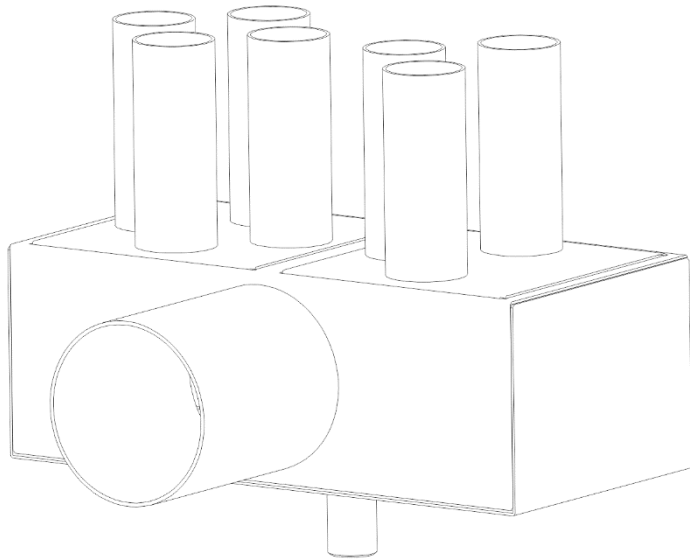
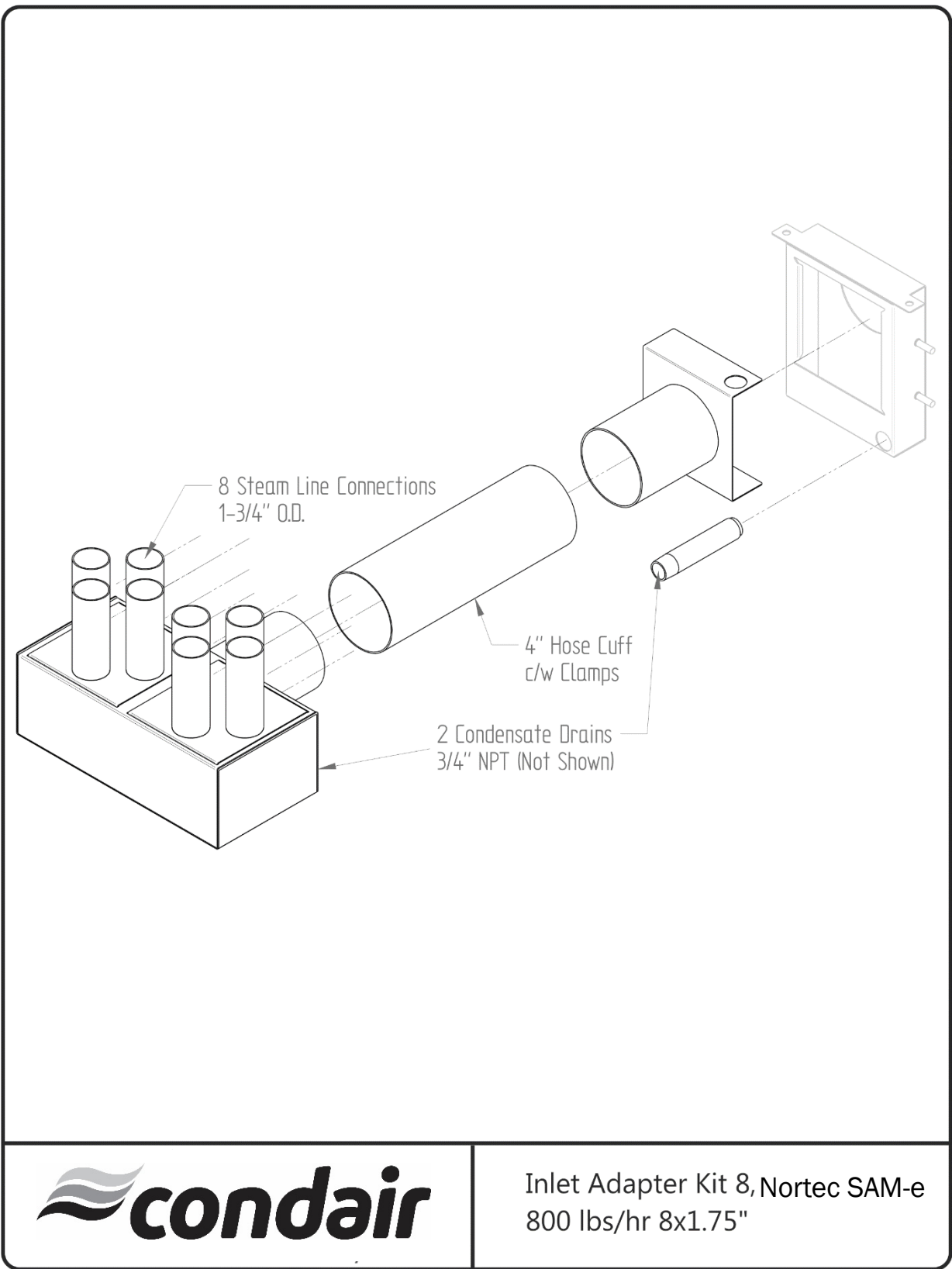


Figure 13: KIT 7 - Header and Adapter Configuration



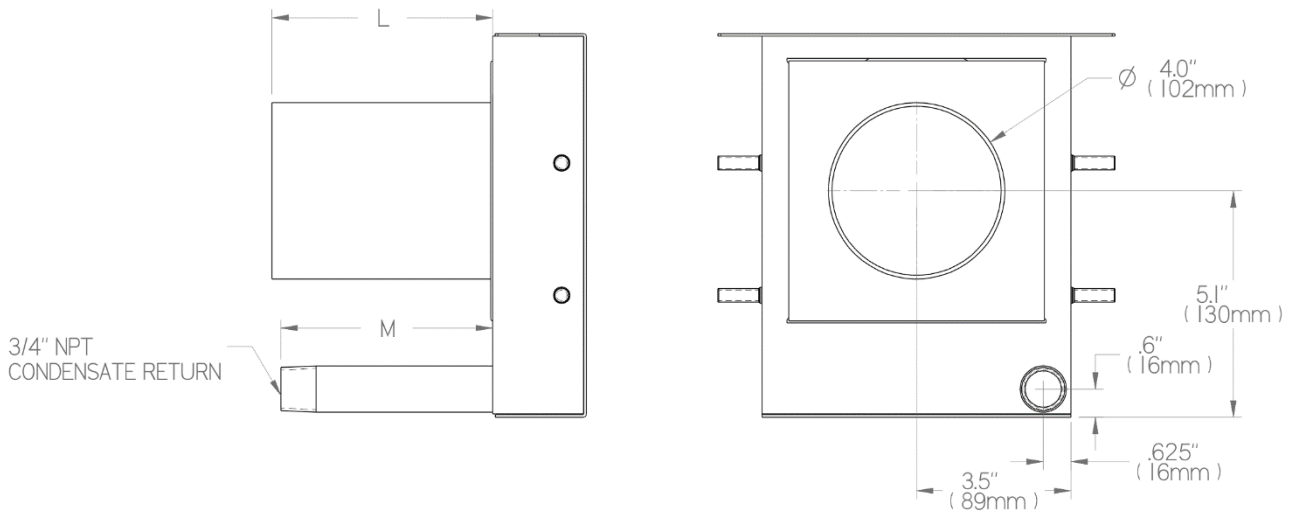
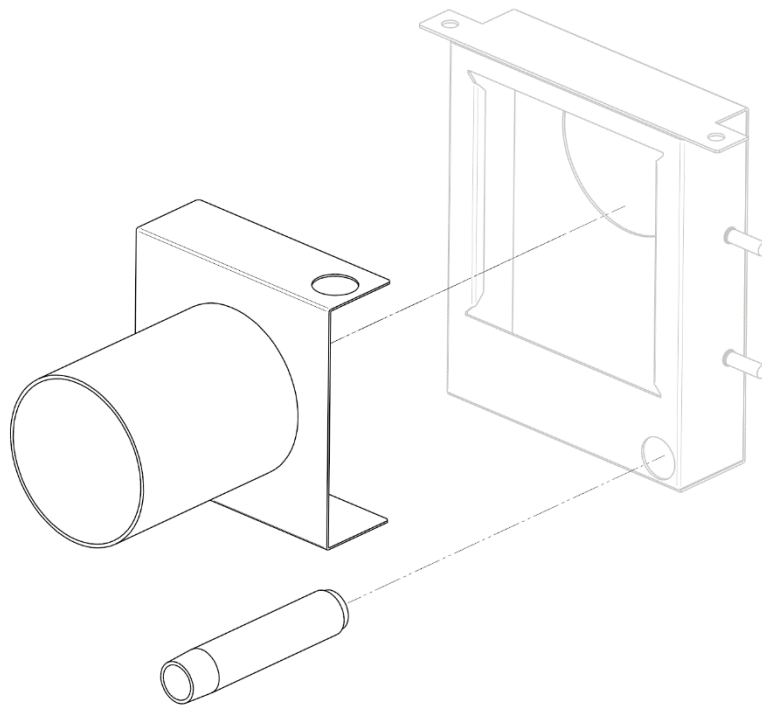
Inlet Adapter Kit 7

Figure 14: KIT 7 - Header and Adapter Configuration



**Figure 15: KIT 8 - Header and Adapter Configuration**



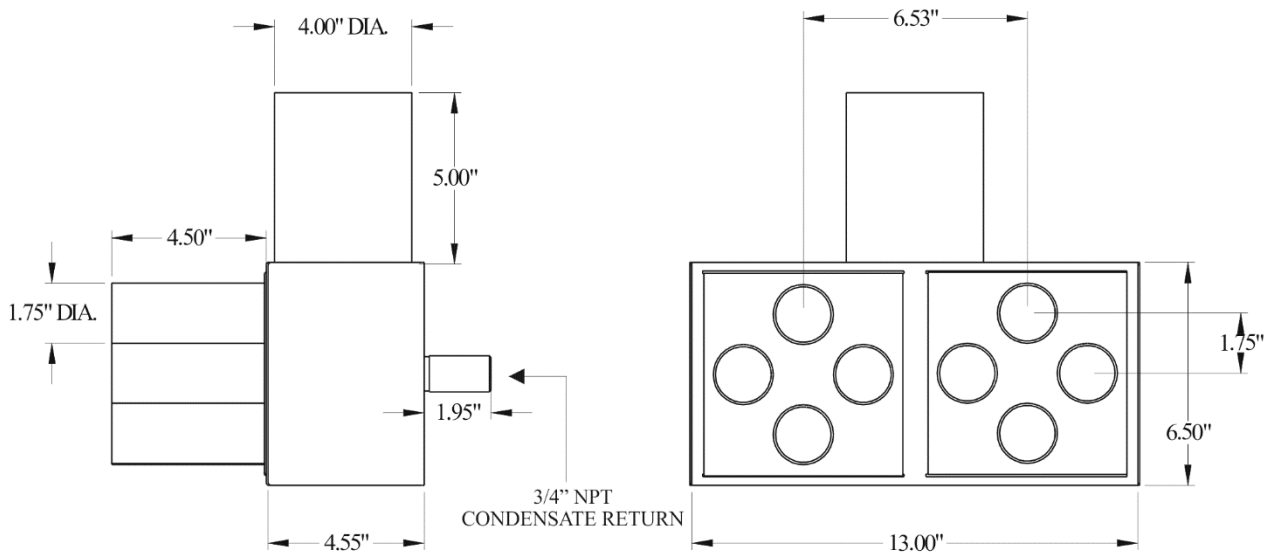
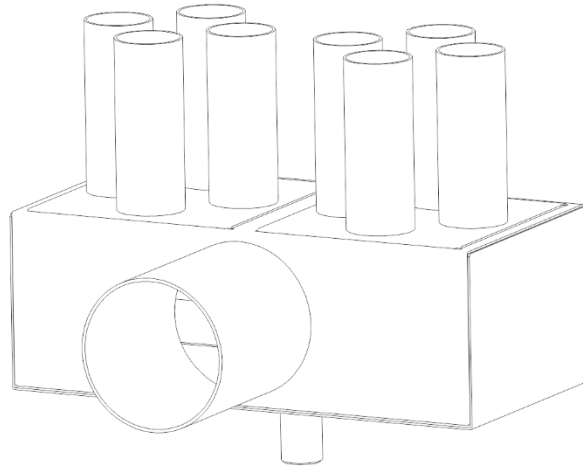


| Part No. | Description                  | L (in. (mm)) | M (in. (mm)) |
|----------|------------------------------|--------------|--------------|
| 1503486  | Kit 8, SAM-e, 8x1-3/4" x 5"  | 5.0 (127)    | 4.8 (122)    |
| 2526044  | Kit 8, SAM-e, 8x1-3/4" x 10" | 10.0 (254)   | 9.8 (249)    |
| 2526045  | Kit 8, SAM-e, 8x1-3/4" x 12" | 12.0 (305)   | 11.8 (300)   |



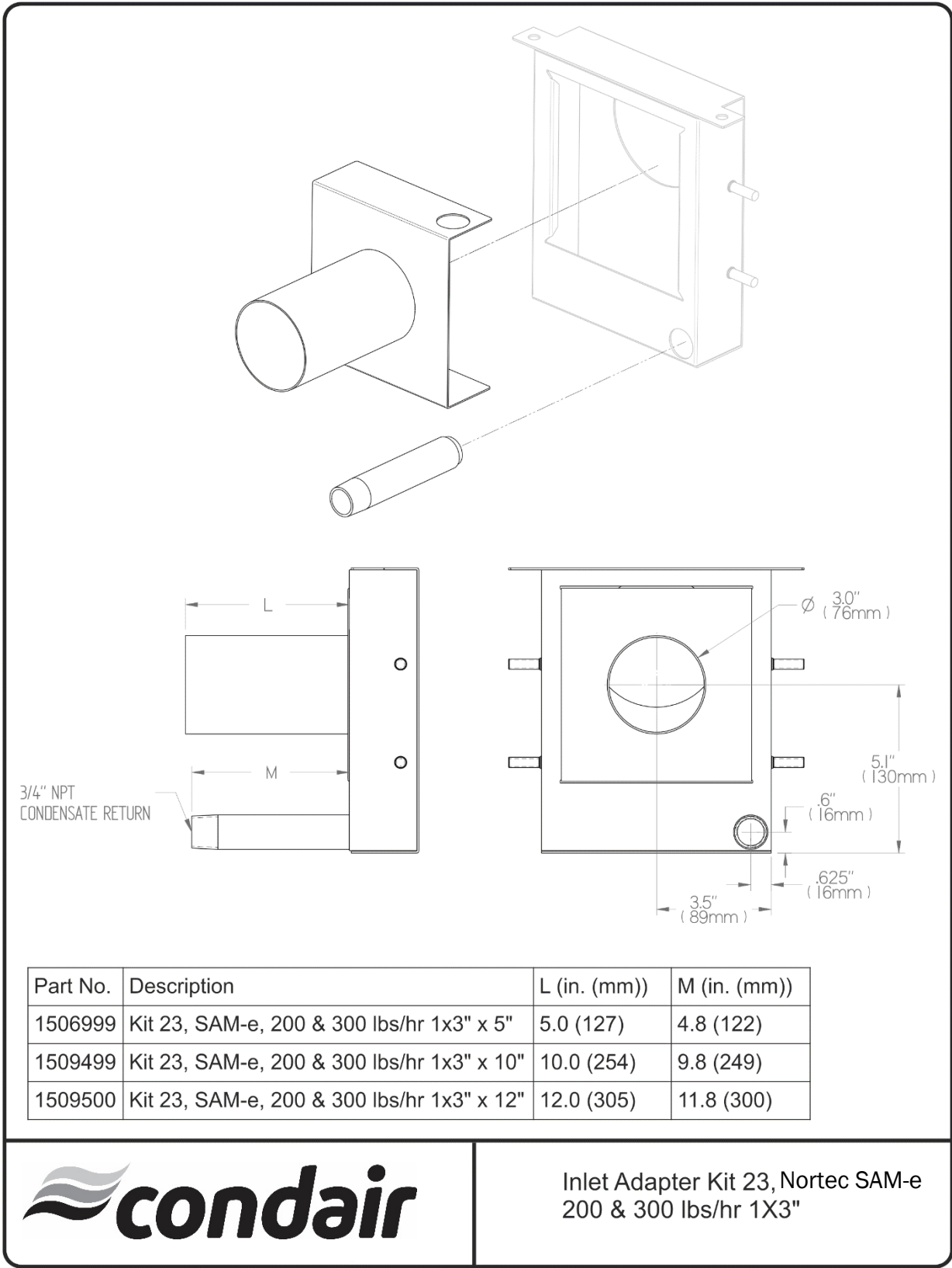
Inlet Adapter Kit 8

Figure 16: KIT 8 - Header and Adapter Configuration



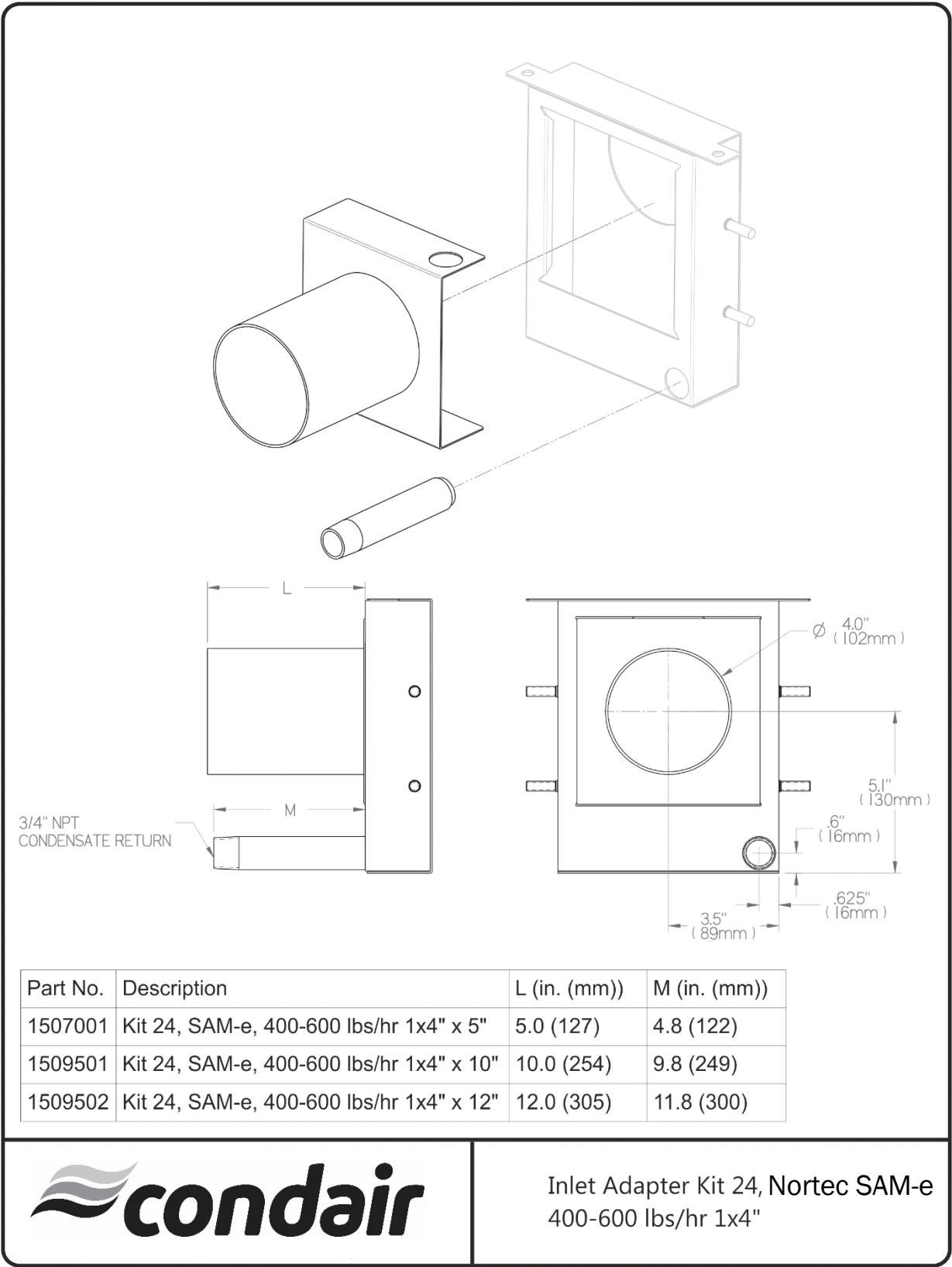
Inlet Adapter Kit 8

Figure 17: KIT 8 - Header and Adapter Configuration



Inlet Adapter Kit 23, Nortec SAM-e  
200 & 300 lbs/hr 1X3"

Figure 18: KIT 23 - Header and Adapter Configuration



Inlet Adapter Kit 24, Nortec SAM-e  
400-600 lbs/hr 1x4"

Figure 19: KIT 24 - Header and Adapter Configuration

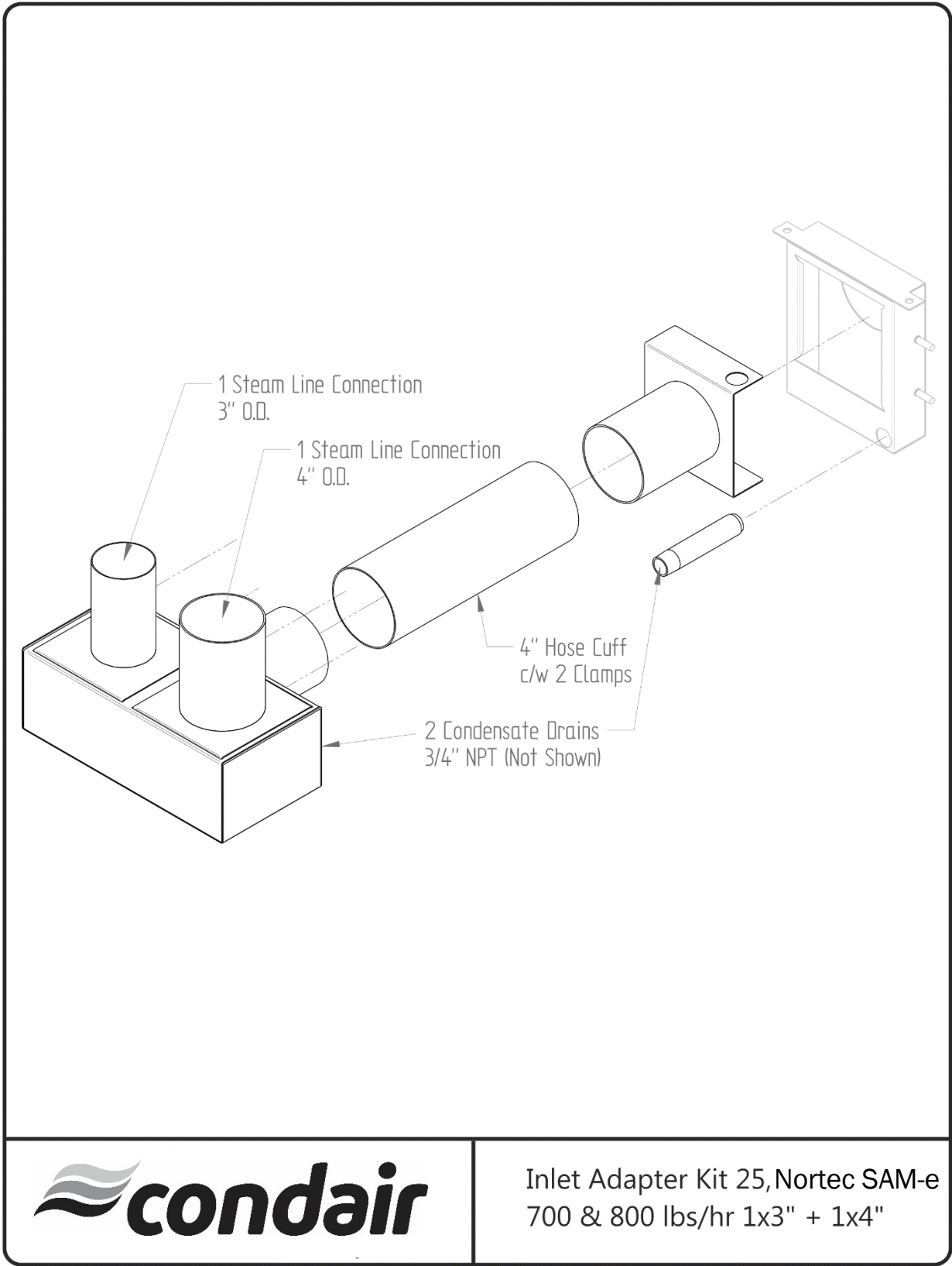


Figure 20: KIT 25 - Header and Adapter Configuration

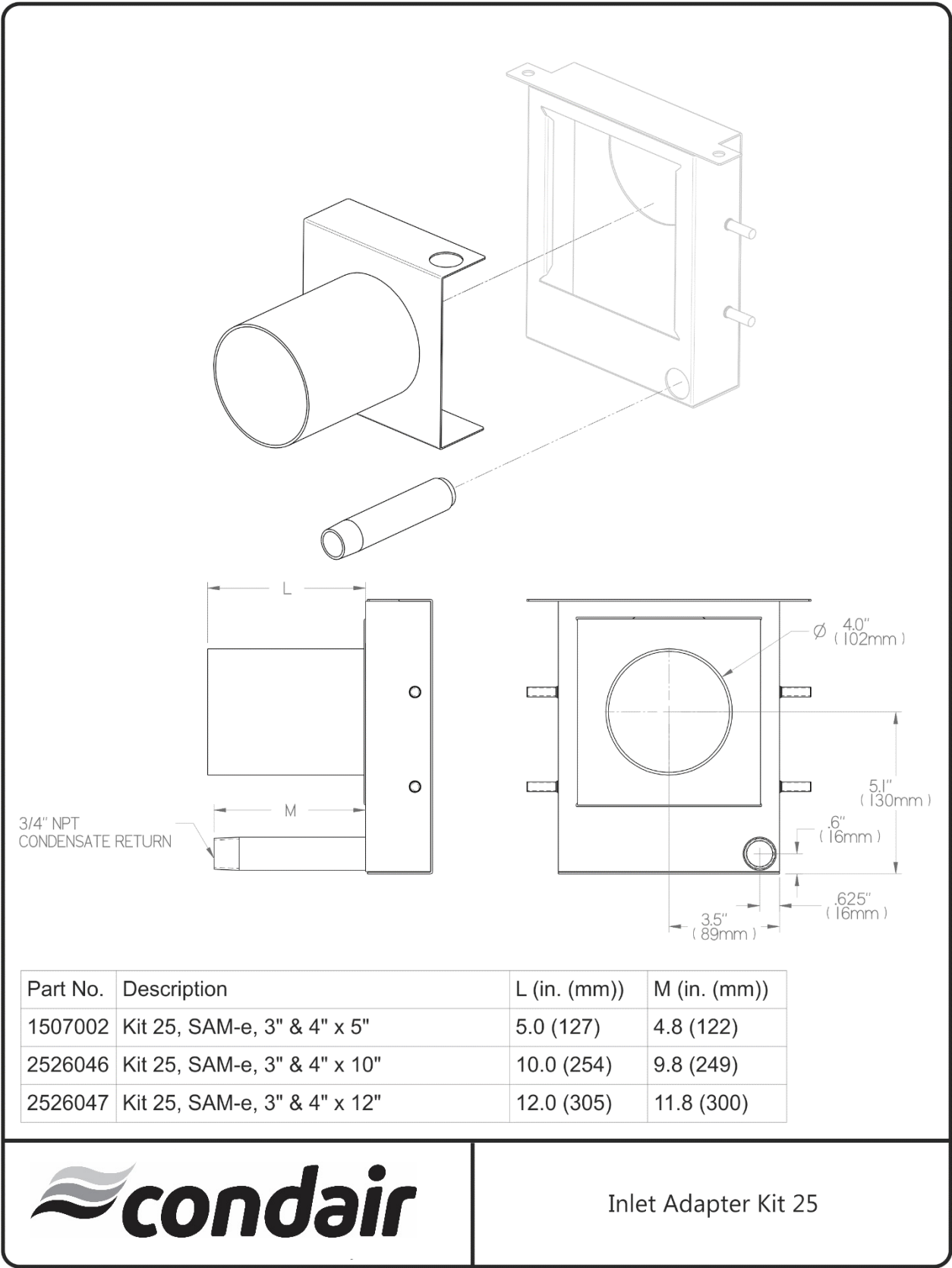
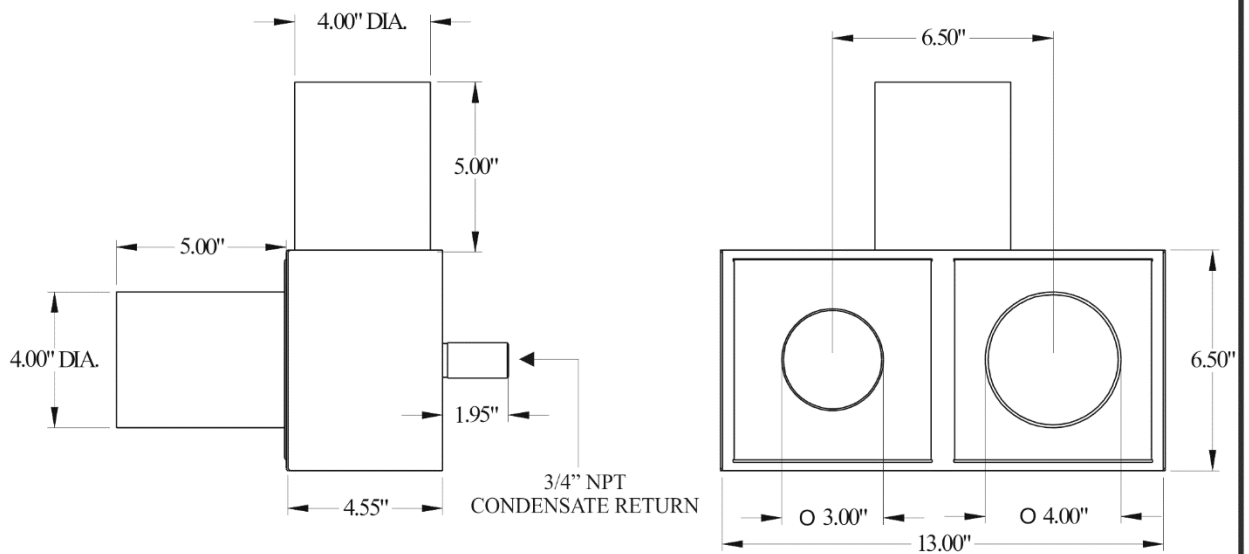
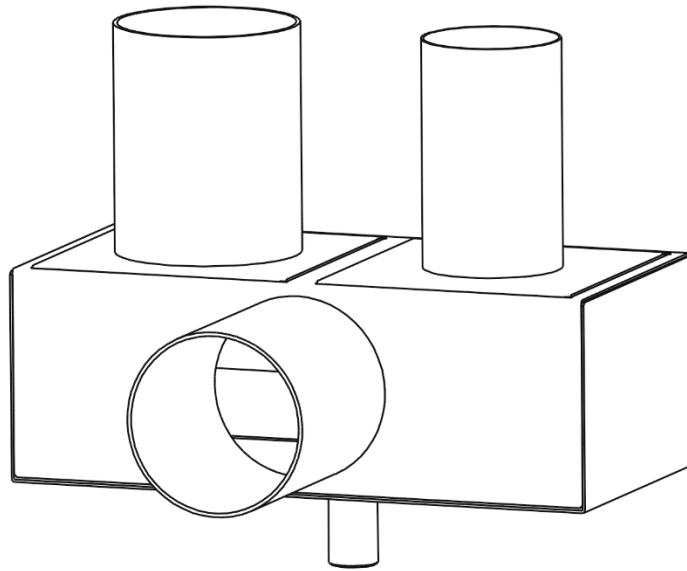
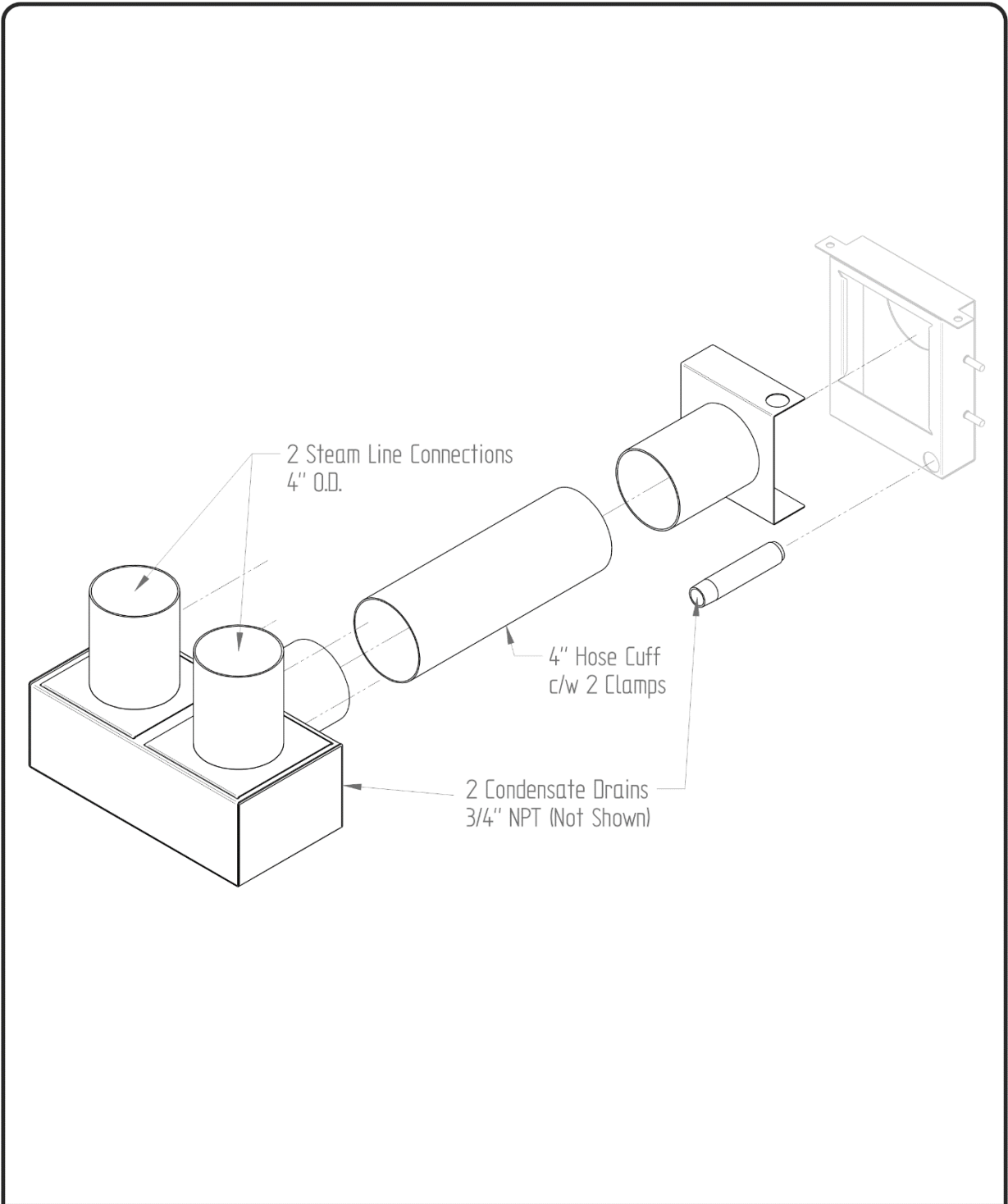


Figure 21: KIT 25 - Header and Adapter Configuration



Inlet Adapter Kit 25

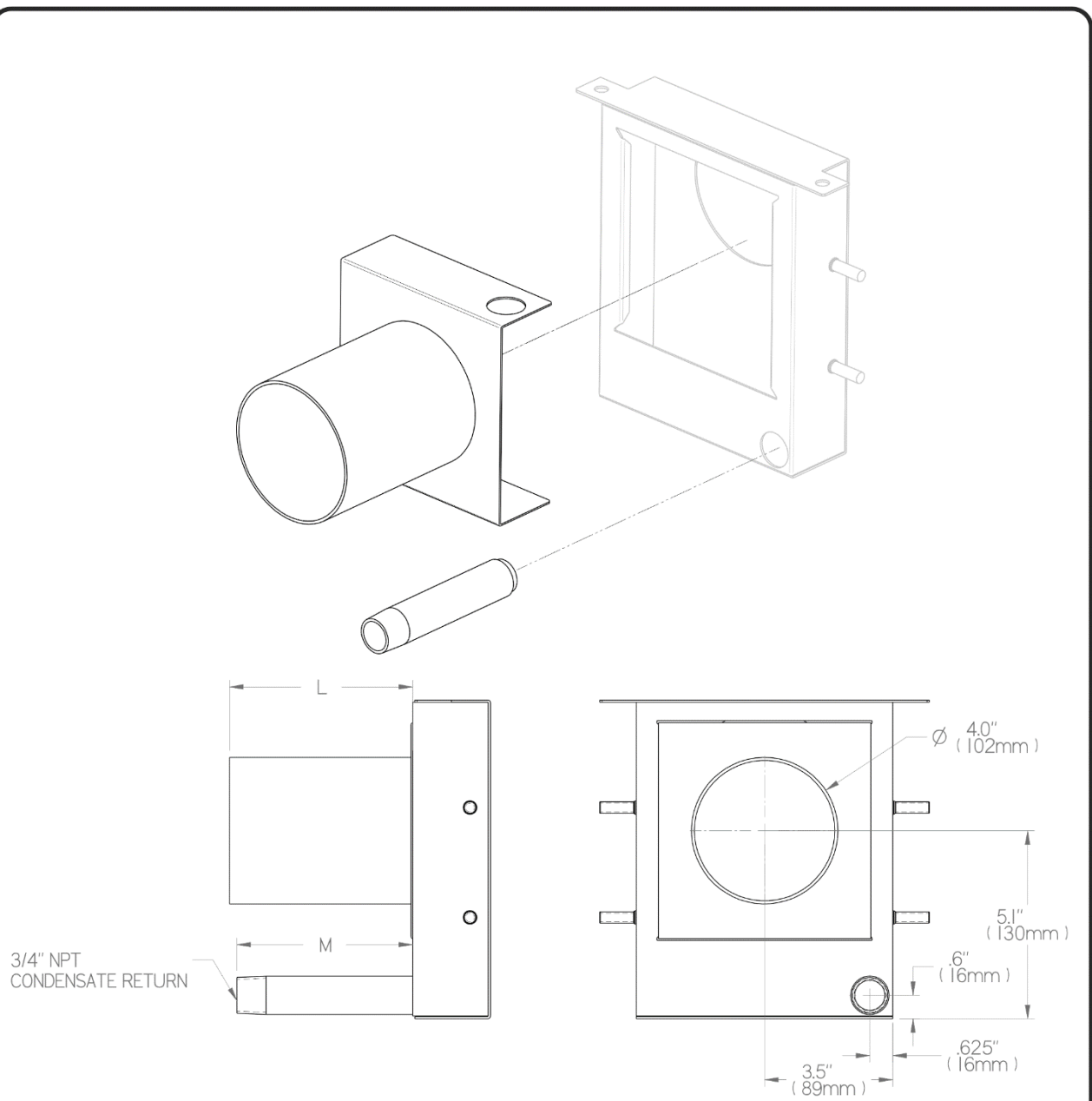
Figure 22: KIT 25 - Header and Adapter Configuration



Inlet Adapter Kit 26, Nortec SAM-e  
800 lbs/hr 2x4"

Figure 23: KIT 26 - Header and Adapter Configuration



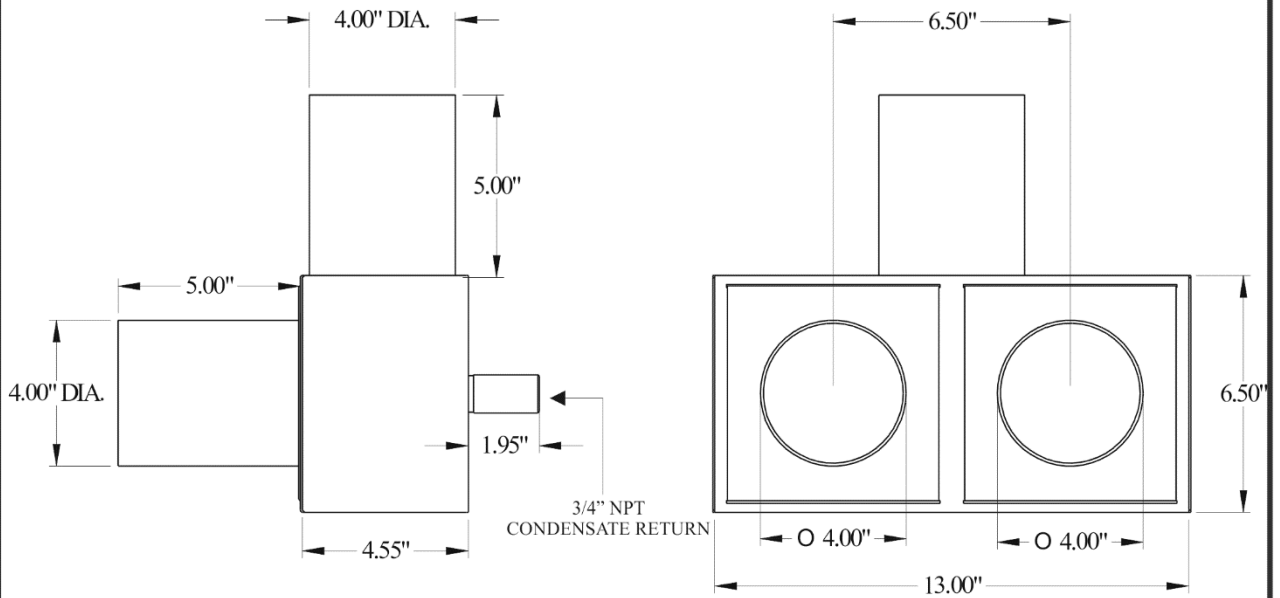
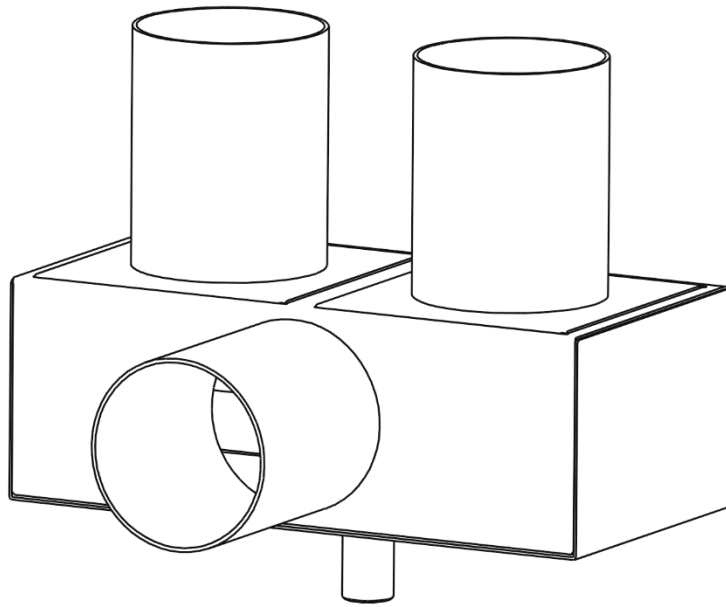


| Part No. | Description               | L (in. (mm)) | M (in. (mm)) |
|----------|---------------------------|--------------|--------------|
| 1507003  | Kit 26, SAM-e, 2x4" x 5"  | 5.0 (127)    | 4.8 (122)    |
| 2526048  | Kit 26, SAM-e, 2x4" x 10" | 10.0 (254)   | 9.8 (249)    |
| 2526049  | Kit 26, SAM-e, 2x4" x 12" | 12.0 (305)   | 11.8 (300)   |



Inlet Adapter Kit 26

Figure 24: KIT 26 - Header and Adapter Configuration



Inlet Adapter Kit 26

Figure 25: KIT 26 - Header and Adapter Configuration

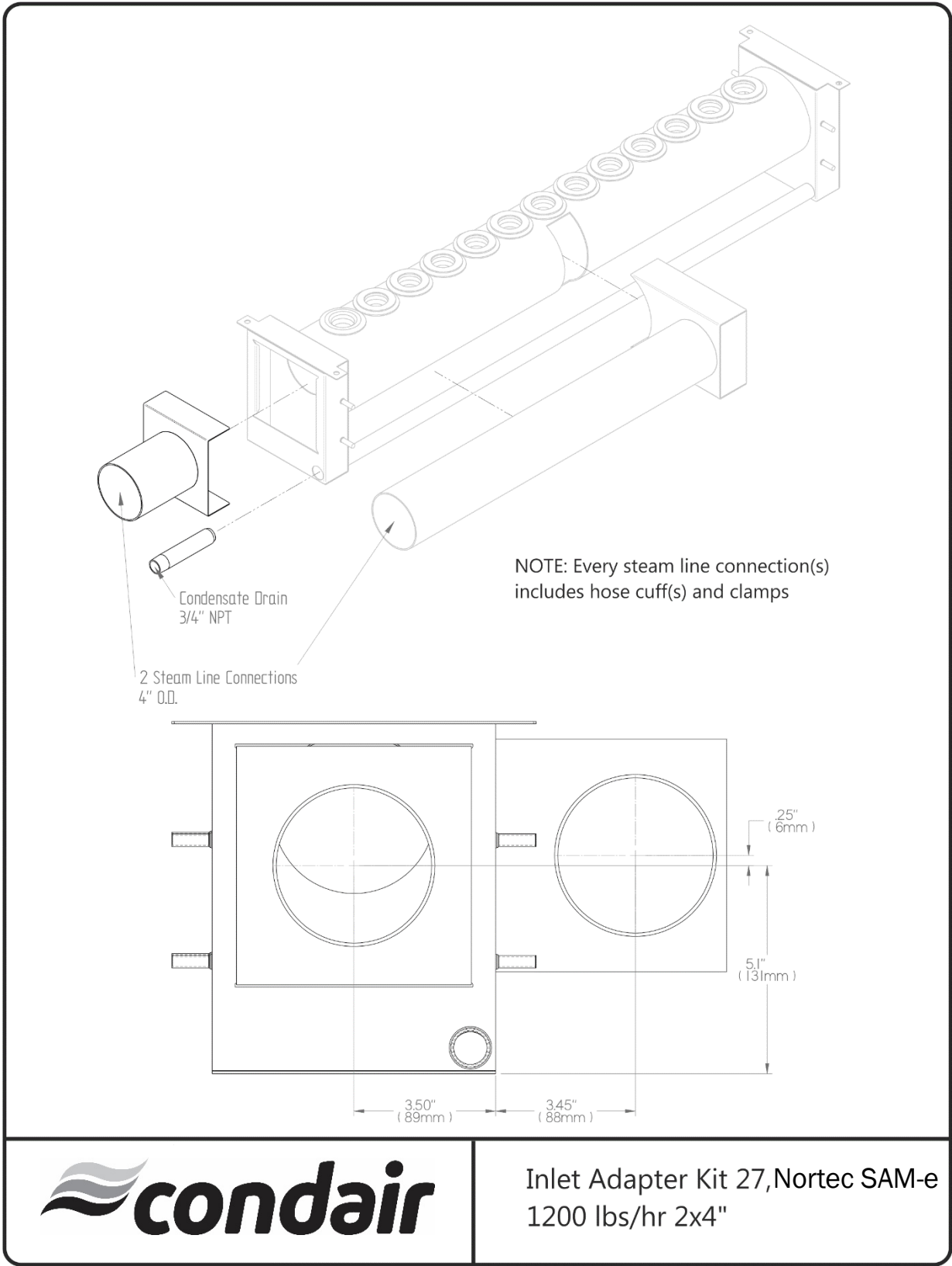
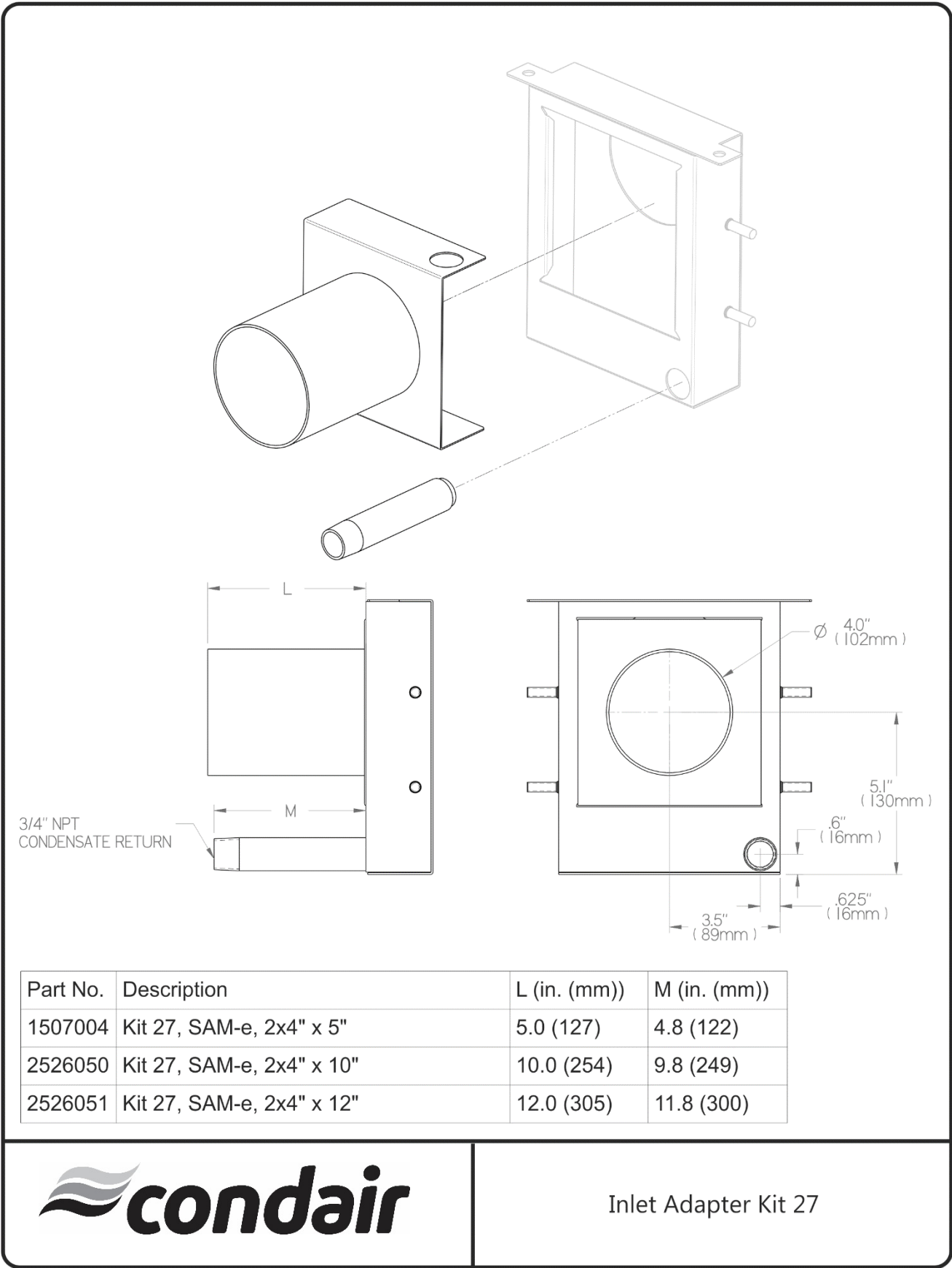
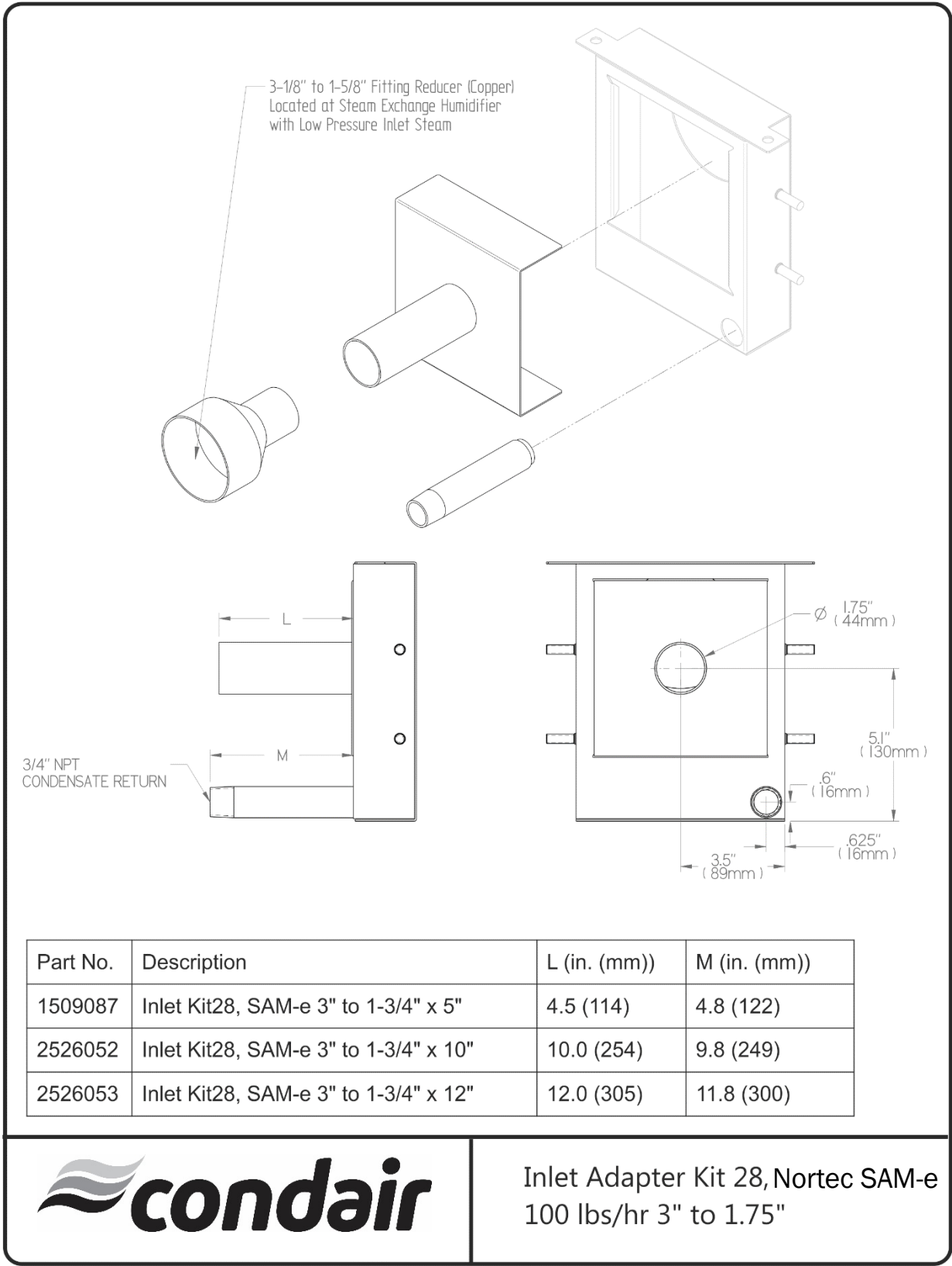


Figure 26: KIT 27 - Header and Adapter Configuration



Inlet Adapter Kit 27

Figure 27: KIT 27 - Header and Adapter Configuration



Inlet Adapter Kit 28, Nortec SAM-e  
100 lbs/hr 3" to 1.75"

Figure 28: KIT 28 - Header and Adapter Configuration

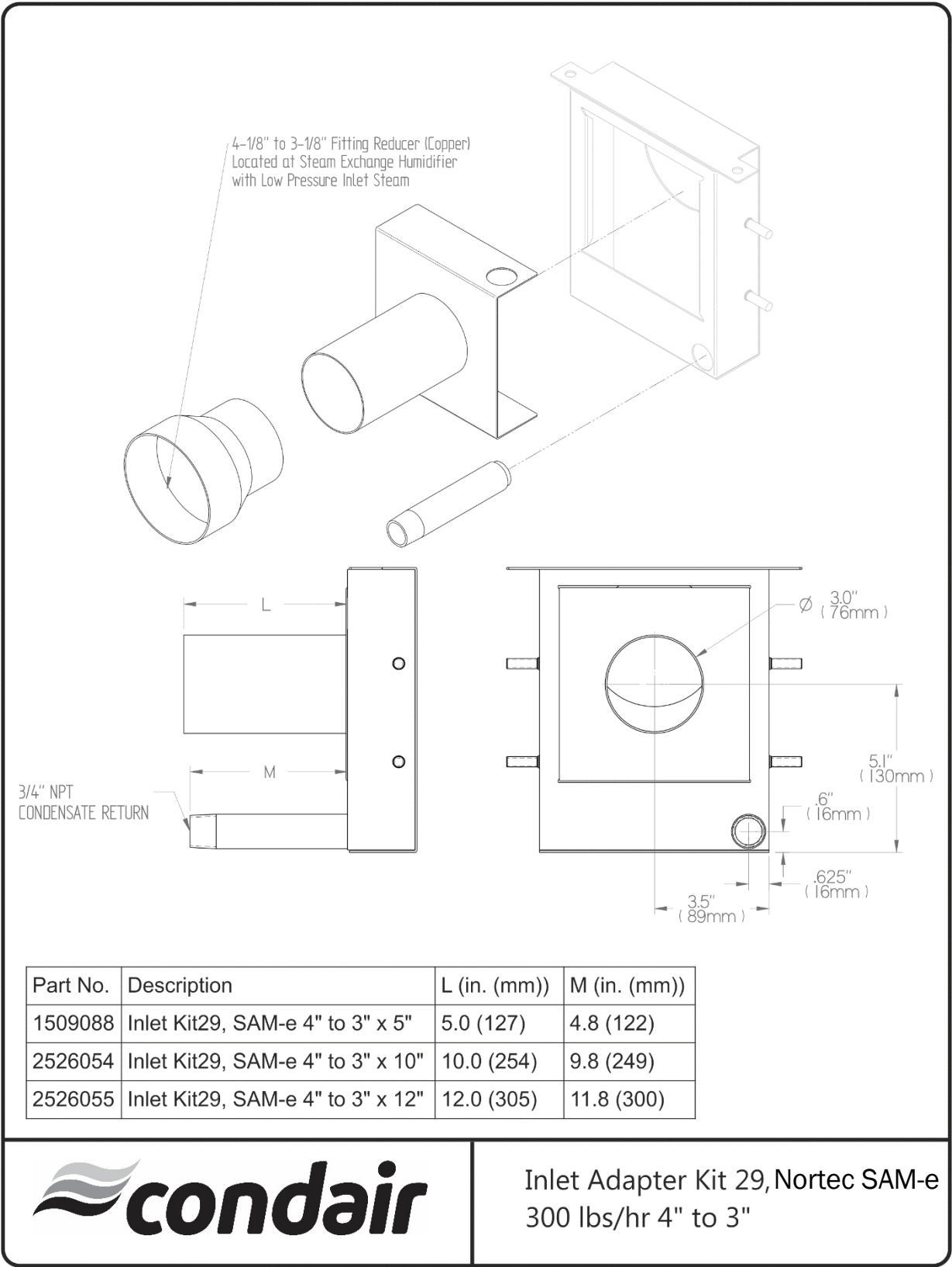
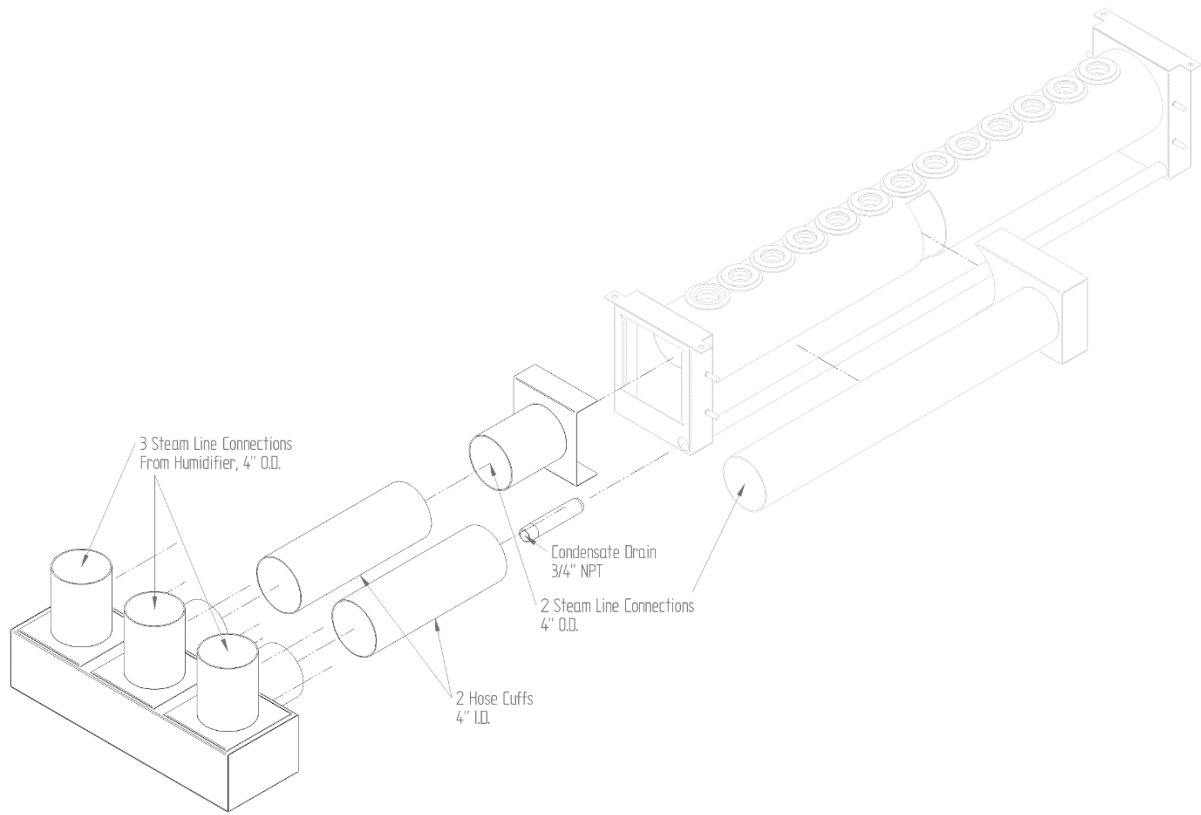


Figure 29: KIT 29 - Header and Adapter Configuration



NOTE: Every steam line connection(s) includes hose cuff(s) and clamps



Inlet Adapter Kit 30, Nortec SAM-e  
1200 lbs/hr 3x4"

Figure 30: KIT 30 - Header and Adapter Configuration

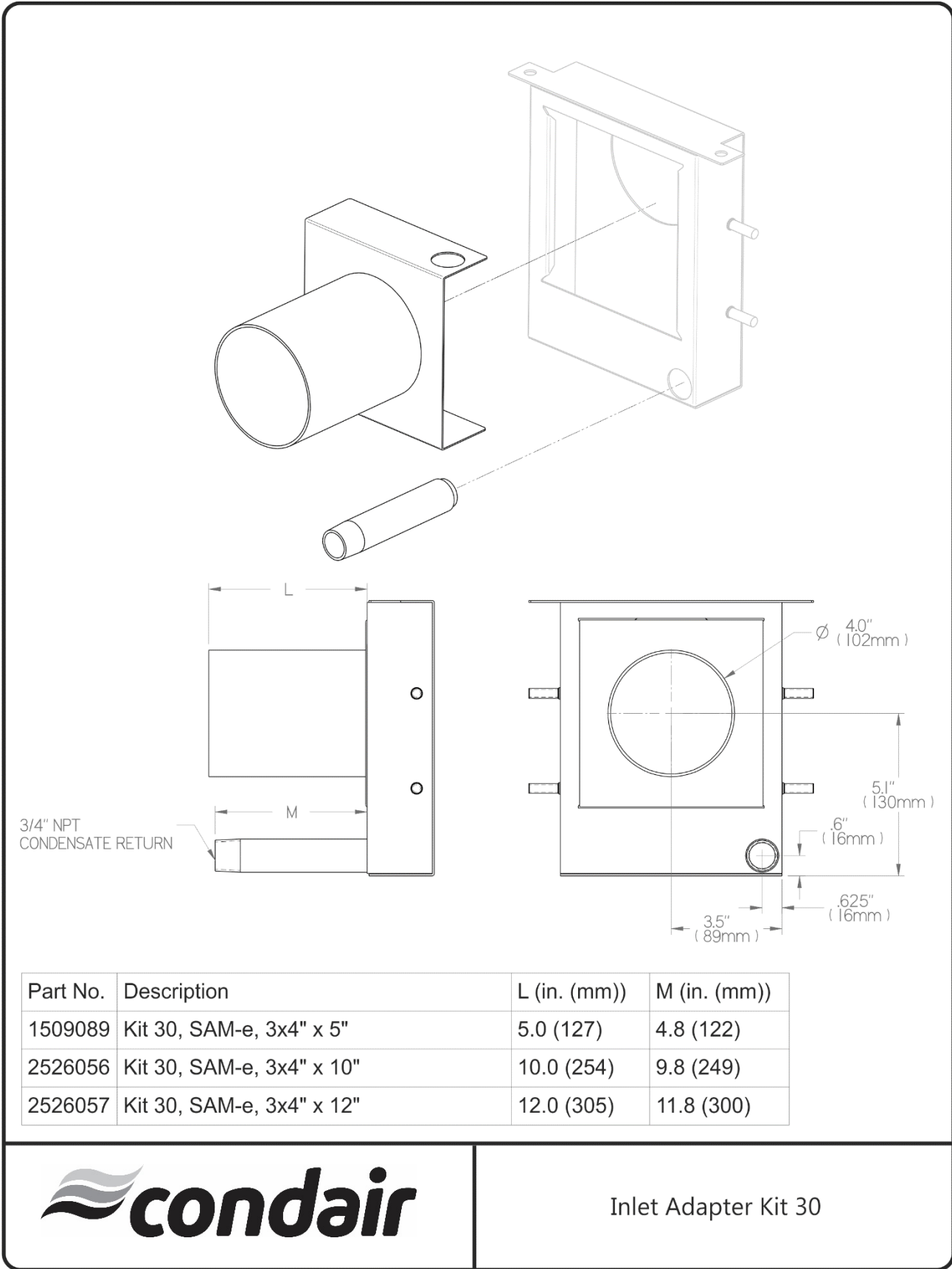
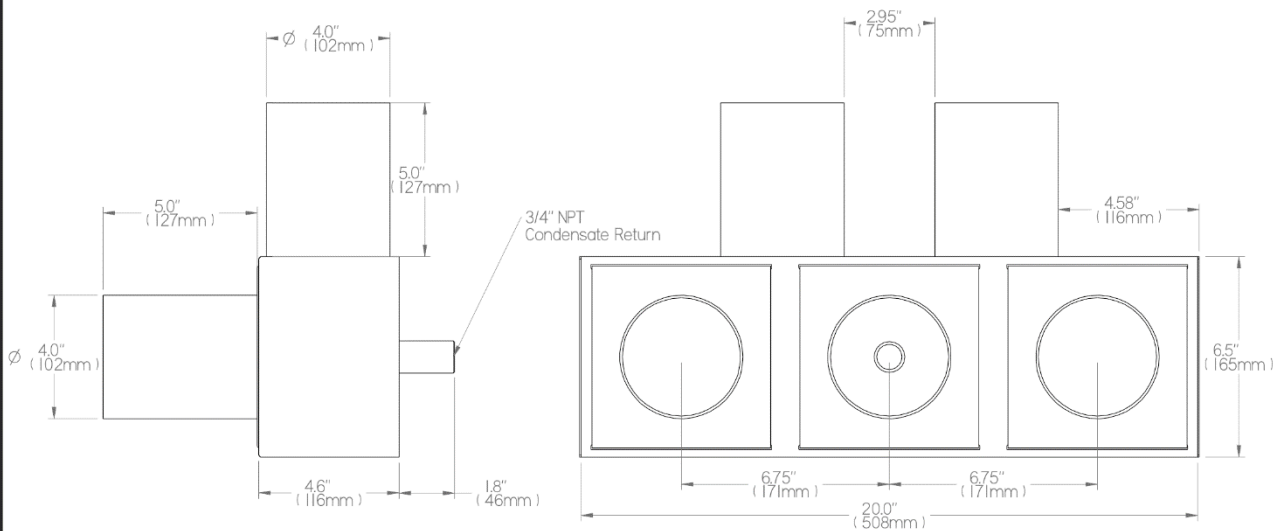
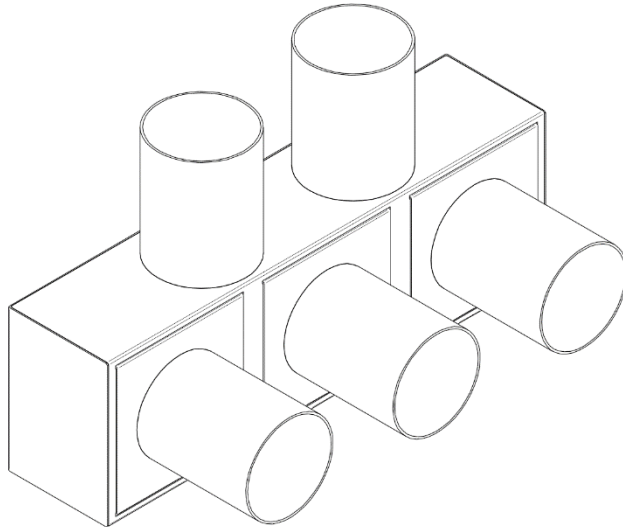


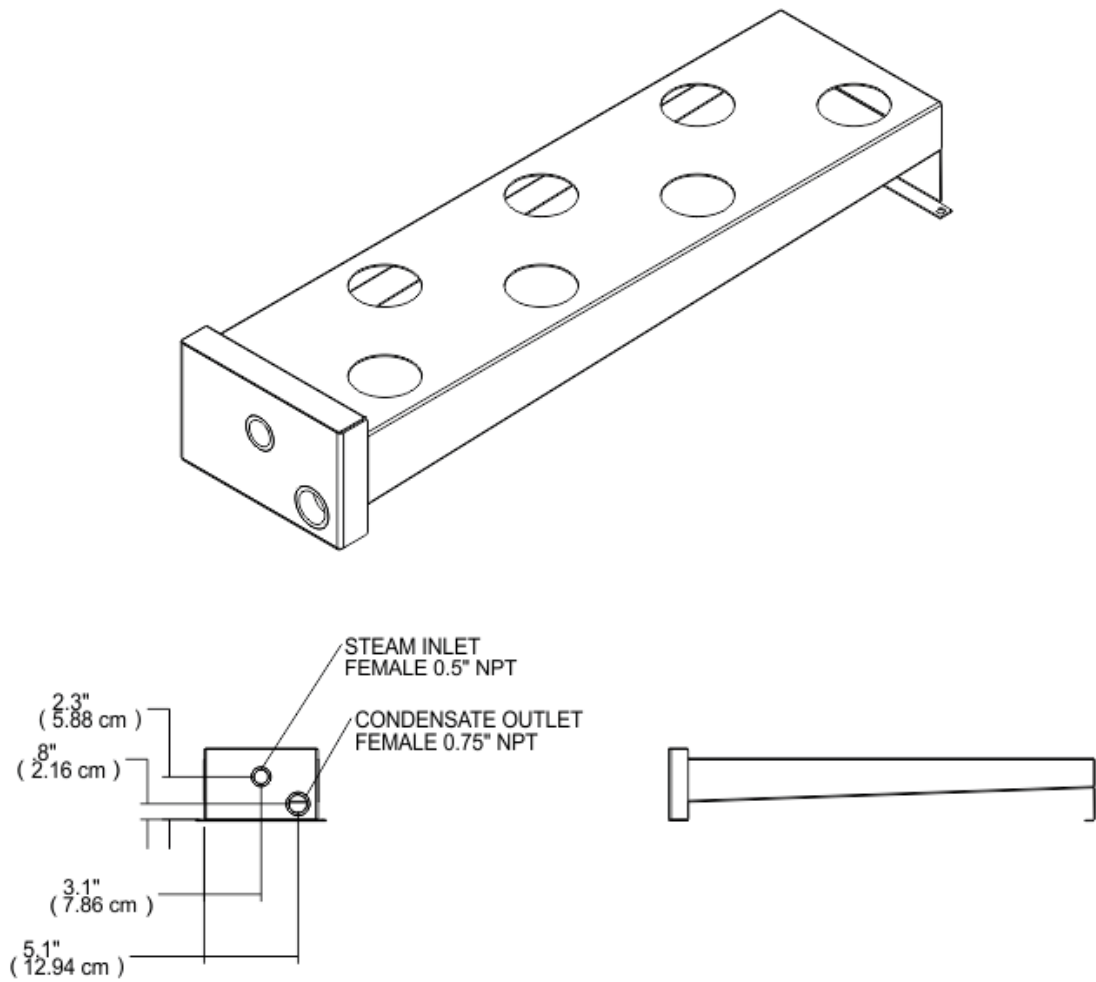
Figure 31: KIT 30 - Header and Adapter Configuration





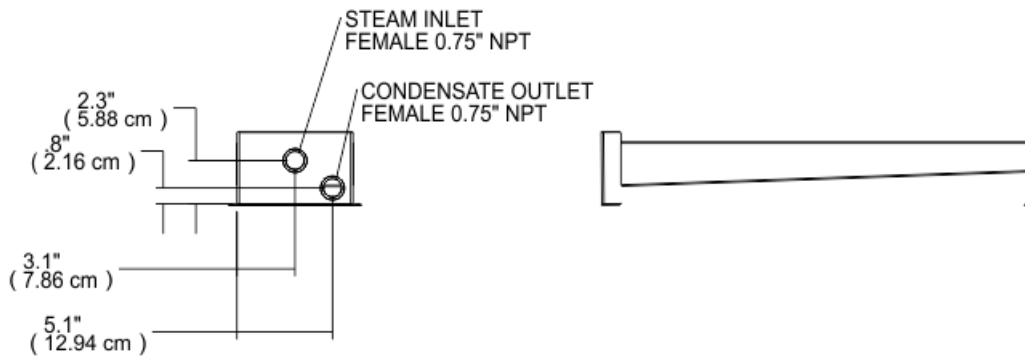
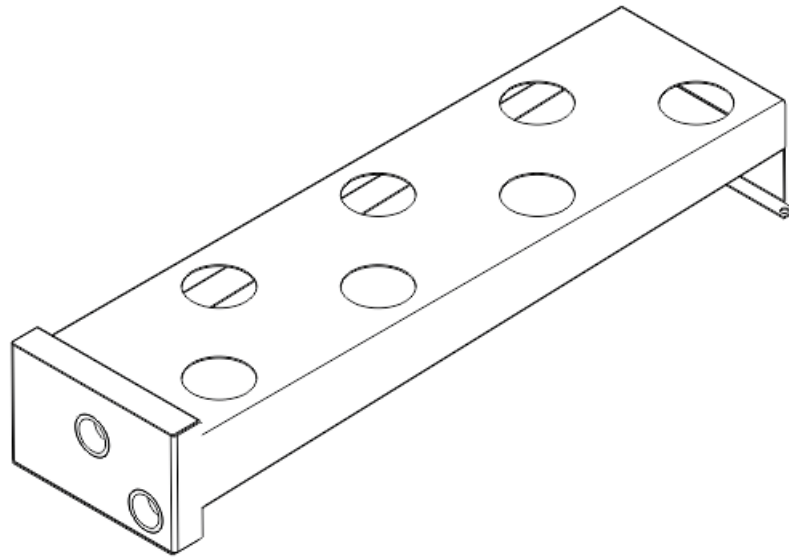
Inlet Adapter Kit 30

Figure 32: KIT 30 - Header and Adapter Configuration



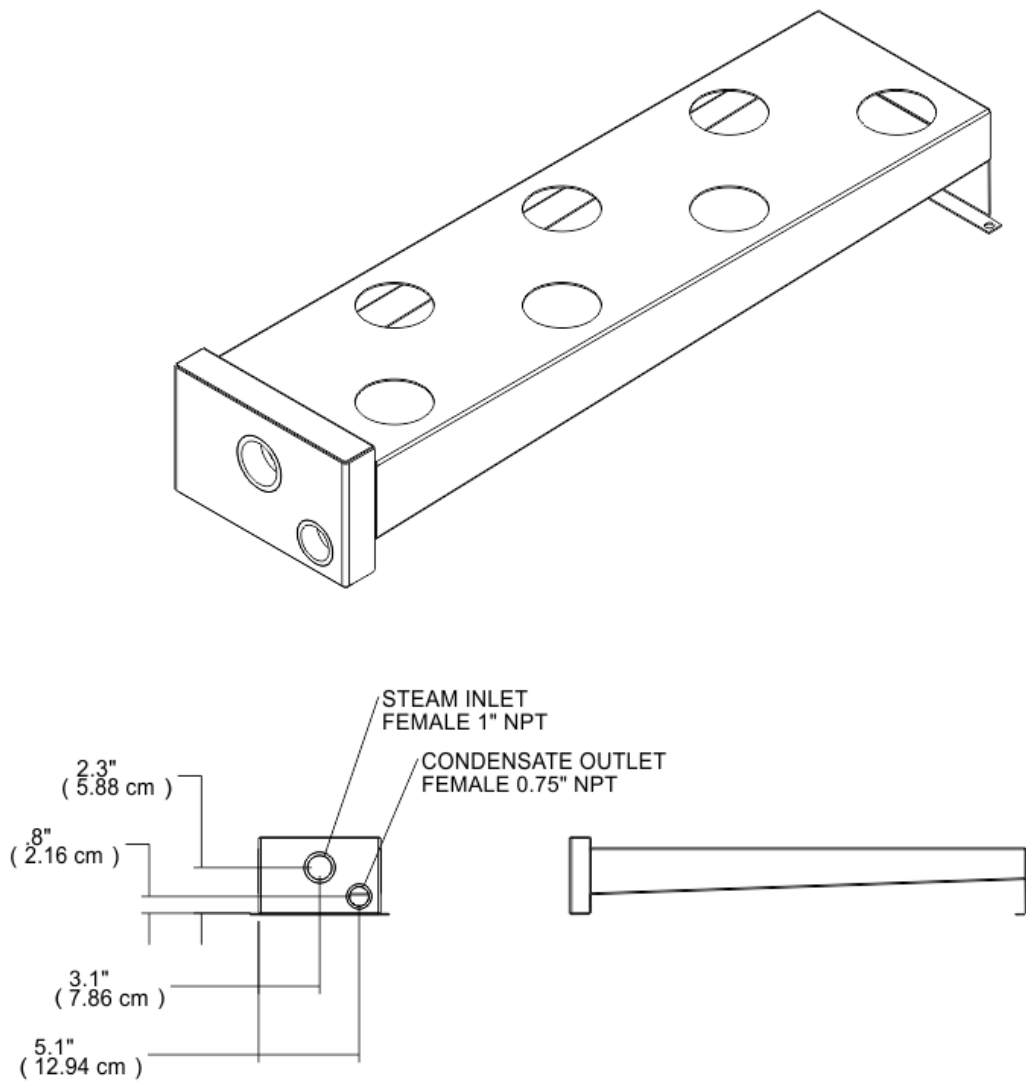
| Part No. | Description                                |
|----------|--|
| 2577686  | Header mini SAM-e 12", 3" center, 0.5" NPT |
| 2577698  | Header mini SAM-e 18", 3" center, 0.5" NPT |
| 2577710  | Header mini SAM-e 24", 3" center, 0.5" NPT |
| 2577692  | Header mini SAM-e 12", 6" center, 0.5" NPT |
| 2577704  | Header mini SAM-e 18", 6" center, 0.5" NPT |
| 2577716  | Header mini SAM-e 24", 6" center, 0.5" NPT |

**Figure 33: 0.5" NPT Nortec Mini SAM-e Header and Inlet Configuration**



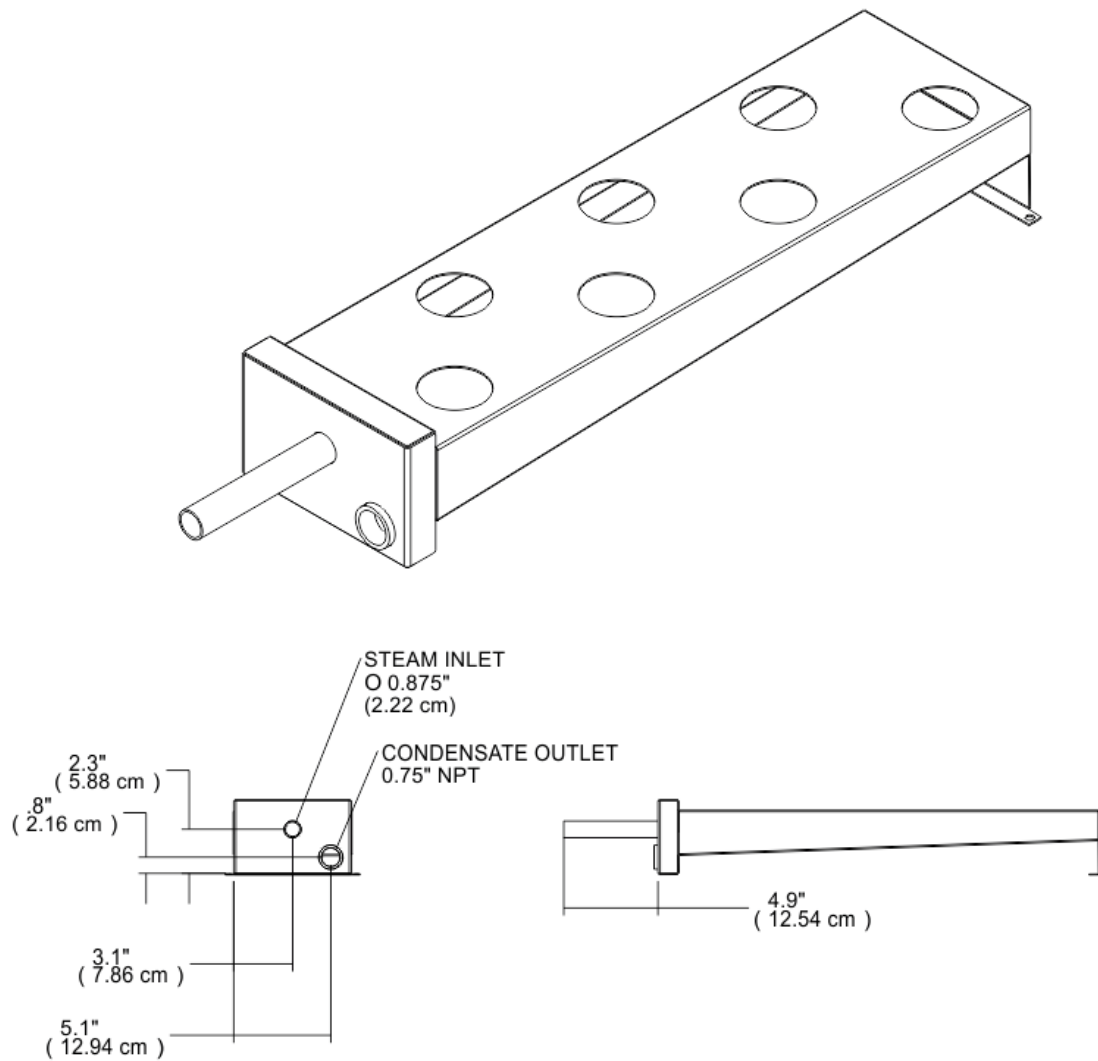
| Part No. | Description                                 |
|----------|---|
| 2577687  | Header mini SAM-e 12", 3" center, 0.75" NPT |
| 2577699  | Header mini SAM-e 18", 3" center, 0.75" NPT |
| 2577711  | Header mini SAM-e 24", 3" center, 0.75" NPT |
| 2577693  | Header mini SAM-e 12", 6" center, 0.75" NPT |
| 2577705  | Header mini SAM-e 18", 6" center, 0.75" NPT |
| 2577717  | Header mini SAM-e 24", 6" center, 0.75" NPT |

**Figure 34: 0.75" NPT Nortec Mini SAM-e Header and Inlet Configuration**



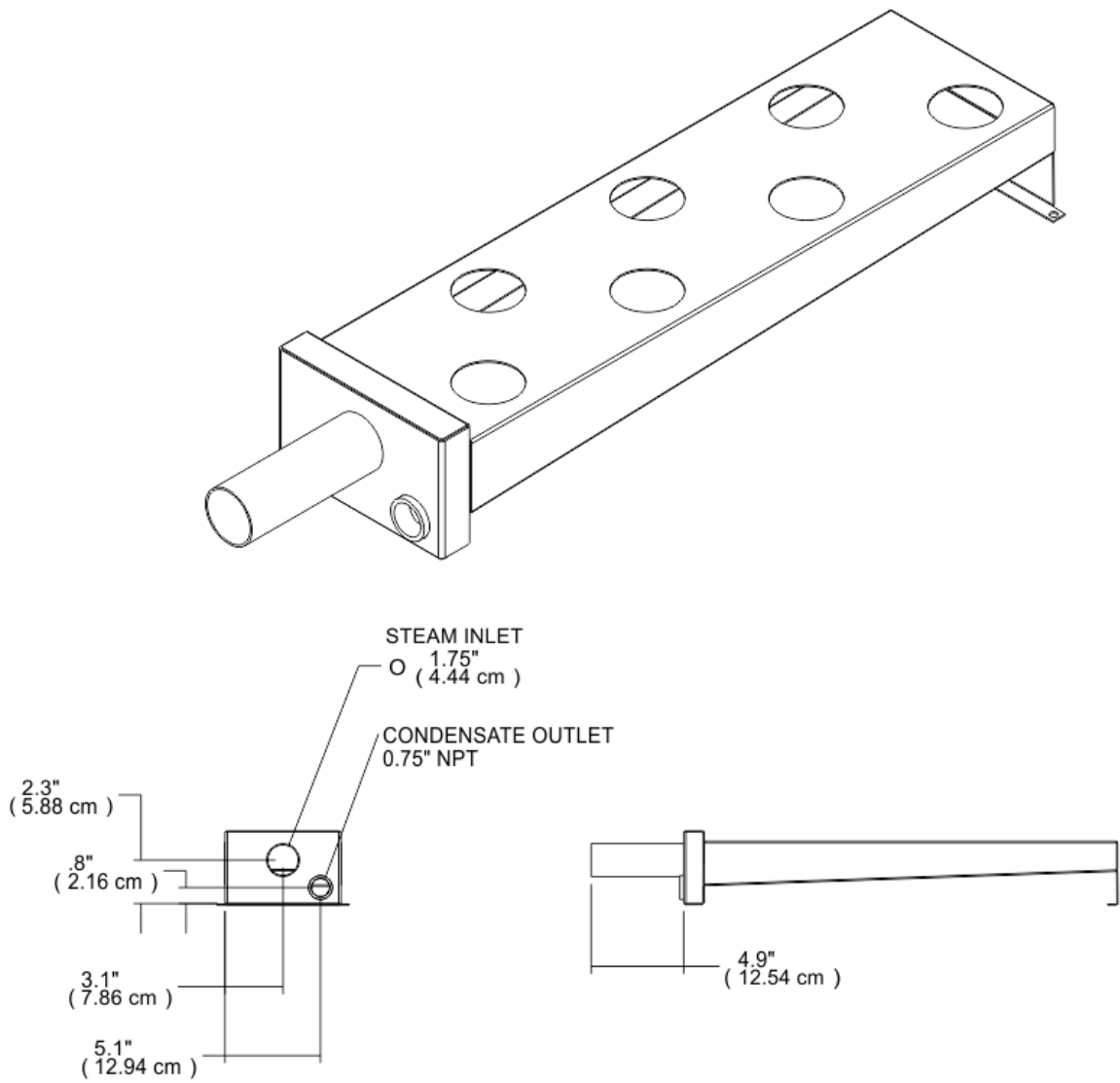
| Part No. | Description                              |
|----------|--|
| 2577688  | Header mini SAM-e 12", 3" center, 1" NPT |
| 2577700  | Header mini SAM-e 18", 3" center, 1" NPT |
| 2577712  | Header mini SAM-e 24", 3" center, 1" NPT |
| 2577694  | Header mini SAM-e 12", 6" center, 1" NPT |
| 2577706  | Header mini SAM-e 18", 6" center, 1" NPT |
| 2577718  | Header mini SAM-e 24", 6" center, 1" NPT |

**Figure 35: 1" NPT Nortec Mini SAM-e Header and Inlet Configuration**



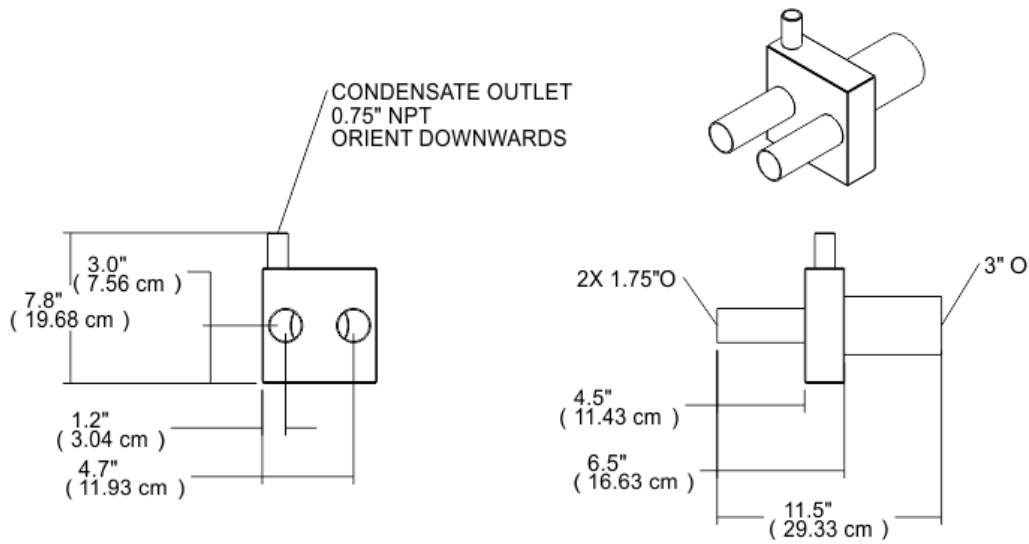
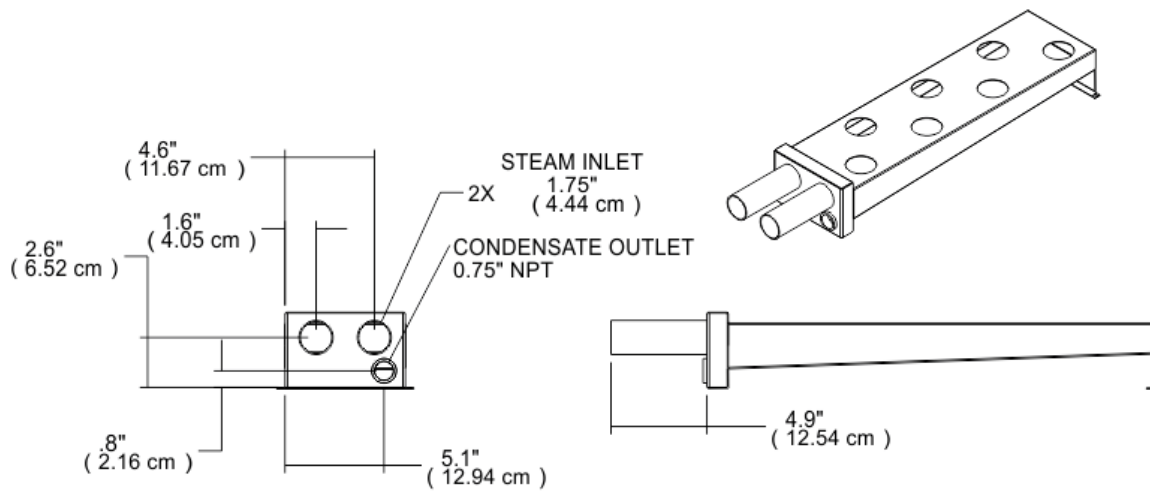
| Part No. | Description                                   |
|----------|---|
| 2577691  | Header mini SAM-e 12", 3" center, 0.875" tube |
| 2577703  | Header mini SAM-e 18", 3" center, 0.875" tube |
| 2577715  | Header mini SAM-e 24", 3" center, 0.875" tube |
| 2577697  | Header mini SAM-e 12", 6" center, 0.875" tube |
| 2577709  | Header mini SAM-e 18", 6" center, 0.875" tube |
| 2577721  | Header mini SAM-e 24", 6" center, 0.875" tube |

**Figure 36: 0.875" Nortec Mini SAM-e Header and Inlet Configuration**



| Part No. | Description                                  |
|----------|--|
| 2577689  | Header mini SAM-e 12", 3" center, 1.75" tube |
| 2577701  | Header mini SAM-e 18", 3" center, 1.75" tube |
| 2577713  | Header mini SAM-e 24", 3" center, 1.75" tube |
| 2577695  | Header mini SAM-e 12", 6" center, 1.75" tube |
| 2577707  | Header mini SAM-e 18", 6" center, 1.75" tube |
| 2577719  | Header mini SAM-e 24", 6" center, 1.75" tube |

**Figure 37: 1.75" Nortec Mini SAM-e Header and Inlet Configuration**



| Part No. | Description                               |
|----------|---|
| 2577889  | Header mini SAM-e 12", 3" center, 3" tube |
| 2577891  | Header mini SAM-e 18", 3" center, 3" tube |
| 2577893  | Header mini SAM-e 24", 3" center, 3" tube |
| 2577890  | Header mini SAM-e 12", 6" center, 3" tube |
| 2577892  | Header mini SAM-e 18", 6" center, 3" tube |
| 2577894  | Header mini SAM-e 24", 6" center, 3" tube |

**Figure 38: 3" Nortec Mini SAM-e Header and Inlet Configuration**

# Warranty

---

Condair Inc. and/or Condair Ltd. (hereinafter collectively referred to as THE COMPANY), warrant for a period of ten years after installation, that THE COMPANY's manufactured and assembled products, not otherwise expressly warranted (with the exception of the tube coupling seals, two years only), are free from defects in material and workmanship. No warranty is made against corrosion, deterioration, or suitability of substituted materials used as a result of compliance with government regulations.

THE COMPANY's obligations and liabilities under this warranty are limited to furnishing replacement parts to the customer, F.O.B. THE COMPANY's factory, providing the defective part(s) is returned freight prepaid by the customer. Parts used for repairs are warranted for the balance of the term of the warranty on the original humidifier or 90 days, whichever is longer.

The warranties set forth herein are in lieu of all other warranties expressed or implied by law. No liability whatsoever shall be attached to THE COMPANY until said products have been paid for in full and then said liability shall be limited to the original purchase price for the product. Any further warranty must be in writing, signed by an officer of THE COMPANY.

THE COMPANY's limited warranty on accessories, not of the companies manufacture, such as controls, humidistats, pumps, etc. is limited to the warranty of the original equipment manufacturer from date of original shipment of humidifier.

THE COMPANY makes no warranty and assumes no liability unless the equipment is installed in strict accordance with a copy of the catalog and installation manual in effect at the date of purchase and by a contractor approved by THE COMPANY to install such equipment.

THE COMPANY makes no warranty and assumes no liability whatsoever for consequential damage or damage resulting directly from misapplication, incorrect sizing or lack of proper maintenance of the equipment.

THE COMPANY makes no warranty and assumes no liability whatsoever for damage resulting from freezing of the humidifier, supply lines, drain lines, or steam distribution systems.

THE COMPANY makes no warranty and assumes no liability whatsoever for equipment that has failed due to ambient conditions when installed in locations having climates below 14 °F (-10 °C) during January or above 104 °F (40 °C) during July.

THE COMPANY retains the right to change the design, specification and performance criteria of its products without notice or obligation.



**U.S.A.**  
2700 90th Street,  
Sturtevant, WI 53177

835 Commerce Park Drive,  
Ogdensburg, NY 13669-2209

**CANADA**  
2740 Fenton Road  
Ottawa, Ontario K1T 3T7

TEL: 1.866.667.8321  
EMAIL: [na.info@condair.com](mailto:na.info@condair.com)  
WEBSITE: [www.condair.com](http://www.condair.com)



 **condair**