Technical Data and Installation Instructions

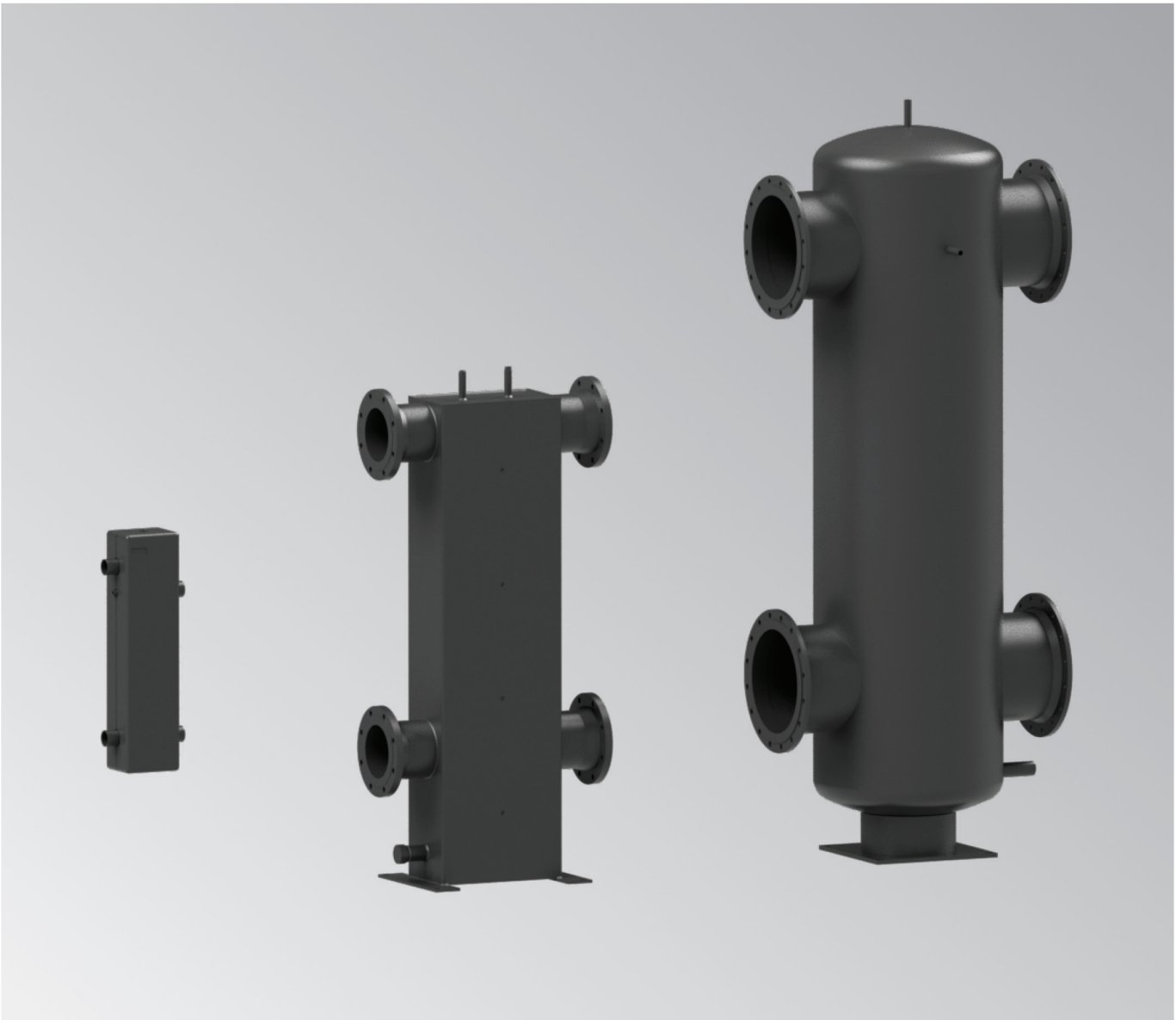
for use by heating contractor

Low-loss headers

Steel chamber with supply and return connections for both boiler and system loop

For Residential and Commercial application in conjunction with Viessmann boilers

Low-Loss Headers



5848 037 - 06 12/2024

Please file in Service Binder

Safety, Installation and Warranty Requirements

Please ensure that these instructions are read and understood before commencing installation. Failure to comply with the instructions listed below and details printed in this manual can cause product/property damage, severe personal injury, and/or loss of life. Ensure all requirements below are understood and fulfilled (including detailed information found in manual subsections).

- Product documentation
  Read all applicable documentation before commencing installation. Store documentation near boiler in a readily accessible location for reference in the future by service personnel.

  For a listing of applicable literature, please see section entitled “Important Regulatory and Safety Requirements”.

- Licensed professional heating contractor
  The installation, adjustment, service and maintenance of this equipment must be performed by a licensed professional heating contractor.

  Please see section entitled Safety and “Important Regulatory and Installation Requirements”.

- Advice to owner
  Once the installation work is complete, the heating contractor must familiarize the system operator/ ultimate owner with all equipment, as well as safety precautions/requirements, shutdown procedure, and the need for professional service annually before the heating season begins.

- Warranty
  Information contained in this and related product documentation must be read and followed. Failure to do so renders the warranty null and void.

Important Regulatory and Installation Requirements

Approvals
Viessmann boilers, burners and controls are approved for sale in North America by CSA International.

Codes
The installation of this unit shall be in accordance with local codes. In the absence of local codes, use:

- CSA C22.1 Part 1 and/or local codes in Canada
- National Electrical Code ANSI/NFPA 70 in the U.S.

Always use latest editions of codes.
The heating contractor must comply with the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1 where required by the authority having jurisdiction.

Working on the equipment
The installation, adjustment, service, and maintenance of this product must be done by a licensed professional heating contractor who is qualified and experienced in the installation, service, and maintenance of hot water boilers. There are no user serviceable parts on the boiler, burner, or control.

▶ Please carefully read this manual prior to attempting installation. Any warranty is null and void if these instructions are not followed.

For information regarding other Viessmann System Technology componentry, please reference documentation of the respective product.

We offer frequent installation and service seminars to familiarize our partners with our products. Please inquire.

▶ The completeness and functionality of field supplied electrical controls and components must be verified by the heating contractor. These include low water cut-offs, flow switches (if used), staging controls, pumps, motorized valves, air vents, thermostats, etc.

Table of Contents

Safety

General Information

Installation

5848 037 - 06

About these Installation Instructions

Take note of all symbols and notations intended to draw attention to potential hazards or important product information.

WARNING

Warnings draw your attention to the presence of potential hazards or important product information.

▶ Indicates an imminently hazardous situation which, if not avoided, could result in death, serious injury or substantial product/property damage.

CAUTION

Cautions draw your attention to the presence of potential hazards or important product information.

▶ Indicates an imminently hazardous situation which, if not avoided, may result in minor injury or product / property damage.

IMPORTANT

▶ Helpful hints for installation, operation or maintenance which pertain to the product.

▶

▶ This symbol indicates to note additional information

▶ This symbol indicates that other instructions must be referenced.

Product Description

Description

When used in conjunction with the Viessmann boilers, the low-loss header acts as a hydraulic break, decoupling boiler and system circuits from each other.

It is recommended to use the low-loss header in applications in which the total system flow rate exceeds the maximum boiler flow rate.

The temperature sensor well located at the top of the low-loss header ensures low return temperatures to the boilers, at all times, increasing operational efficiency.

In addition, the low-loss header helps eliminate air and debris from the heating system.

Low-loss headers

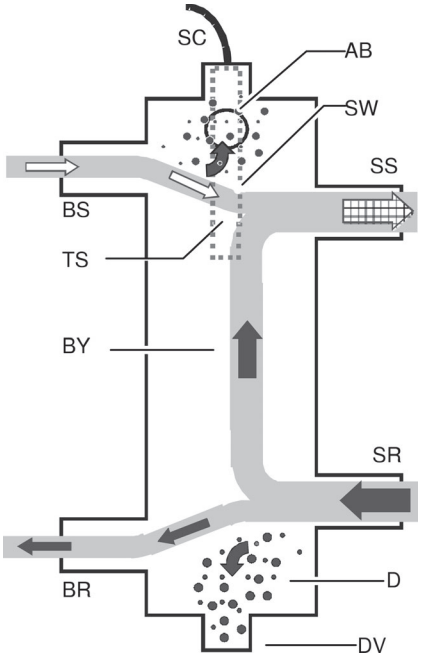
The benefits at a glance:

- To decouple high flow rate systems from the boiler loop.
- Enables constant flow through boiler.
- Avoids flow problems in secondary heating circuits.
- Promotes boiler condensation when used with condensing boilers.
- Protect boiler heat exchanger.
- Helps eliminate air, sediment, and debris from the heating system.
- Stand-by losses minimized by highly effective foamed in place or mineral wool insulation (optional accessory).
- Used as a separation point between boiler and system loop for troubleshooting purposes.

When to use a low-loss header:

- When the system flow rate exceeds the maximum boiler flow rate.
- When the boiler flow rate exceeds the maximum system flow rate (usually in multiple boiler systems with a low system $\triangle t$).

Principle of Operation



Legend
AB Air Bleed
BR Boiler Return
BS Boiler Supply
BY Bypass (with laminar flow)
D Debris
DV Drain Valve
SC Sensor Cable
SR System Return
SS System Supply
TS Viessmann Temperature Sensor
SW Sensor Well

The temperature sensor connection [TS] typically located at the top of the low-loss header ensures low return temperatures to the boiler at all times and increases operational efficiency.

In addition, the low-loss header helps eliminate air and debris [D] from the heating system.

See diagram on the left for an illustration of the principle of operation.

Product may not look exactly as illustrated.

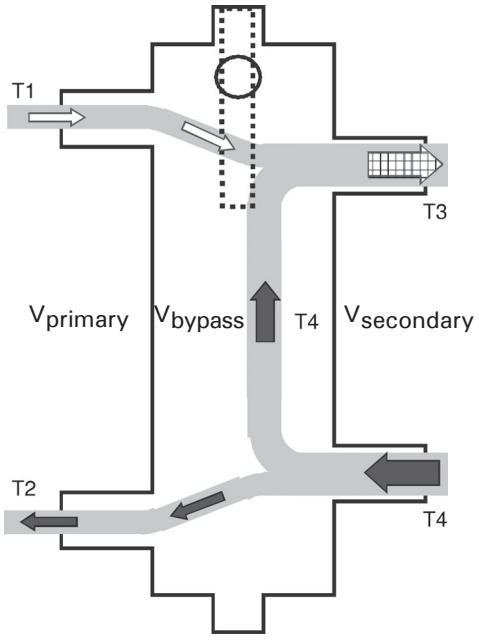
IMPORTANT

Use only a Viessmann low-loss header supplied temperature sensor to guarantee a functional system.

IMPORTANT

When installing a low-loss header, system mixed supply temperature (T3) must be calculated as follows:

$$T3 = \frac{T1 \times V_{primary} + T4\ V_{bypass}}{V_{secondary}}$$



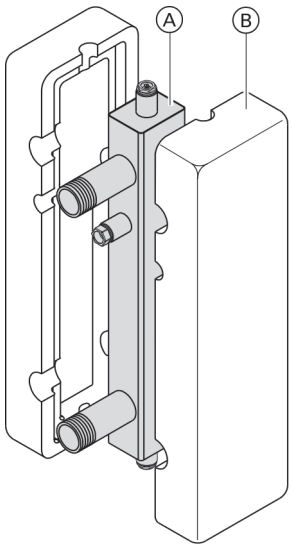
Legend
T1 Boiler supply temperature
T2 Boiler return temperature
T3 System supply temperature
T4 System return temperature
$V_{primary}$ Boiler circuit flow rate
$V_{secondary}$ Heating circuit flow rate
V_{bypass} Bypass flow rate
$Q_{primary}$ Heat supplied by boiler
$Q_{secondary}$ Heat consumed by system

$V_{primary} < V_{secondary}$
$T1 > T3$
$T2 = T4$
$Q_{primary} = Q_{secondary}$

$T1 \leq 167°F\ (75°C)$
$V_{secondary} = V_{primary} + V_{bypass}$

5848 037 - 06

Product Information



Legend

Ⓐ Low-loss header 80/60 or 120/80

Ⓑ Insulation (included)

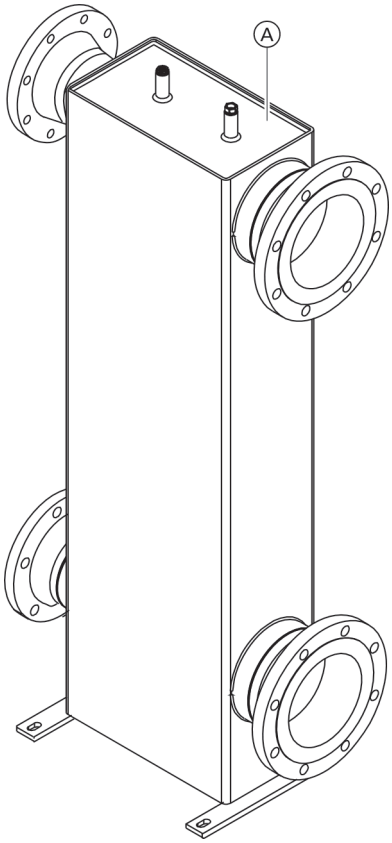
IMPORTANT

For all multi-Vitodens installations using a low-loss distribution manifold, refer to the low-loss header information in the multiple-boiler low-loss distribution manifold installation instructions.

The low-loss header is available in the following sizes. Select the size based on the maximum system flow rate of your application.

LLH Model No.	Maximum system flow rate GPM (L/min)
80/60	19.5 (74)
120/80	35.2 (133)

Note: Refer to the specific application guide in the boiler technical data manual.



Legend

Ⓐ Low-loss header 160/80 through to 500/300

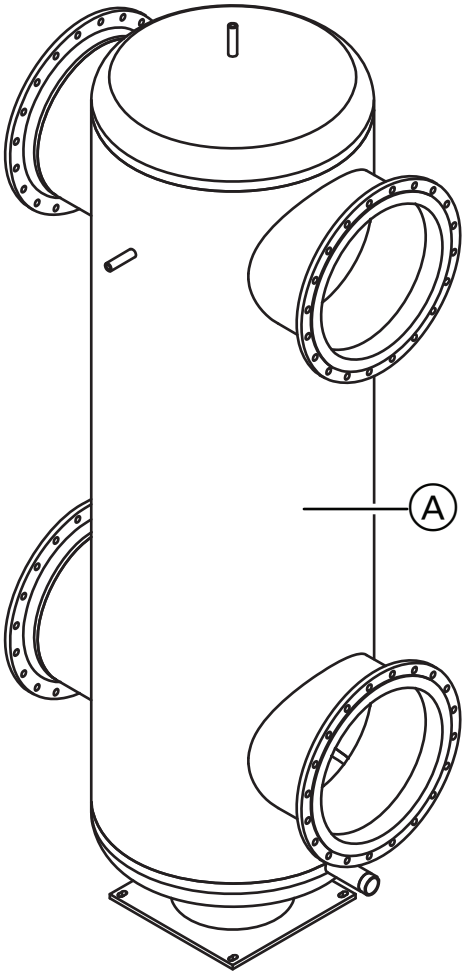
Ⓑ Insulation not shown (optional)

The low-loss header is available in the following sizes. Select the size based on the maximum system flow rate of your application.

LLH Model No.	Maximum system flow rate GPM (L/min)
160/80	44 (167)
200/120	80 (303)
250/150	119 (450)
300/200	189 (715)
400/200	251 (950)
450/250	374 (1416)
500/300	484 (1832)

Note: Contact your Viessmann representative for multi-boiler and commercial product applications.

Product Information



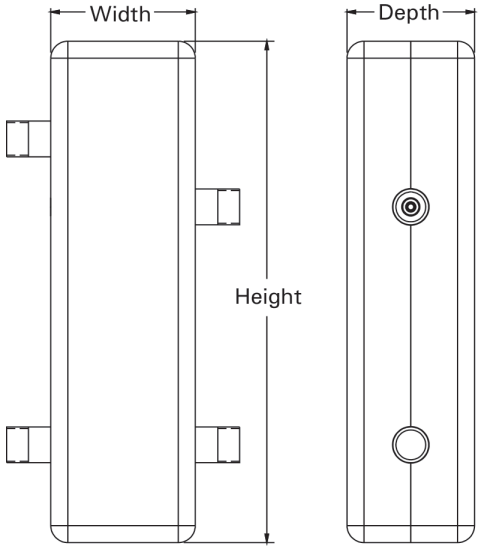
Legend
Ⓐ Low-loss header 12/20 through to 20/32

The low-loss header is available in the following sizes. Select the size based on the maximum system flow rate of your application.

LLH Model No.	Maximum system flow rate GPM (L/min)
12/20	947 (3584)
14/24	1541 (5833)
16/24	1541 (5833)
16/28	1981 (7498)
20/32	2642 (10001)

Note: Contact your Viessmann representative for multi-boiler and commercial product applications.

Description (Models 80/60 and 120/80)



Low-loss header 80/60 and 120/80 (with insulation)

Standard equipment

Models 80/60 and 120/80:

- Sensor well tapping, ½ in. (c/w sensor well)
- Air bleed tapping, ½ in. (c/w bleed valve)
- Drain/flush tapping, ½ in. plug
- NPT threaded connections
- Insulation

Low-loss header temperature sensors

Note: No temperature sensor is used with the Vitodens 100 boiler. Temperature sensor for all other boilersmust be purchased separately (if required - optional accessory).

Insulation

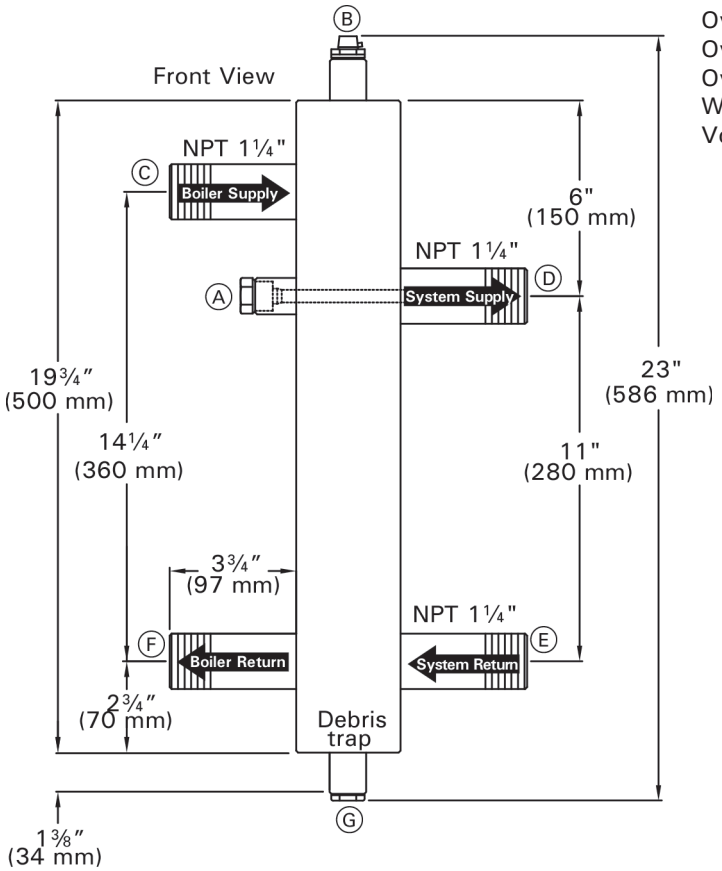
IMPORTANT

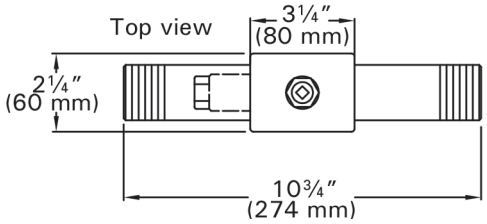
If the standard low-loss header insulation is being installed, add extra clearance between the back of the low loss header and the finished wall.

Insulation dimensions

Model #	Depth in. (mm)	Width in. (mm)	Height in. (mm)
80/60	5⅜ (135)	6 (155)	22⅝ (575)
120/80	7¼ (183)	8¾ (223)	35⅝ (905)

Dimensions (Model 80/60)





Low-loss header dimensions

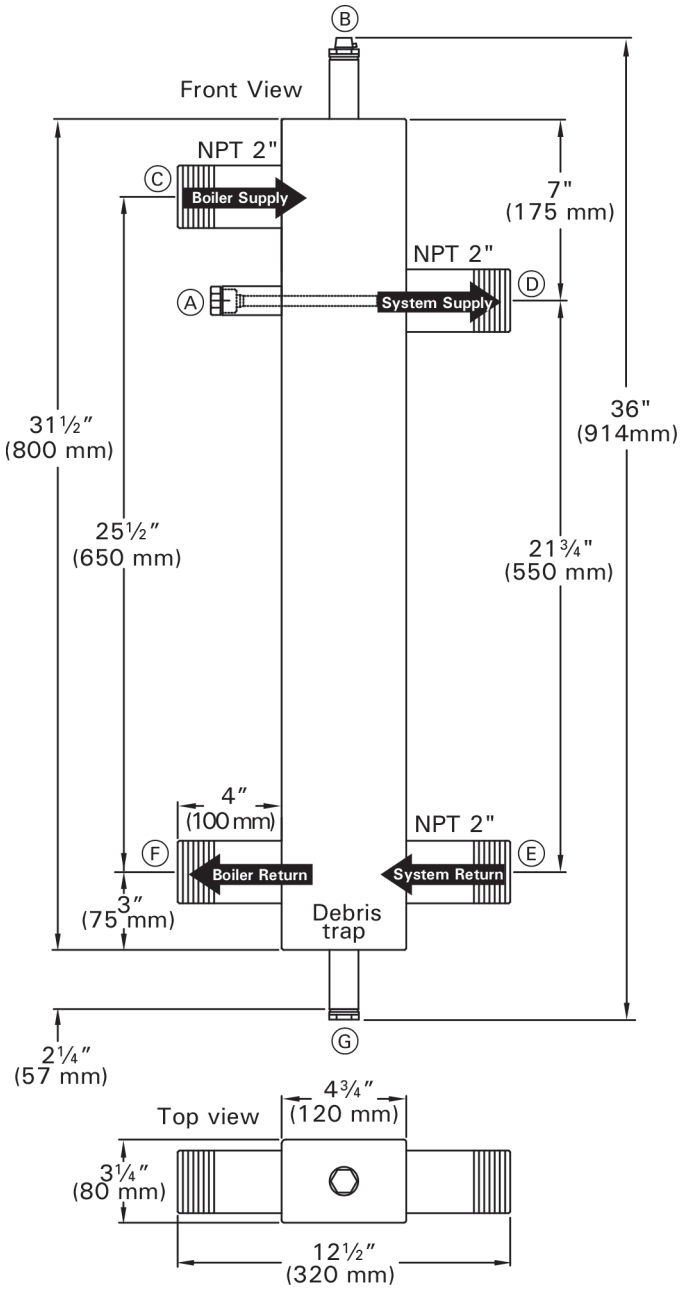
Overall depth	2¼ in. (60 mm)
Overall width	10¾ in. (274 mm)
Overall height	23 in. (586 mm)
Weight (dry)	15.4 lb (7 kg)
Volume	0.5 USG (2 L)

Legend

Ⓐ Sensor well, 150 mm
Ⓑ Air bleed plug
Ⓒ Boiler supply
Ⓓ System supply
Ⓔ System return
Ⓕ Boiler return
Ⓖ ½ in. drain plug

5848 037 - 06

Dimensions (Model 120/80)



Low-loss header dimensions

Overall depth	3¼ in. (80 mm)
Overall width	12½ in. (320 mm)
Overall height	36 in. (914 mm)
Weight (dry)	28.6 lb (13 kg)
Volume	2 USG (7.6 L)

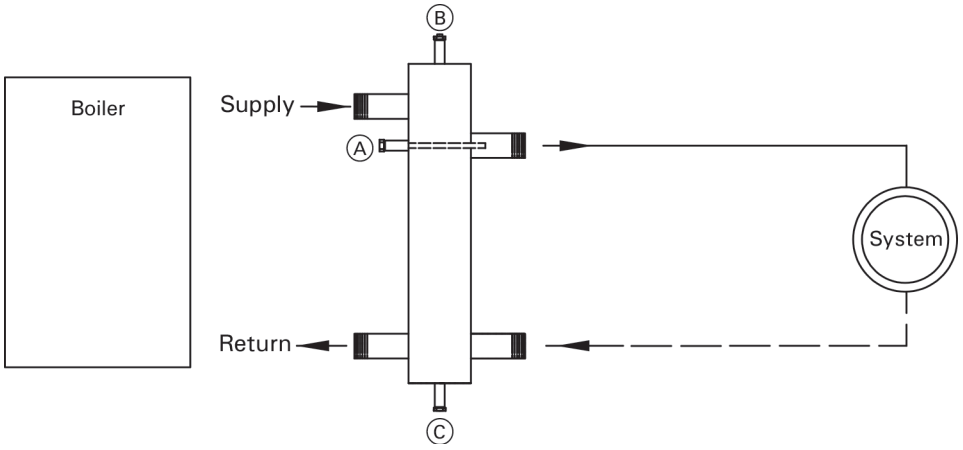
Legend

Ⓐ Sensor well, 200 mm
Ⓑ Air bleed plug
Ⓒ Boiler supply
Ⓓ System supply
Ⓔ System return
Ⓕ Boiler return
Ⓖ ½ in. drain plug

Installation Steps (Models 80/60 and 120/80)

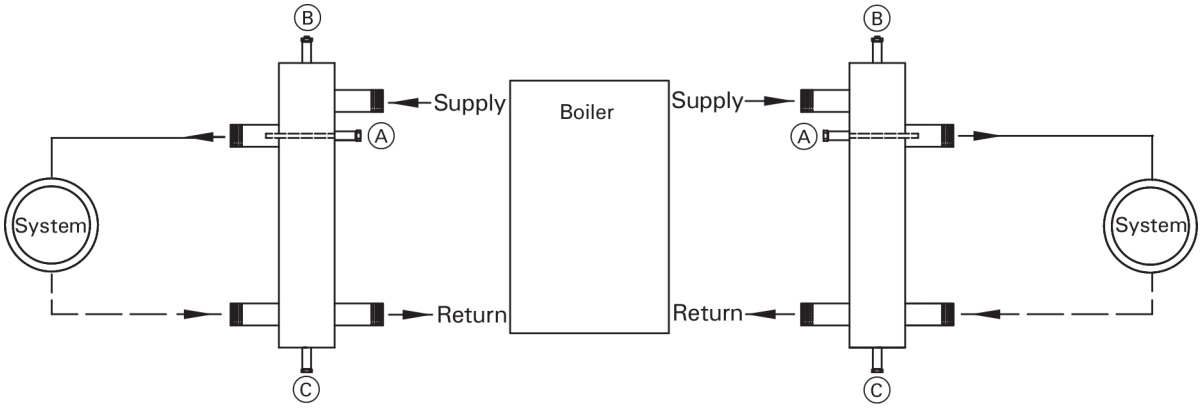
Before commencing with the installation of the low-loss header, check low-loss header orientation with respect to your heating system.

If (when holding the low-loss header with the sensor well connection facing to the left, as shown below).....



- the boiler is located to the left of the low-loss header and the heating system is located to the right, install the low-loss header as shown above (with sensor well Ⓐ located on left side), following the installation steps on the following page.
- the boiler is located to the right of the low-loss header and the heating system on the opposite side, perform the following steps:

1. Position the low-loss header, as shown below (with the sensor well facing the boiler).

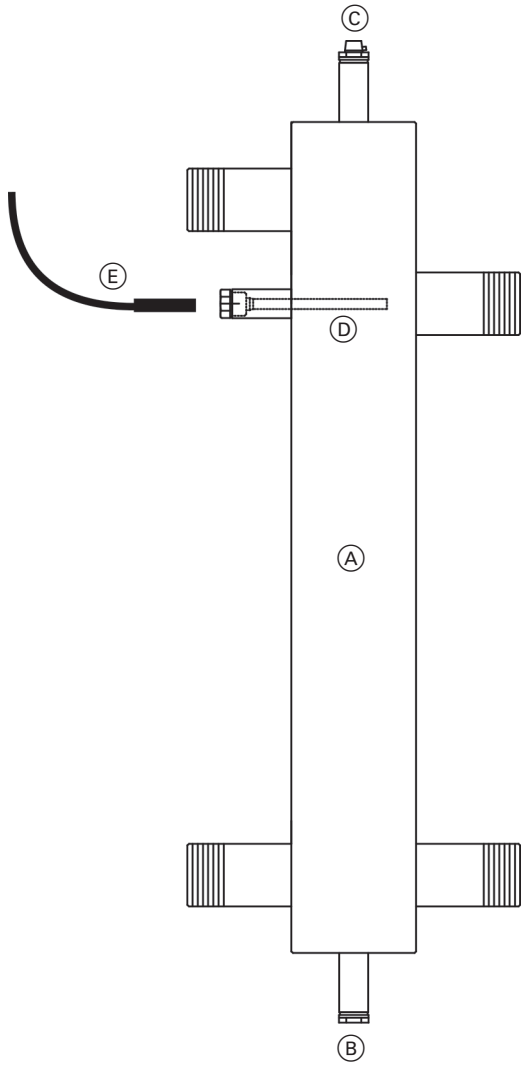


2. Proceed with the installation steps on the following pages (depending on low-loss header model).

Ⓐ Sensor well
Ⓑ Air bleed opening
Ⓒ ½ in. drain plug

Note: Refer to boiler Installation Instructions for boiler pump installation location.

Installation Steps (Models 80/60 and 120/80) *(continued)*



Legend

Ⓐ Low-loss header
Ⓑ Drain plug
Ⓒ Air bleed plug
Ⓓ Sensor well
Ⓔ Temperature sensor (optional) Refer to the boiler installation instructions for application.

1. Remove low-loss header and supplied accessories from carton (see section entitled “Standard Equipment” on pages 8 and 13 for a list of component parts included with your low-loss header).

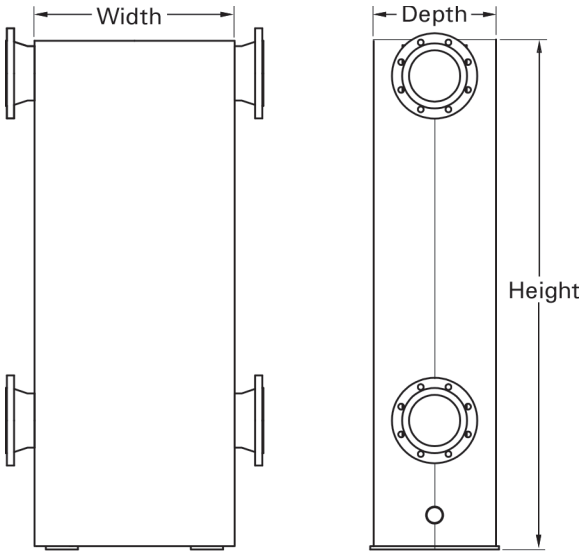
2. Drain plug Ⓑ, air bleed plug Ⓒ (c/w O-ring) and sensor well Ⓓ are pre-installed. Ensure tightness and check for leaks.

3. Tighten all connections.

4. Install low-loss header only in vertical position (as shown). See pages 6, indicating system and boiler connection sides. Make system and boiler connections accordingly.

5. Insert temperature sensor Ⓔ probe end fully into sensor well Ⓓ (if supplied). Refer to the boiler installation/service instructions for sensor connections.

Description (Models 160/80 to 500/300)



Low-loss header 160/80 to 500/300
(with insulation - optional accessory)

Standard equipment

Models 160/80 to 500/300:

- Sensor well tapping, ½ in. or Air bleed tapping, ½ in.
- Air bleed tapping, ½ in.
- Drain/flush tapping, 2 in.
- ANSI flanges welded on
- Insulation (optional - accessory)

Low-loss header temperature sensors

Note: Temperature sensor for boilers must be purchased separately (if required). Refer to the boiler and/or control installation instructions for more information. For multi-boiler installations a common supply sensor is supplied with the Viessmann cascade control (Vitocontrol-S/Vitotronic 300-K).

Insulation

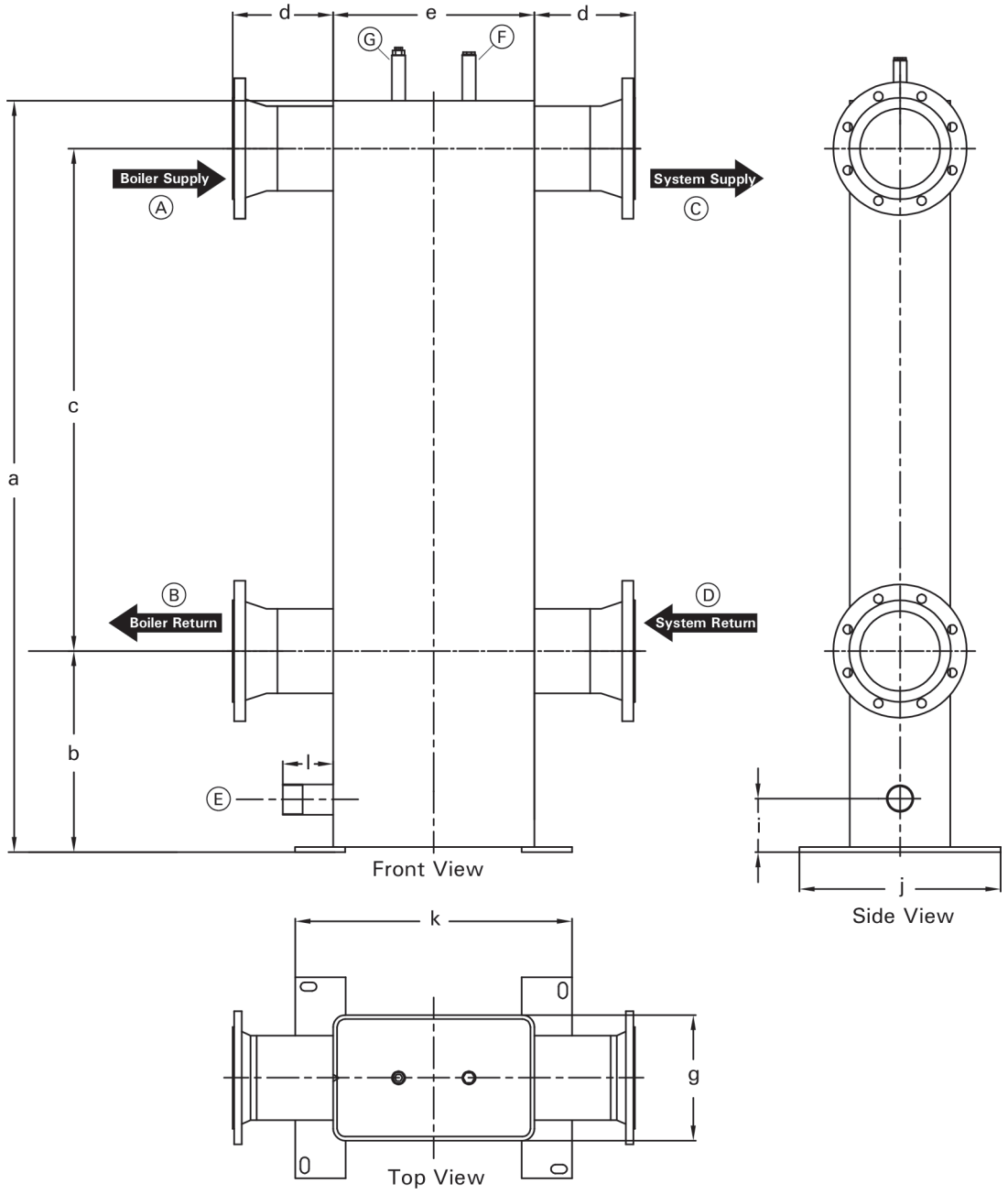
IMPORTANT

If the low-loss header insulation is being installed, add extra clearance between the back of the low loss header and the finished wall.

Insulation dimensions

Model #	Depth in. (mm)	Width in. (mm)	Height in. (mm)
160/80	11 (280)	22⅛ (560)	56¾ (1440)
200/120	12⅝ (320)	23¾ (600)	57 (1450)
250/150	13¾ (350)	25⅝ (650)	57¾ (1468)
300/200	15¾ (400)	27⅝ (700)	58¼ (1481)
400/200	15¾ (400)	31½ (800)	58⅞ (1495)
450/250	17¾ (450)	33½ (850)	59¾ (1520)
500/300	19¾ (500)	35½ (900)	71⅝ (1819)

Dimensions (Models 160/80 to 500/300)



Legend

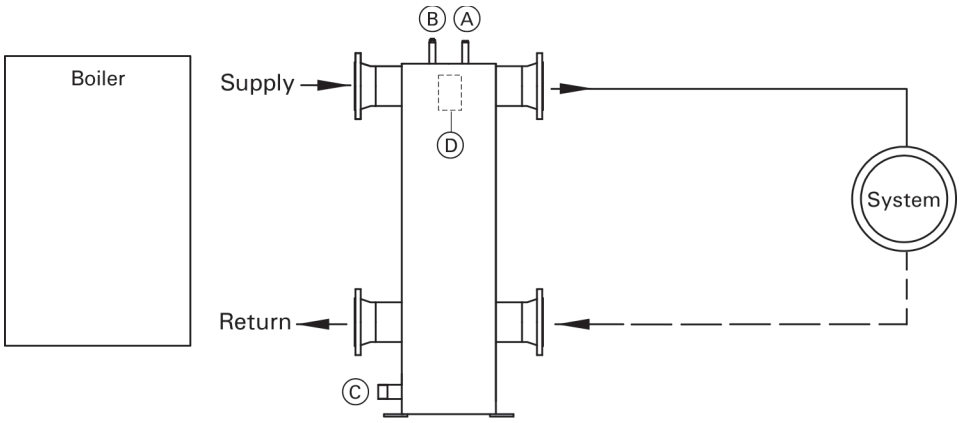
Ⓐ Boiler supply
Ⓑ Boiler return
Ⓒ System supply
Ⓓ System return
Ⓔ Drain/clean-out opening
Ⓕ Sensor well (system side)
Ⓖ Air vent (boiler side)

Dimensions (Models 160/80 to 500/300) *(continued)*

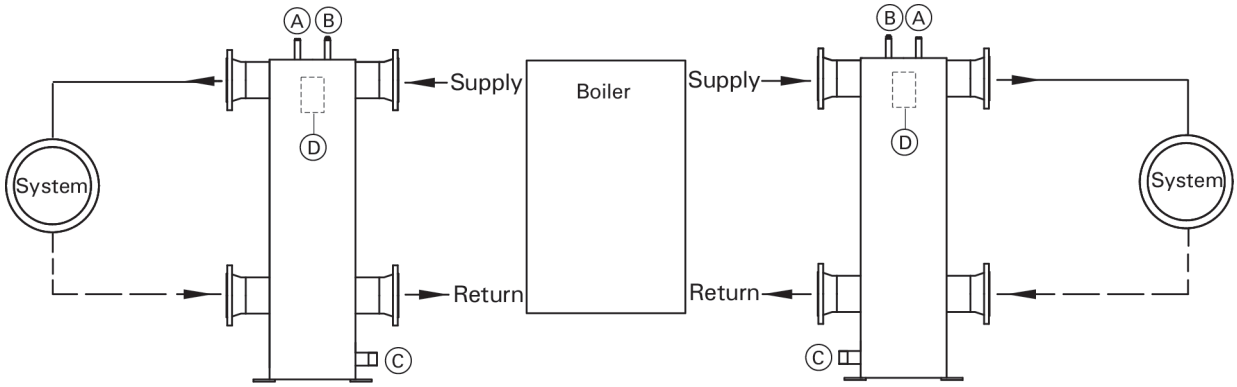
		Low-loss Header Model						
Dimension		160/80	200/120	250/150	300/200	400/200	450/250	500/300
a	in.	56.7	57	57.8	58.3	58.9	59.8	71.6
	(mm)	(1440)	(1450)	(1468)	(1481)	(1495)	(1520)	(1820)
b	in.	15.3	15.3	15.7	15.7	15.7	15.7	19.7
	(mm)	(390)	(390)	(400)	(400)	(400)	(400)	(500)
c	in.	39.4	39.4	39.4	39.4	39.4	39.4	47.2
	(mm)	(1000)	(1000)	(1000)	(1000)	(1000)	(1000)	(1200)
d	in.	7.9	7.9	7.9	7.9	7.9	7.9	7.9
	(mm)	(200)	(200)	(200)	(200)	(200)	(200)	(200)
e	in.	6.3	7.9	9.8	11.8	15.7	17.7	19.7
	(mm)	(160)	(200)	(250)	(300)	(400)	(450)	(500)
g	in.	3.1	4.7	5.9	7.9	7.9	9.8	11.8
	(mm)	(80)	(120)	(150)	(200)	(200)	(250)	(300)
i	in.	3.8	3.8	4.2	4.2	4.2	4.2	4.2
	(mm)	(97)	(97)	(107)	(107)	(107)	(107)	(105)
j	in.	11	12.6	13.8	15.7	15.7	17.7	19.7
	(mm)	(280)	(320)	(350)	(400)	(400)	(450)	(500)
k	in.	12.2	13.8	15.7	17.7	21.7	23.6	25.6
	(mm)	(310)	(350)	(400)	(450)	(550)	(600)	(650)
l	in.	4	4	4	4	4	4	6.3
	(mm)	(100)	(100)	(100)	(100)	(100)	(100)	(160)
Flange		ANSI 2½ in.	ANSI 3 in.	ANSI 4 in.	ANSI 5 in.	ANSI 6 in.	ANSI 8 in.	ANSI 8 in.
Weight (Dry)	lb.	72.6	136.4	193.6	211.2	316.8	387.2	624.8
	(kg)	(33)	(62)	(88)	(96)	(144)	(176)	(284)
Volume	USG	4.9	9.3	14.5	23.2	31.4	46.6	62.2
	(L)	(18.8)	(35.2)	(55.1)	(88.2)	(118.7)	(177.1)	(236.2)

Installation Steps (Models 160/80 to 500/300)

Before commencing with the installation of the low-loss header, check low-loss header orientation with respect to your heating system.



1. Position the low-loss header, as shown below (with the drain plug facing the boiler).



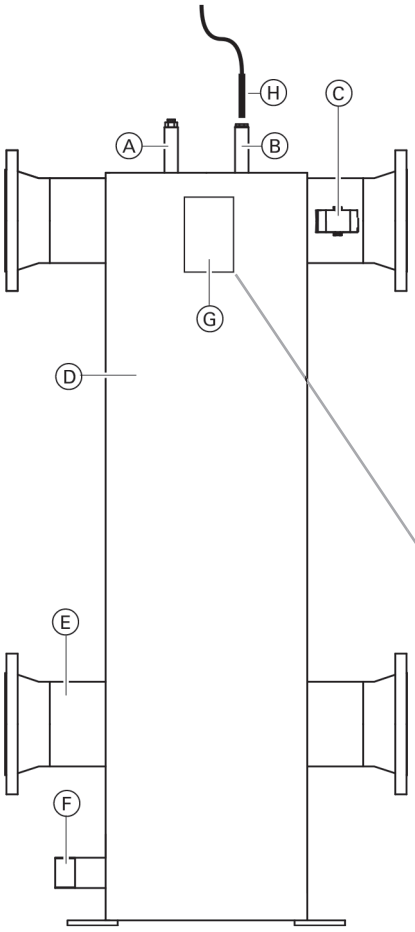
2. Proceed with the installation steps on the following pages.

Legend

Ⓐ Sensor well
Ⓑ Air bleed opening
Ⓒ Drain tapping 2 in. NPT
Ⓓ Low-loss header label

Note: Refer to boiler Installation Instructions for boiler pump installation location.

Installation Steps (Models 160/80 to 500/300) *(continued)*



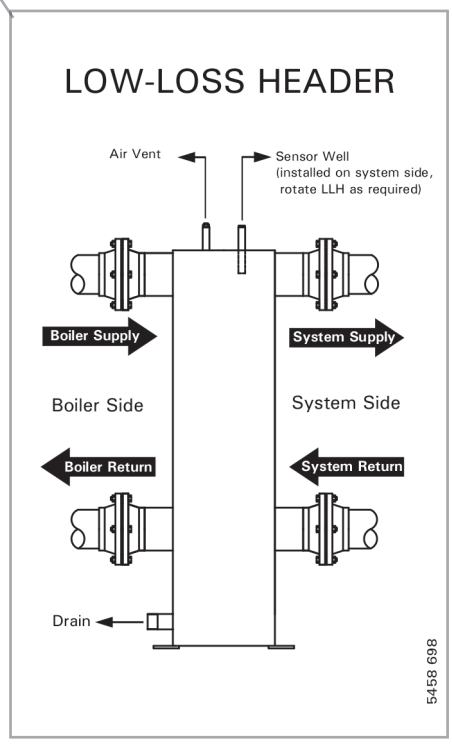
1. Before commencing with the installation, plan the location and orientation of the low-loss header. Take the following into consideration...
   - The sensor well is installed on the system side of the low-loss header. The low-loss header can be rotated as required.
   - Ensure that the drain connection is not pointing towards the wall.
   - Low-loss header must be installed in a vertical position.
2. Fasten the low-loss header to the floor with anchor bolts (field supplied), using anchor holes provided. Solid flooring such as concrete is required when floor-mounting the low-loss header.
3. Complete piping as required (ANSI counter flanges, gaskets and bolts (field supplied).
4. Tighten all connections.
5. Install and connect common supply temperature sensor.

Legend

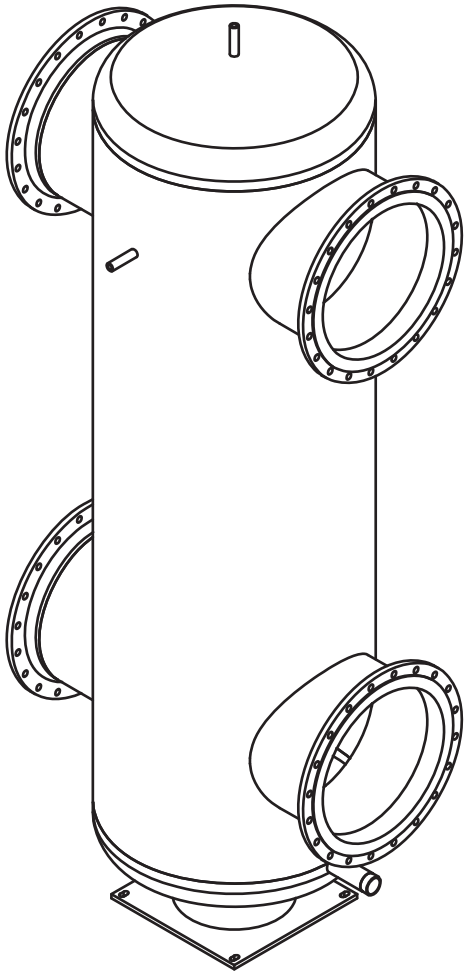
Ⓐ Air vent
Ⓑ Common supply temperature sensor well (immersion sensor)*
Ⓒ Common supply temperature sensor (strap-on sensor)*
Ⓓ Low-loss header
Ⓔ Flange of low-loss header, ANSI standard
Ⓕ Drain connection, 2 in. NPT male
Ⓖ Low-loss header label
Ⓗ Common supply low-loss header temperature sensor (immersion type)

* Immersion or strap-on sensor depending on application and boiler/control models.

Note: All counter flanges shall be ANSI standard (field supplied).



Description (Models 12/20 to 20/32)



Low-loss header 12/20 to 20/32

Standard equipment

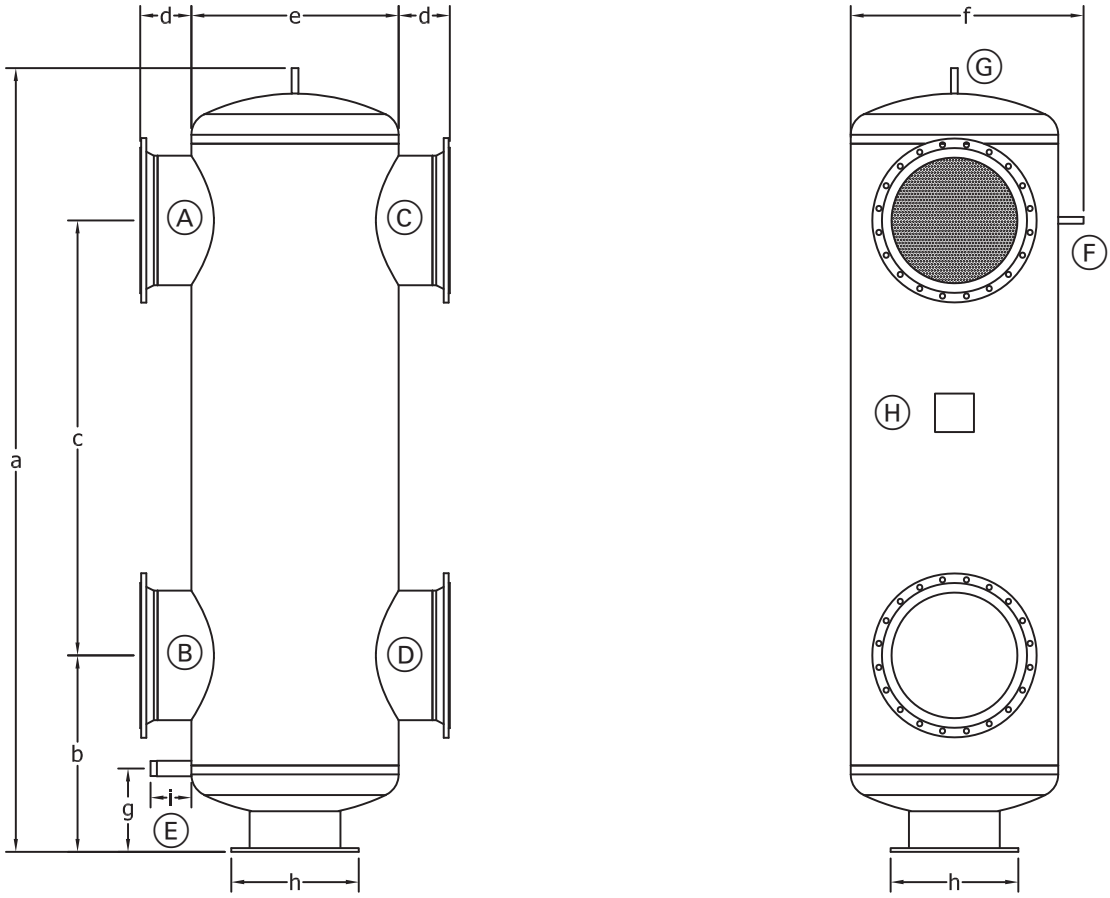
Models 12/20 to 20/32:

- Sensor well tapping, ½ in.
- Air bleed tapping, ½ in.
- Drain/flush tapping, 2 in.
- ANSI flanges

Low-loss header temperature sensors

Note: Temperature sensor for boilers must be purchased separately (if required). Refer to the boiler and/or control installation instructions for more information. For multi-boiler installations a common supply sensor is supplied with the Viessmann cascade control (Vitocontrol-S/Vitotronic 300-K).

Dimensions (Models 12/20 to 20/32)



Legend

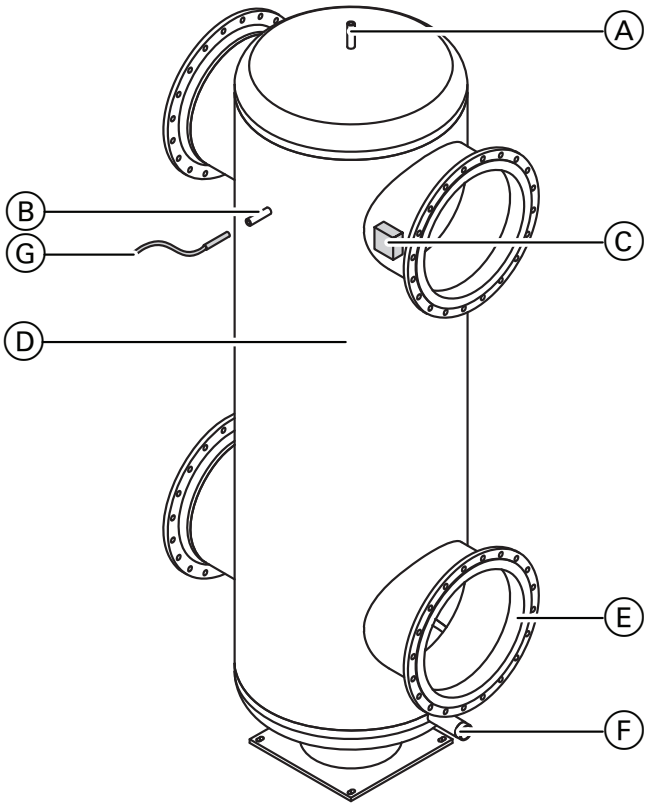
Ⓐ Boiler supply
Ⓑ Boiler return
Ⓒ System supply
Ⓓ System return
Ⓔ Drain/clean-out opening
Ⓕ Sensor well
Ⓖ Air vent
Ⓗ ASME Rating Plate with CRN

5848 037 - 06

Dimensions (Models 12/20 to 20/32) *(continued)*

		Low-loss Header Model				
Dimension		12/20	14/24	16/24	16/28	20/32
a	in. (mm)	84-¾ (2150)	100-½ (2550)	104-½ (2650)	112-¼ (2850)	121 (3075)
b	in. (mm)	24-½ (620)	25-¾ (655)	27 (685)	27 (685)	30-¼ (770)
c	in. (mm)	42-½ (1080)	55-½ (1410)	57-¼ (1455)	64-½ (1640)	67-¼ (1705)
d	in. (mm)	8 (200)	8 (200)	8 (200)	8 (200)	8 (200)
e	in. (mm)	20 (508)	24 (610)	24 (610)	28 (711)	32 (810)
f	in. (mm)	24 (608)	28 (710)	28 (710)	32 (810)	36 (913)
g	in. (mm)	10-½ (264)	11-¼ (284)	11-¼ (284)	11-½ (291)	13 (327)
h	in. (mm)	15-¾ (400)	15-¾ (400)	15-¾ (400)	19-¾ (500)	19-¾ (500)
i	in. (mm)	6-¼ (160)	6-¼ (160)	6-¼ (160)	6-¼ (160)	6-¼ (160)
Flange		ANSI 12 in.	ANSI 14 in.	ANSI 16 in.	ANSI 16 in.	ANSI 20 in.
Weight (Dry)	lb. (kg)	807 (366)	1131 (513)	1294 (587)	1660 (753)	2110 (957)
Volume	USG (L)	137 (519)	229 (867)	254 (962)	348 (1318)	516 (1914)
Maximum Operating Pressure	PSI (bar)	87 (6)				
Maximum Operating Temperature	°F (°C)	95 (203)				

Installation Steps (Models 12/20 to 20/32)



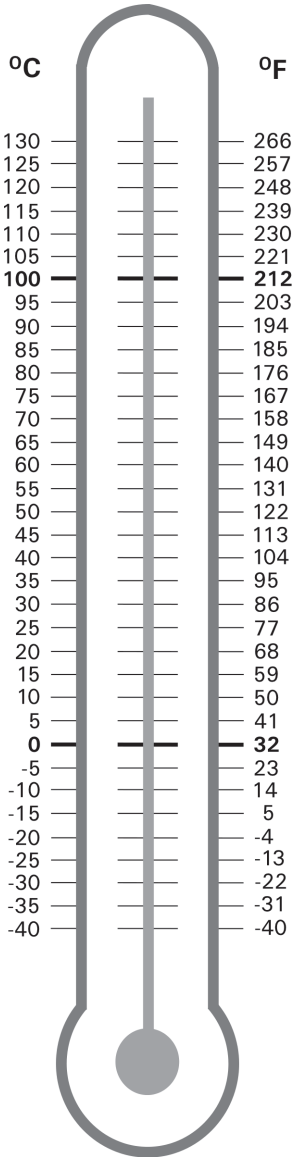
1. Before commencing with the installation, plan the location and orientation of the low-loss header. Take the following into consideration...
   - Ensure that the drain connection is not pointing towards the wall.
   - Low-loss header must be installed in a vertical position.
2. Fasten the low-loss header to the floor with anchor bolts (field supplied), using anchor holes provided. Solid flooring such as concrete is required when floor-mounting the low-loss header.
3. Complete piping as required (ANSI counter flanges, gaskets and bolts (field supplied).
4. Tighten all connections.
5. Install and connect common supply temperature sensor.

Legend
Ⓐ Air vent
Ⓑ Common supply temperature sensor well (immersion sensor)*
Ⓒ Common supply temperature sensor (strap-on sensor)*
Ⓓ Low-loss header
Ⓔ Flange of low-loss header, ANSI standard
Ⓕ Drain connection, 2 in. NPT male
Ⓖ Common supply low-loss header temperature sensor (immersion type)

* Immersion or strap-on sensor depending on application and boiler/control models.

Note: All counter flanges shall be ANSI standard (field supplied).

Installation



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