Flue Systems for neoTower®
Combined Heat and Power Plants

Planning and installation information

CE **0036 CPD 91265-001**
Approved for gas and oil condensing boilers and CHP units

RMB ENERGIE
A YANMAR COMPANY

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Requirements for heat generator and flue system

1. General information

In the text you will often find a link behind the symbol-;↗ you can click on it and obtain online information. You will also find QR codes that can be scanned with a smartphone.

2. General technical conditions

These planning and installation instructions have been developed in cooperation between ATEC GmbH & Co. KG and RMB/ENERGIE GmbH. This document is intended to support the planning and handling of exhaust systems manufactured by ATEC GmbH & Co. KG in connection with the neoTower® combined heat and power plants of RMB/ENERGIE GmbH.

The document is essentially limited to the connecting pipe, i.e. the connection between the combined heat and power plant (CHP) and the vertical section of the flue system.

The described flue systems are primarily constructed in PP plastic. Upon request to the flue pipe manufacturer ATEC, these pipes can also be manufactured and supplied in stainless steel. The stainless steel design has the advantage that the lines may be insulated, which is generally prohibited for plastic lines according to EN14471. The stainless steel pipes quickly cause burns to human skin at surface temperatures of 70° and above, and therefore insulation should not be omitted. When insulating, do not insulate special components such as test ports, measuring points, traps, reverse flow protectors, test and measuring elements, which are also subject to maintenance.

Stainless steel flue pipes can be designed in pressure class P1 as a push-fit system with sleeves and internal seals. For pressure classes above P1, i.e. M1 or H1, the lines must be constructed in the KL push-fit system (conical-sealing). Further advice on this can be obtained from ATEC.

This manual also shows the design method of flue gas cascades according to ATEC approval

Z-7.1-3538 for CHP units with CHP units or CHP units with gas heat generators. Approval for cascading requires operation in the condensing mode of all units and a maximum flue gas temperature of 120°C; for CHP units a maximum of 100°C.

In condensing boiler systems, due to the condensation of the flue gas, a minimum slope of 3° (5cm/m) back to the heat generator and/or trap must be ensured.

Furthermore, the supply of combustion air as well as exhaust air of the combined heat and power units is discussed.

Ask ATEC for a free calculation of the flue system for your line according to EN13384. Use the form at the end of this documentation or on the ATEC homepage for your request:
↗ at https://oxomi.com/p/2024648/catalog/10003633

In the case of flue gas cascading, it must be ensured that only ATEC products in accordance with approval Z-7.1-3538 are used in the horizontal section (boiler room). According to the ↗ DIBt General Design Approval, a flue gas cascade may not exceed a total heat output of 1 MW.

Further technical descriptions and details on the subject of flue gas technology:

↗ Declaration of performance

↗ PMH reverse flow protector

↗ PMH counter-slope

Regarding the requirements for the boiler room ventilation, please refer to the German Technical Regulation for Gas Installations (TRGI) G600 and the planning document of RMB/ENERGIE GmbH:

CHP units are classified as type-B according to the TRGI due to their flue gas and supply air routing. The flue gases are discharged with gauge pressure. Therefore, the rooms must have an opening leading directly to the outside with a free cross-section of at least 150 cm^2 or two openings of 75 cm^2 each.

For gas devices with a total rated output of more than 100 kW, the rooms must have two openings leading directly to the outside (one lower and one upper with as large a vertical distance as possible) with a free cross-section of at least 150 cm^2 each plus 1 cm^2 for each kW exceeding 100 kW.

If these rooms are not directly adjacent to an external wall, ventilation can also be provided
with the measures described in TRGI G600 in sections 8.3.2.4.2.2 or 8.3.2.4.2.3. These openings can be included in the combustion air supply

TRGI G600 8.3.2.4.2.2 describes the ventilation of the installation room via a supply air duct and a exhaust air shaft

TRGI G600 8.3.2.4.2.3 describes the ventilation of the installation room via a supply air line with mechanical supply air guidance (electric fan) and an exhaust air line

Requirements for heat generator and flue-gas system

3. Technical requirements for flue gas cascading

ATEC approval Z-7.1-3538 enables the installation of collective flue systems (cascades) in heating or installation rooms for joint flue gas routing of combined heat and power units and condensing boilers in compliance with regulations. The total nominal heat output of the cascade must not exceed 1,000 kW. The operating mode of all devices is dependent on room air and the installation room must be ventilated (see TRGI and information sheet no. 39 from the Federal Association of the German Heating Industry (Bundesverband der Deutschen Heizindustrie)). The exhaust system is designed in gauge pressure according to EN13384. It is essential to ensure that the value "max. permissible operating pressure" in the chapter DVGW (German Technical and Scientific Association for Gas and Water) 635 is set to 50 Pa in the general default settings of the software. This value can be checked in the printout of the finished calculation in the chapter Verification of function by the commissioned district chimney sweep. For this reason, flue gas cascades with CHP units and boilers are still generally not regulated and not permitted when calculated in vacuum.

Furthermore, the flue gas velocities and the condensate discharge must be taken into account during planning and dimensioning. Flue gas velocities in excess of 6 m/s in all flue gas paths must not be exceeded. Condensate drains must be sufficiently large, must have a special design so that condensate cannot run past the discharge point and must be installed in sufficient numbers for longer flue gas paths. For CHP interconnecting piping, there should be condensate drainage at least every 10 meters. Therefore, let ATEC advise you in order to build a line that is safe to operate. In this context, there is also the mandatory minimum slope of flue gas routes according to DIN 18160 of 3°, i.e. 5 cm/m. The discharge of the condensate into the sewage system is subject to the provisions of worksheet DWA A-251. In addition, the statutes of the local waste disposal companies and the water law regulations of the German federal states apply.

In particular, because of the special exhaust gas character of a CHP unit, condensate discharge, sound effects and pulsation of the flue gas flow must be assessed. RMB offers special silencers for the reduction of pulsation and consequently can avoid or reduce vibration of reverse flow protectors.

Combined heat and power units are also approved with flue gas temperatures of up to 500°C in the approval. However, for the overall consideration of the condensing flue gas system, this means that the flue gas temperatures of the CHP unit must be reduced to 100 °C before merging with the condensing boiler. The return temperatures of the heating system cool the flue gases to ≤ 100 °C and can then be fed into the cascade manifold via a continuing plastic or metal flue pipe with an integrated flue gas temperature limiter.

In EN 13384 and accordingly in every connecting pipe of a furnace, reverse flow protectors must be planned and installed. This is no longer necessary for condensing boilers with integrated reverse flow protectors. External ATEC reverse flow protectors with a dimension of 80 to 200 mm are approved and certified with this approval. When used with condensing boilers, this ATEC reverse flow protector must be matched to the device for resistance reasons, which is why approval must be obtained from the boiler manufacturer prior to execution.

As stated previously, higher operating pressures in the connecting pipes must be reduced to 50 Pa when entering the cascade manifold. This is achieved by means of EN 13384 via the dimensioning change. For control purposes, this maximum operating pressure must be permanently detected via a pressure switch in the manifold in accordance with the approval. ATEC supplies this so-called flue-gas pressure switch (ADW) in all required dimensions. The ATEC flue gas pressure monitor has a potential-free contact/changeover contact. The contact must switch off the safety chain of all furnaces and CHP units in the cascade simultaneously if the operating pressure in the cascade manifold exceeds 50 Pa.

The professional and approval-compliant installation of the flue system must be confirmed for the authorised chimney sweep and the building owner with a specialist contractor's declaration.

4. Legal disclaimer

Warranty and liability claims for personal injury and property damage are excluded if they are due to the following causes:

- Improper use
- Failure to observe the technical information, installation instructions and recognised rules of technology
- Operating the flue system with non-functioning safety or protective devices
- Continued use despite a malfunction/defect
- Unauthorised modification of/addition to the flue system
- Improper installation, commissioning, operation and maintenance of the flue system
- Installation and combination of third-party flue pipes. Only original ATEC parts may be used.
- Insulation of plastic flue pipes and systems
- Connection of unsuitable firing systems and modes of operation (see performance characteristics of the CE marking)
- Force majeure

The General Terms and Conditions of RMB/ENERGIE GmbH apply.

5. Copyright

ATEC and RMB/ENERGIE reserve the right to make changes or additions to the information provided.

6. Description of symbols / general explanations / explanation of abbreviations

ATTENTION, notice of possible danger

Real risk of injury

Note, tip, recommendation

Coordination with the authorised district chimney sweep

Correct installation

Incorrect installation

Minimum slope 3°, i.e. approx. 5 cm/m

(10° is approx. 18 cm/m; 17° is approx. 30 cm/m)

The necessary slope serves to protect the seals, among other things. Furthermore, standing condensation water would greatly narrow the cross-section of the flue pipe and lead to operating faults.

Low room heights may require flue ducts with counter-slopes. ATEC offers the necessary special components with a warranty. ATEC will provide you with advice and a suitable offer.

Operating principle of gravity. Perpendicular installation of the reverse flow protector (RSS) is required.

Room requires ventilation

For information on dimensioning supply air opening, see TRGI 600 Sec. 8.3.2.4.2.2 and .3

RSS	Reverse flow protector
RXS	Reflection silencer for type 2.0 up to 20 kW_{el}
DXS	Double-pipe reflection silencer for type 25 to 30 kW_{el}
ASD	Absorption silencer
ADW	Flue gas pressure monitor
ATB	Flue gas temperature limiter
P1	Max. pressure class 200 Pa
M1	Max. pressure class 1,500 Pa
H1	Max. pressure class 5,000 Pa
K	Auxiliary contactor with multiple contacts

Coordination with boiler manufacturer

RMB system articles

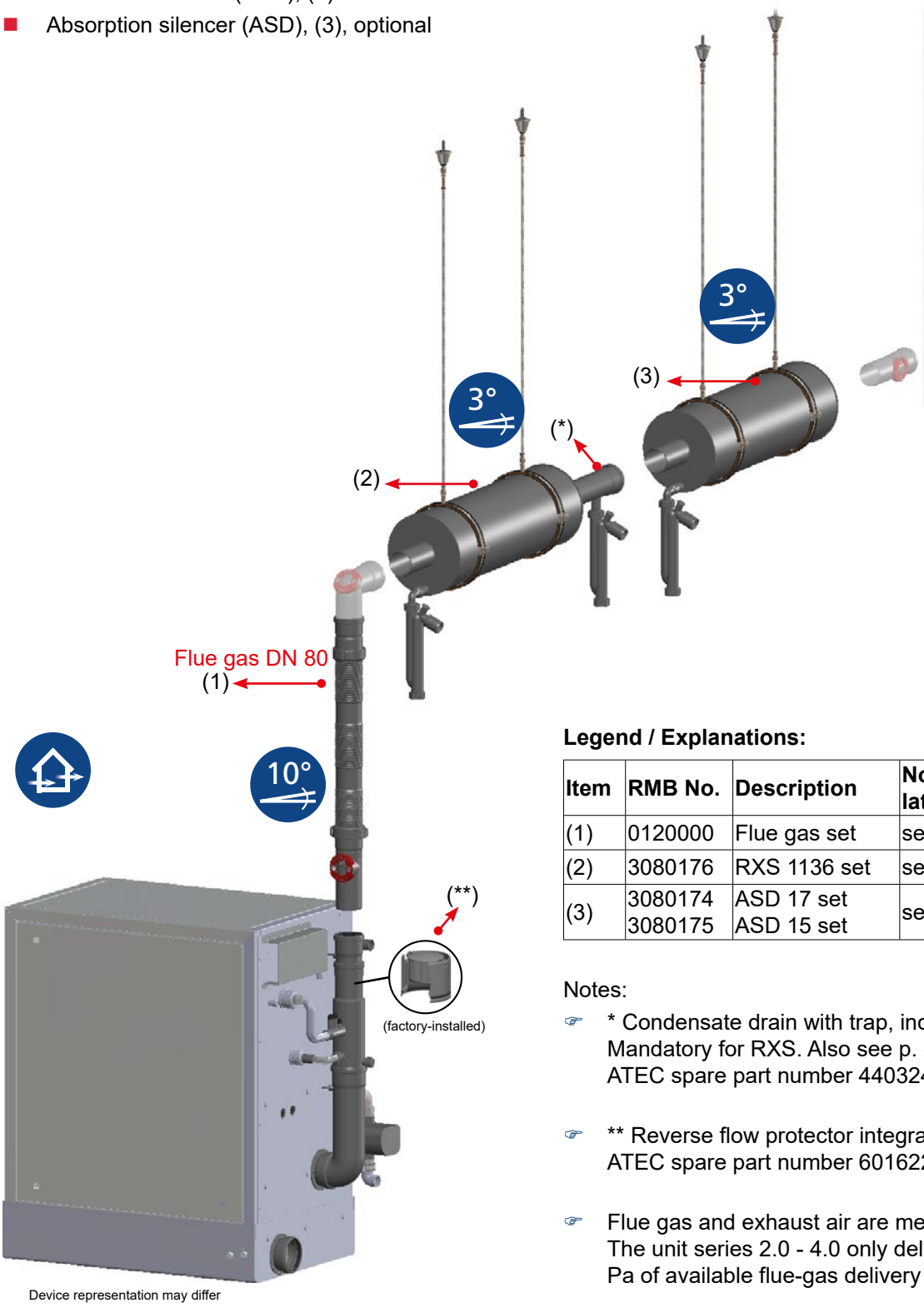
Delivery only through RMB

ATEC standard articles
Product range

7. Description of neoTower® LIVING 2.0, 3.3, 4.0

7.1 Single assignment with one or two silencers

- Flue gas set, (1)
- Reflection silencer (RXS), (2)
- Absorption silencer (ASD), (3), optional



Device representation may differ

Dimensioning according to EN13384

Legend / Explanations:

Item	RMB No.	Description	Notes on installation
(1)	0120000	Flue gas set	see page 19
(2)	3080176	RXS 1136 set	see page 21
(3)	3080174 3080175	ASD 17 set ASD 15 set	see page 21

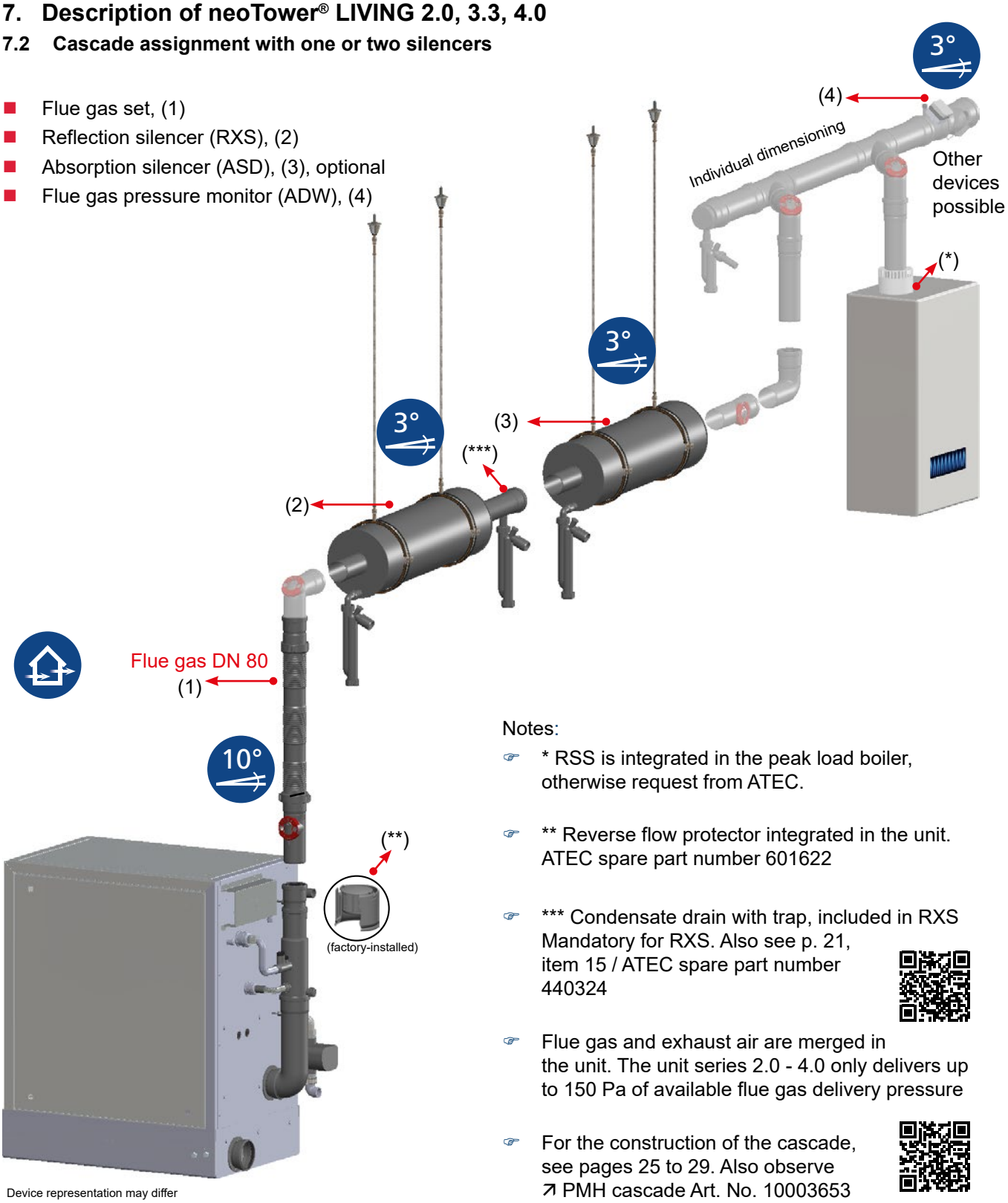
Notes:

- * Condensate drain with trap, included in RXS Mandatory for RXS. Also see p. 21, item 15 / ATEC spare part number 440324
- ** Reverse flow protector integrated in the unit. ATEC spare part number 601622
- Flue gas and exhaust air are merged in the unit. The unit series 2.0 - 4.0 only delivers up to 150 Pa of available flue-gas delivery pressure
- The RMB articles (black) can be supplemented as desired with standard articles (grey) from the ATEC price list.

7. Description of neoTower® LIVING 2.0, 3.3, 4.0

7.2 Cascade assignment with one or two silencers

- Flue gas set, (1)
- Reflection silencer (RXS), (2)
- Absorption silencer (ASD), (3), optional
- Flue gas pressure monitor (ADW), (4)



Device representation may differ

Notes:

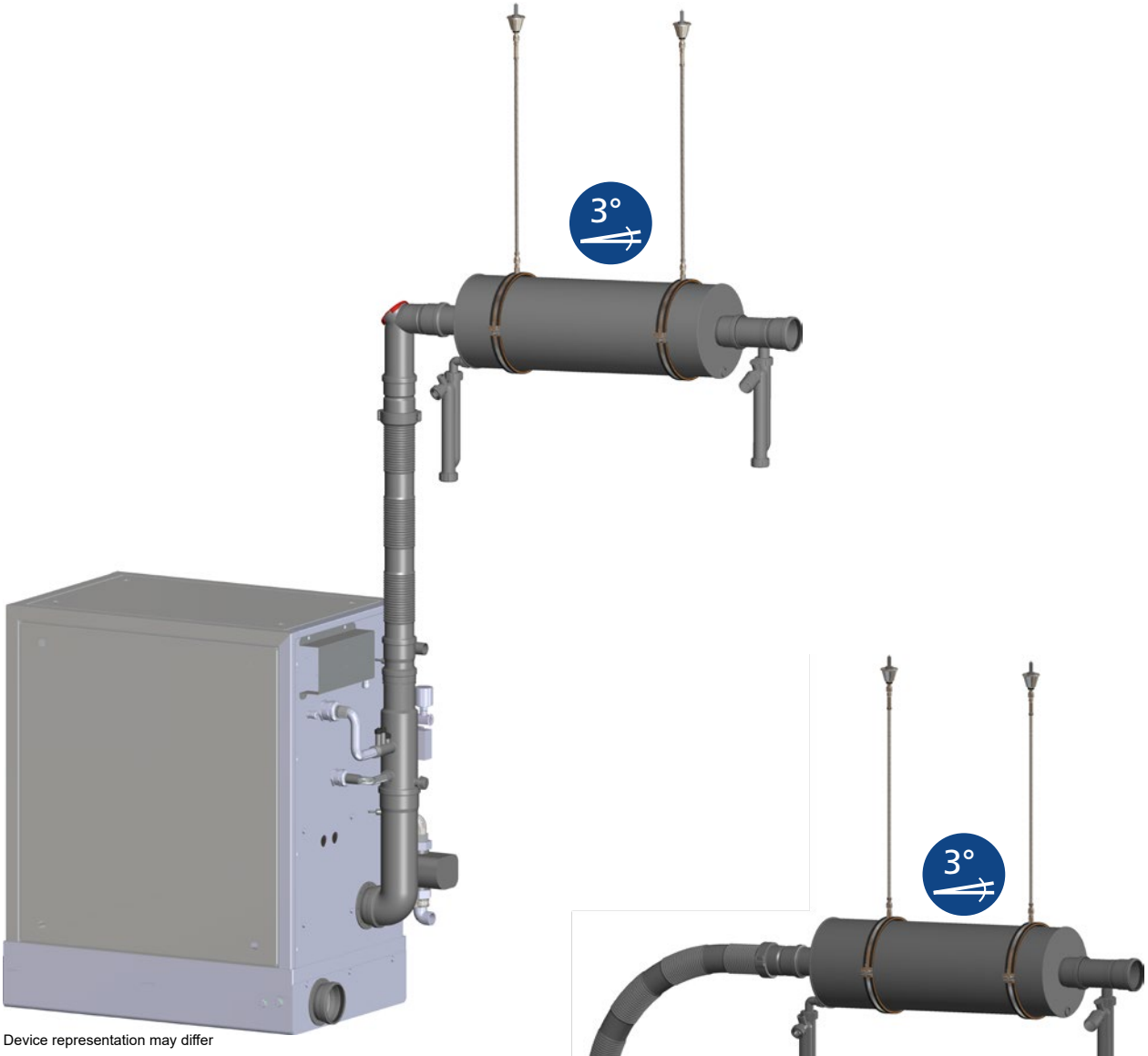
- * RSS is integrated in the peak load boiler, otherwise request from ATEC.
- ** Reverse flow protector integrated in the unit. ATEC spare part number 601622
- *** Condensate drain with trap, included in RXS Mandatory for RXS. Also see p. 21, item 15 / ATEC spare part number 440324
- Flue gas and exhaust air are merged in the unit. The unit series 2.0 - 4.0 only delivers up to 150 Pa of available flue gas delivery pressure
- For the construction of the cascade, see pages 25 to 29. Also observe ↗ PMH cascade Art. No. 10003653
- The RMB articles (black) can be supplemented as desired with standard articles (grey) from the ATEC price list.
- The cascade may consist of several CHP units and boilers up to a maximum of 1 MW.

Legend / Explanations:

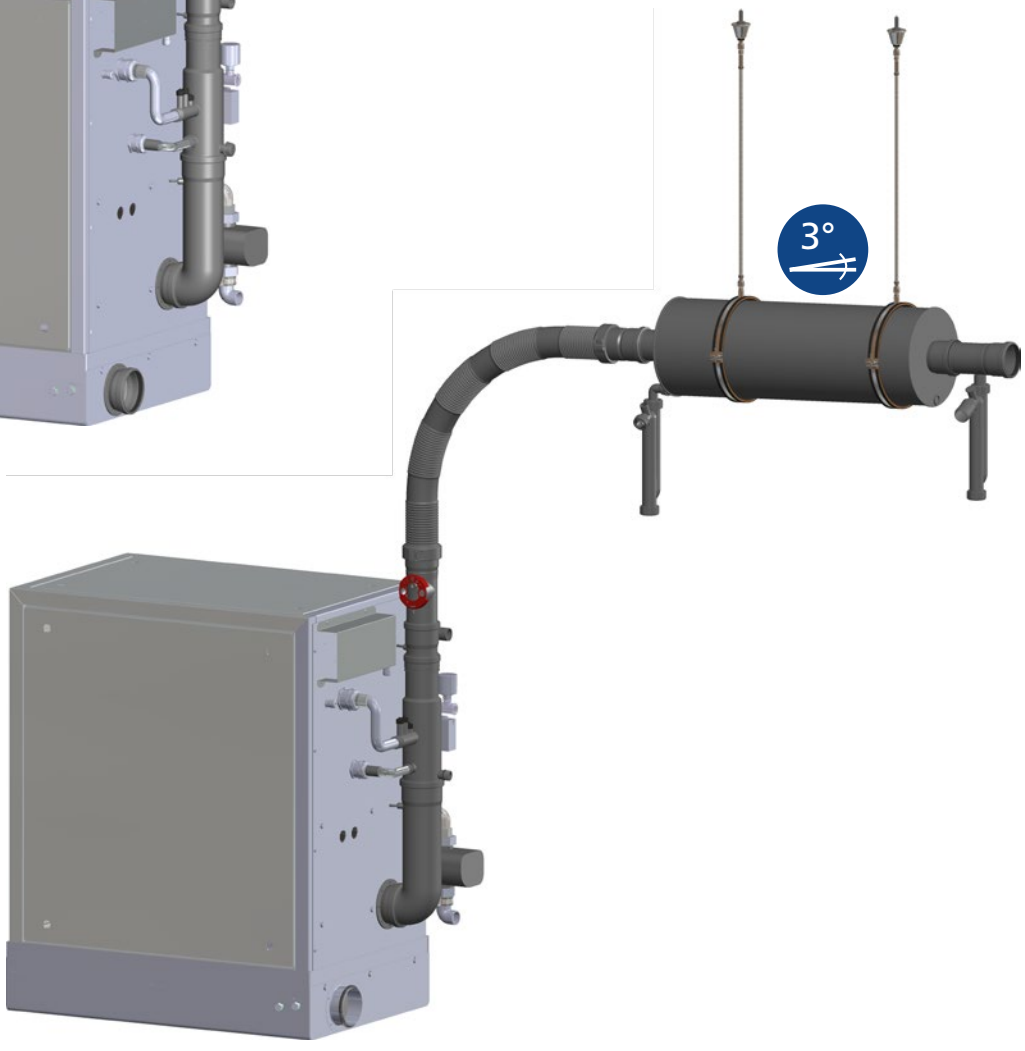
Item	RMB No.	Description	Notes on installation
(1)	0120000	Flue gas set	see page 19
(2)	3080176	RXS 1136 set	see Page 21
(3)	3080174 3080175	ASD 17 set ASD 15 set	see page 21
(4)	Dimensioning according to ATEC EN13384		

7. Description of neoTower® LIVING 2.0, 3.3, 4.0

7.3 Installation options of flexible connection line for neoTower® LIVING



Device representation may differ



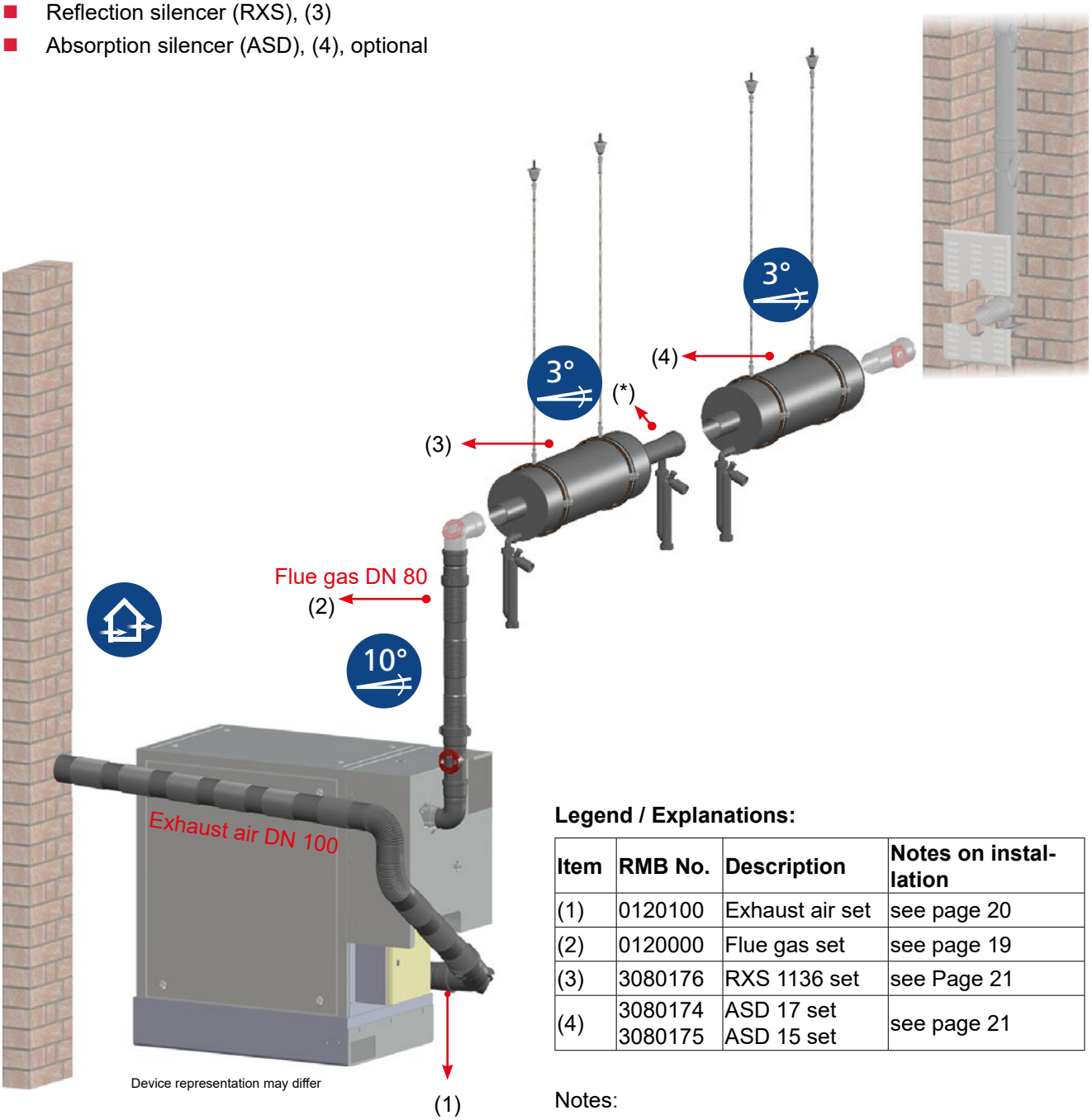
Device representation may differ

8. Description of neoTower® 5.0, 7.2

8.1 Single assignment with one or two silencers

- Exhaust air set, (1)
- Flue gas set, (2)
- Reflection silencer (RXS), (3)
- Absorption silencer (ASD), (4), optional

Dimensioning according to EN13384



Legend / Explanations:

Item	RMB No.	Description	Notes on installation
(1)	0120100	Exhaust air set	see page 20
(2)	0120000	Flue gas set	see page 19
(3)	3080176	RXS 1136 set	see Page 21
(4)	3080174 3080175	ASD 17 set ASD 15 set	see page 21

Notes:

☞ * Condensate drain with trap, included in RXS Mandatory for RXS. Also see p. 21, item 15 / ATEC spare part number 440324

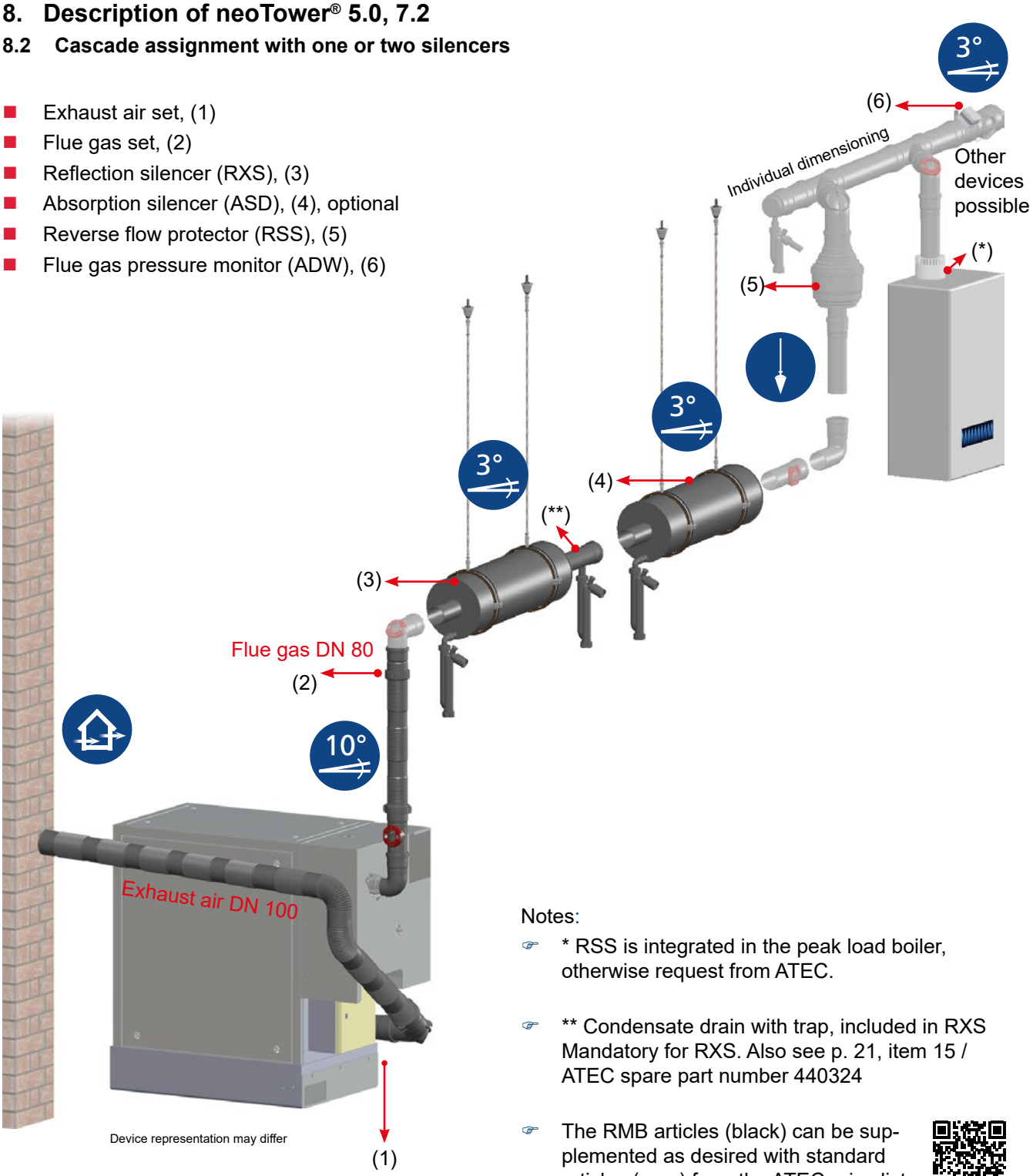
☞ The RMB articles (black) can be supplemented as desired with standard articles (grey) from the ATEC price list.

☞ Exhaust air silencer on request from RMB.

8. Description of neoTower® 5.0, 7.2

8.2 Cascade assignment with one or two silencers

- Exhaust air set, (1)
- Flue gas set, (2)
- Reflection silencer (RXS), (3)
- Absorption silencer (ASD), (4), optional
- Reverse flow protector (RSS), (5)
- Flue gas pressure monitor (ADW), (6)



Notes:

- ☞ * RSS is integrated in the peak load boiler, otherwise request from ATEC.
- ☞ ** Condensate drain with trap, included in RXS Mandatory for RXS. Also see p. 21, item 15 / ATEC spare part number 440324
- ☞ The RMB articles (black) can be supplemented as desired with standard articles (grey) from the ATEC price list.
- ☞ For the construction of the cascade, see pages 25 to 29. Also observe ↗ PMH cascade Art. No. 10003653
- ☞ Exhaust air silencer on request from RMB.
- ☞ The cascade may consist of several CHP units and boilers up to a maximum of 1 MW

Legend / Explanations:

Item	RMB No.	Description	Notes on installation
(1)	0120100	Exhaust air set	see page 20
(2)	0120000	Flue gas set	see page 19
(3)	3080176	RXS 1136 set	see Page 21
(4)	3080174 3080175	ASD 17 set ASD 15 set	see page 21
(5/6)	Dimensioning according to EN 13384		

8. Description of neoTower® 5.0, 7.2

8.3 Flue gas-exhaust air manifold, with one or two silencers

- Exhaust air set, (1)
- Flue gas set, (2)
- Reflection silencer (RXS), (3)
- Absorption silencer (ASD), (4) optional

Dimensioning according to EN13384

Device representation may differ

Legend / Explanations:

Item	RMB No.	Description	Notes on installation
(1)	0120100	Exhaust air set	see page 20
(2)	0120000	Flue gas set	see page 21
(3)	3080176	RXS 1136 set	see Page 21
(4)	3080174 3080175	ASD 17 set ASD 15 set	see page 21
(5)	2348	Condensate trap	P1 200 Pa

Notes:

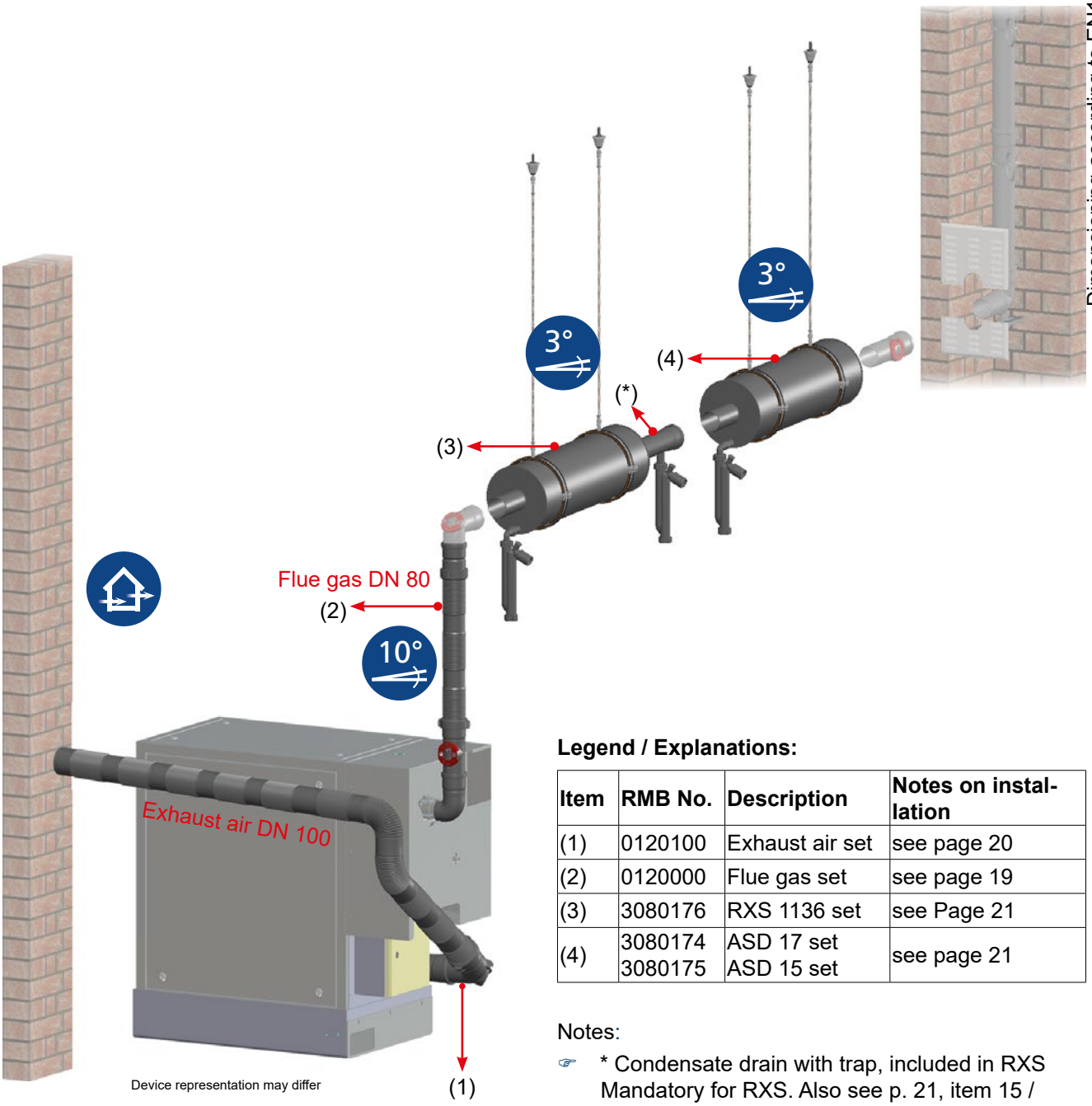
- * Condensate drain with trap, included in RXS Mandatory for RXS. Also see p. 21, item 15 / ATEC spare part number 440324
- The RMB articles (black) can be supplemented as desired with standard articles (grey) from the ATEC price list.
- The devices 5.0 to 7.2 supply 150 Pa of flue-gas delivery pressure at the factory and can be adjusted up to 500 Pa depending on the requirements. Refer to the RMB documentation "CHP pressure setting"
- Exhaust air silencer on request from RMB.

9. Description of neoTower® 9.5 - 20.0

9.1 Single assignment with one or two silencers

- Exhaust air set, (1)
- Flue gas set, (2)
- Reflection silencer (RXS), (3)
- Absorption silencer (ASD), (4), optional

Dimensioning according to EN13384



Legend / Explanations:

Item	RMB No.	Description	Notes on installation
(1)	0120100	Exhaust air set	see page 20
(2)	0120000	Flue gas set	see page 19
(3)	3080176	RXS 1136 set	see Page 21
(4)	3080174 3080175	ASD 17 set ASD 15 set	see page 21

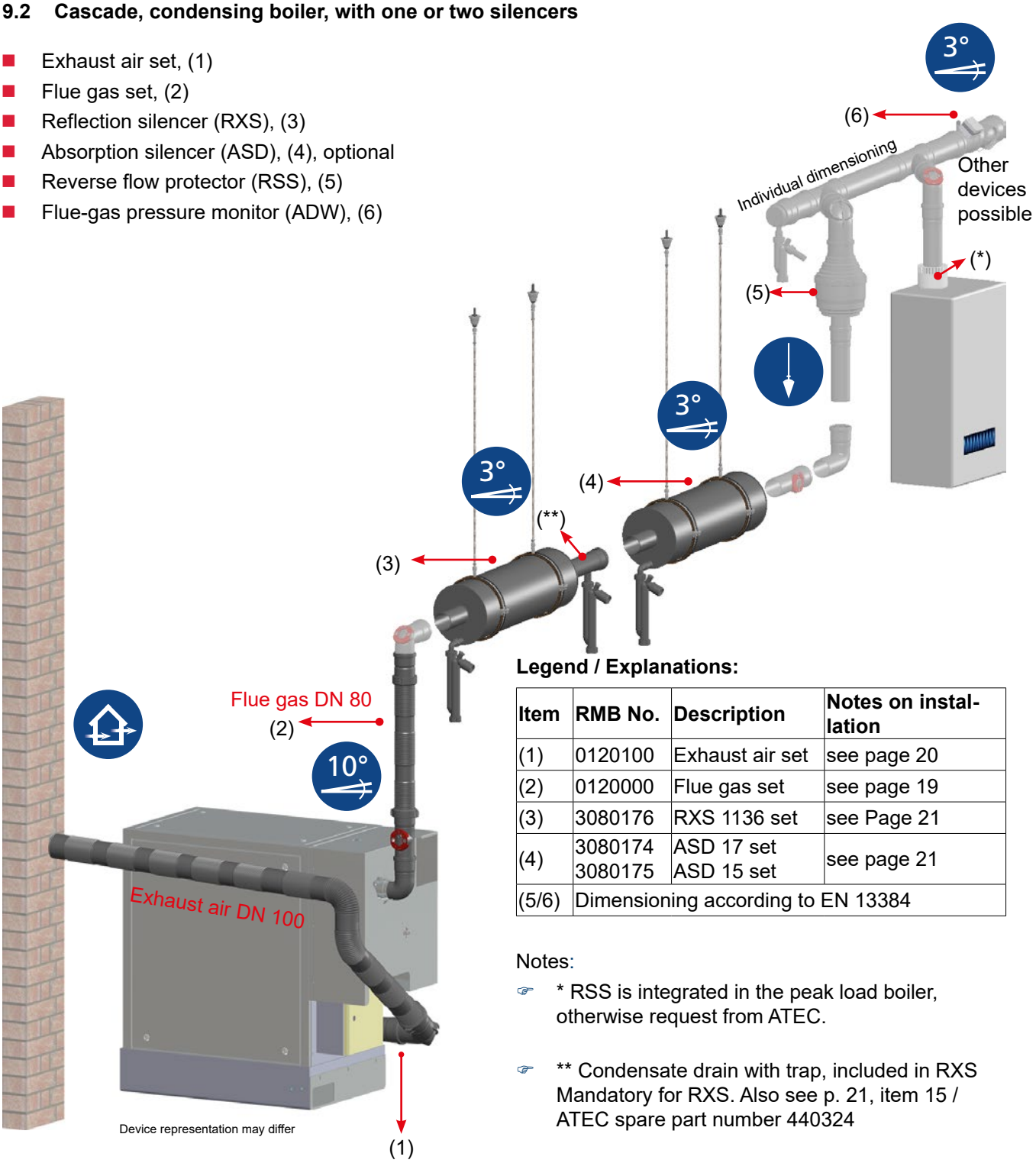
Notes:

- ☞ * Condensate drain with trap, included in RXS Mandatory for RXS. Also see p. 21, item 15 / ATEC spare part number 440324
- ☞ The RMB articles (black) can be supplemented as desired with standard articles (grey) from the ATEC price list.
- ☞ Exhaust air silencer on request from RMB.

9. Description of neoTower® 9.5 - 20.0

9.2 Cascade, condensing boiler, with one or two silencers

- Exhaust air set, (1)
- Flue gas set, (2)
- Reflection silencer (RXS), (3)
- Absorption silencer (ASD), (4), optional
- Reverse flow protector (RSS), (5)
- Flue-gas pressure monitor (ADW), (6)



Legend / Explanations:

Item	RMB No.	Description	Notes on installation
(1)	0120100	Exhaust air set	see page 20
(2)	0120000	Flue gas set	see page 19
(3)	3080176	RXS 1136 set	see Page 21
(4)	3080174 3080175	ASD 17 set ASD 15 set	see page 21
(5/6)	Dimensioning according to EN 13384		

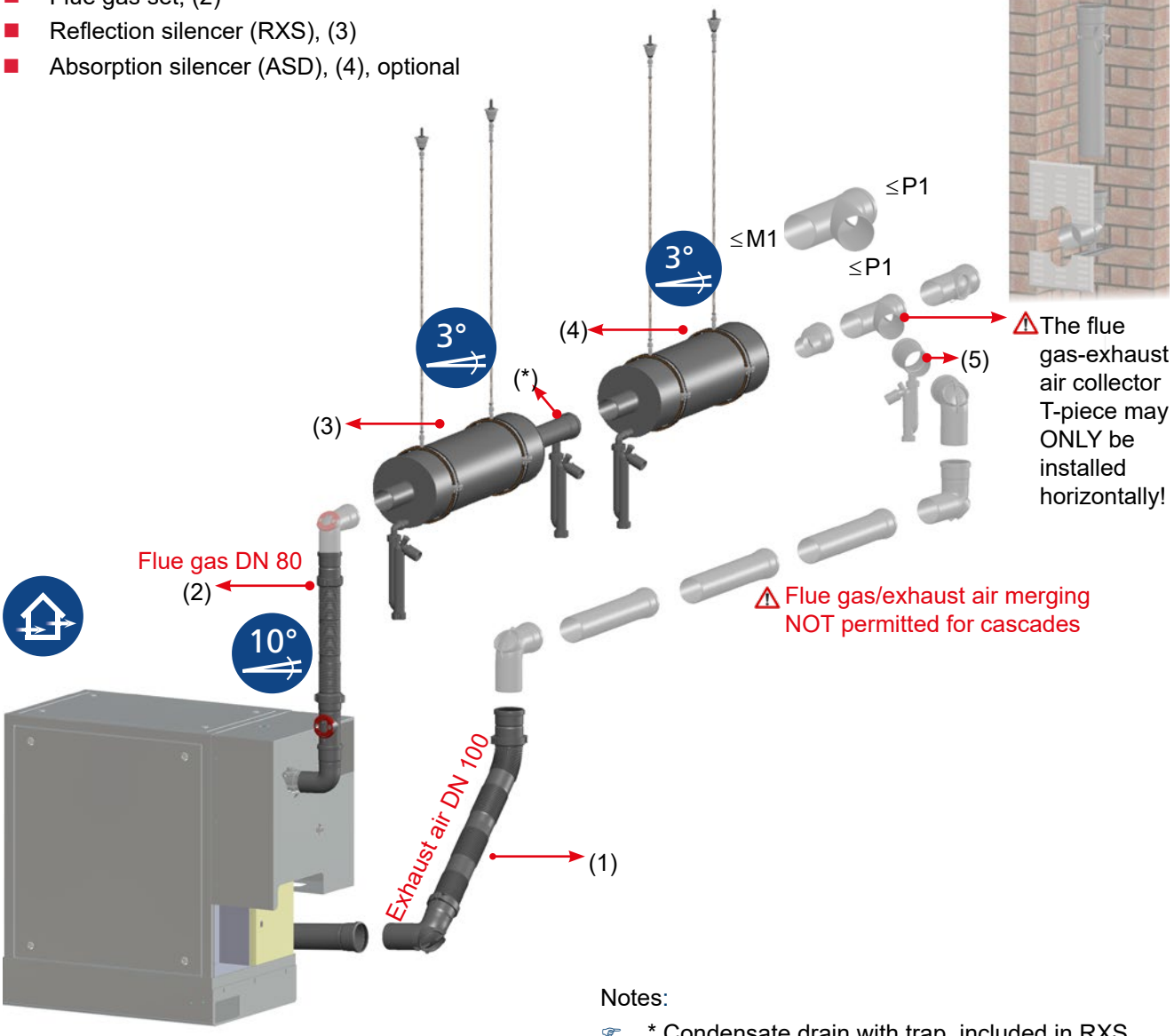
Notes:

- ☞ * RSS is integrated in the peak load boiler, otherwise request from ATEC.
- ☞ ** Condensate drain with trap, included in RXS Mandatory for RXS. Also see p. 21, item 15 / ATEC spare part number 440324
- ☞ For the construction of the cascade, see pages 25 to 29. Also observe ↗ PMH cascade Art. No. 10003653
- ☞ The RMB articles (black) can be supplemented as desired with standard articles (grey) from the ATEC price list.
- ☞ Exhaust air silencer on request from RMB.
- ☞ The cascade may consist of several CHP units and boilers up to a maximum of 1 MW

9. Description of neoTower® 9.5 - 20.0

9.3 Flue gas-exhaust air collector, with one or two silencers

- Exhaust air set, (1)
- Flue gas set, (2)
- Reflection silencer (RXS), (3)
- Absorption silencer (ASD), (4), optional



Device representation may differ

Dimensioning according to N13384

Notes:

☞ * Condensate drain with trap, included in RXS Mandatory for RXS. Also see p. 21, item 15 / ATEC spare part number 440324

☞ The RMB articles (black) can be supplemented as desired with standard articles (grey) from the ATEC price list.

☞ The devices 9.5 to 20.2 supply 150 Pa of flue-gas delivery pressure at the factory and can be adjusted up to 500 Pa depending on the requirements.

☞ Exhaust air silencer on request from RMB.

Legend / Explanations:

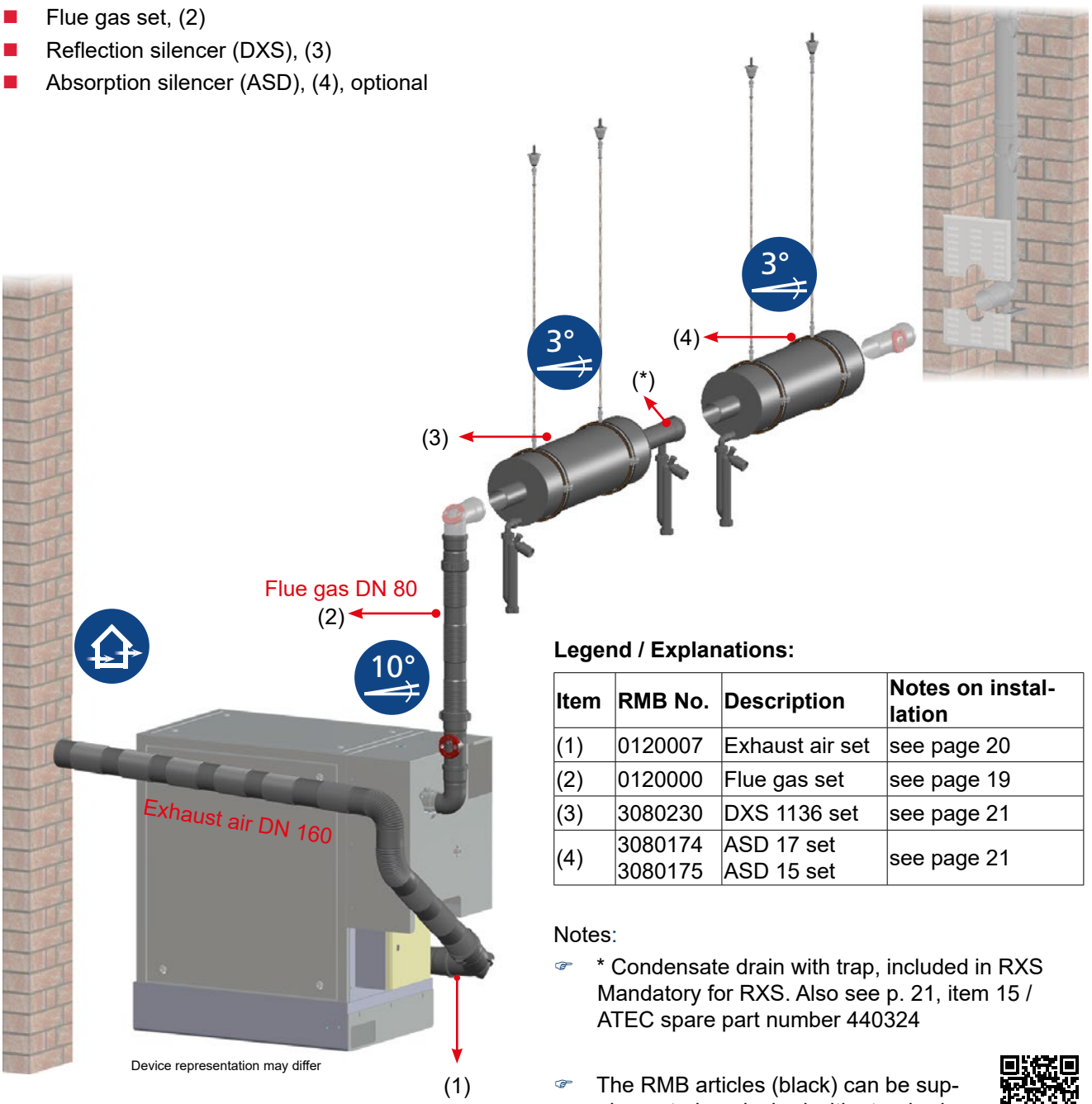
Item	RMB No.	Description	Notes on installation
(1)	0120100	Exhaust air set	see page 20
(2)	0120000	Flue gas set	see page 19
(3)	3080176	RXS 1136 set	see Page 21
(4)	3080174 3080175	ASD 17 set ASD 15 set	see page 21

Item	ATEC No.	Description	Notes on installation
(5)	4348	Condensate trap	P1 200 Pa

10. Description of neoTower® 25.0, 30.0

10.1 Single assignment with one or two silencers

- Exhaust air set, (1)
- Flue gas set, (2)
- Reflection silencer (DXS), (3)
- Absorption silencer (ASD), (4), optional



Dimensioning according to EN13384

Legend / Explanations:

Item	RMB No.	Description	Notes on installation
(1)	0120007	Exhaust air set	see page 20
(2)	0120000	Flue gas set	see page 19
(3)	3080230	DXS 1136 set	see page 21
(4)	3080174 3080175	ASD 17 set ASD 15 set	see page 21

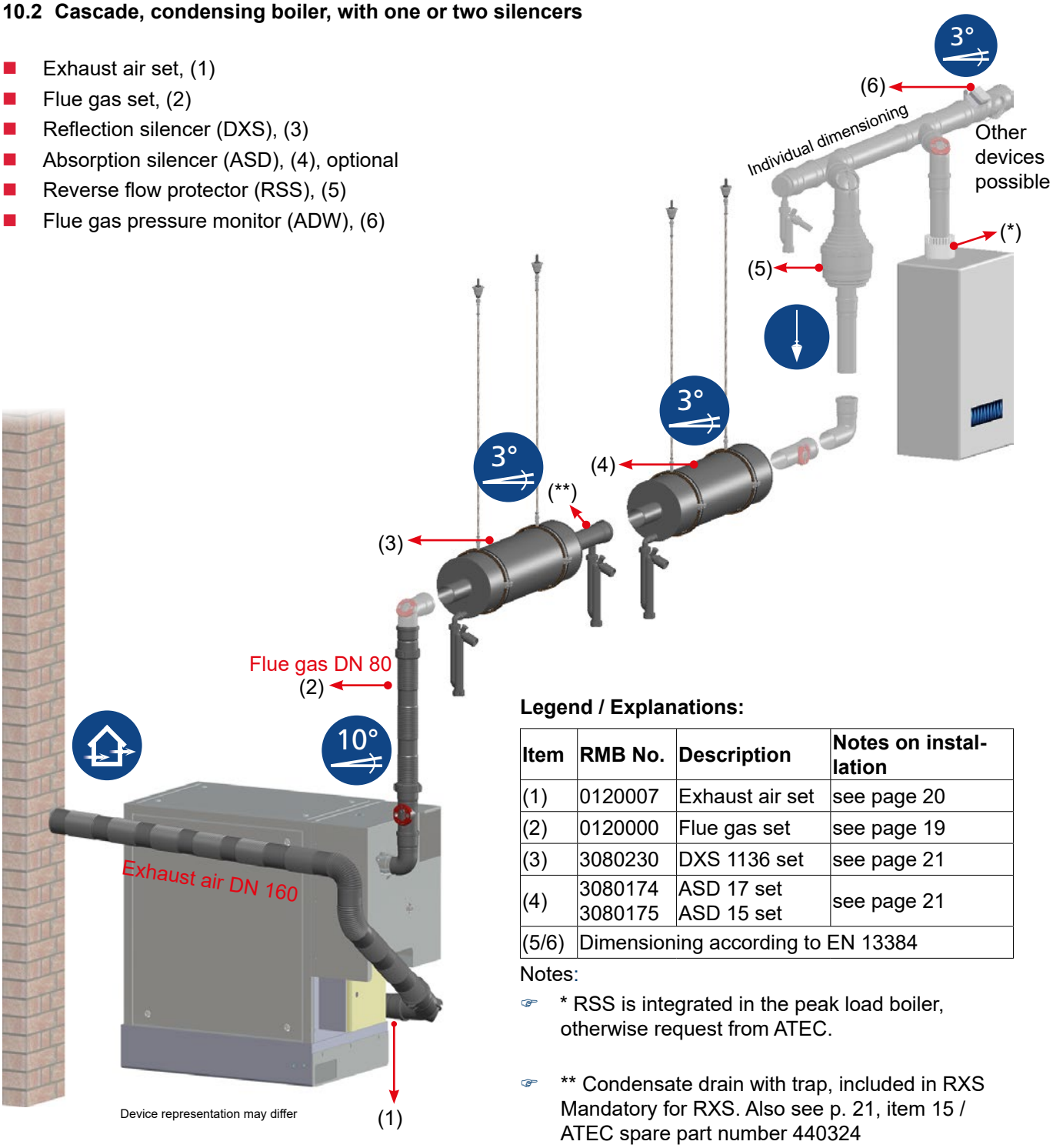
Notes:

- * Condensate drain with trap, included in RXS Mandatory for RXS. Also see p. 21, item 15 / ATEC spare part number 440324
- The RMB articles (black) can be supplemented as desired with standard articles (grey) from the ATEC price list.
- Exhaust air silencer on request from RMB.

10. Description of neoTower® 25.0, 30.0

10.2 Cascade, condensing boiler, with one or two silencers

- Exhaust air set, (1)
- Flue gas set, (2)
- Reflection silencer (DXS), (3)
- Absorption silencer (ASD), (4), optional
- Reverse flow protector (RSS), (5)
- Flue gas pressure monitor (ADW), (6)



Legend / Explanations:

Item	RMB No.	Description	Notes on installation
(1)	0120007	Exhaust air set	see page 20
(2)	0120000	Flue gas set	see page 19
(3)	3080230	DXS 1136 set	see page 21
(4)	3080174 3080175	ASD 17 set ASD 15 set	see page 21
(5/6)	Dimensioning according to EN 13384		

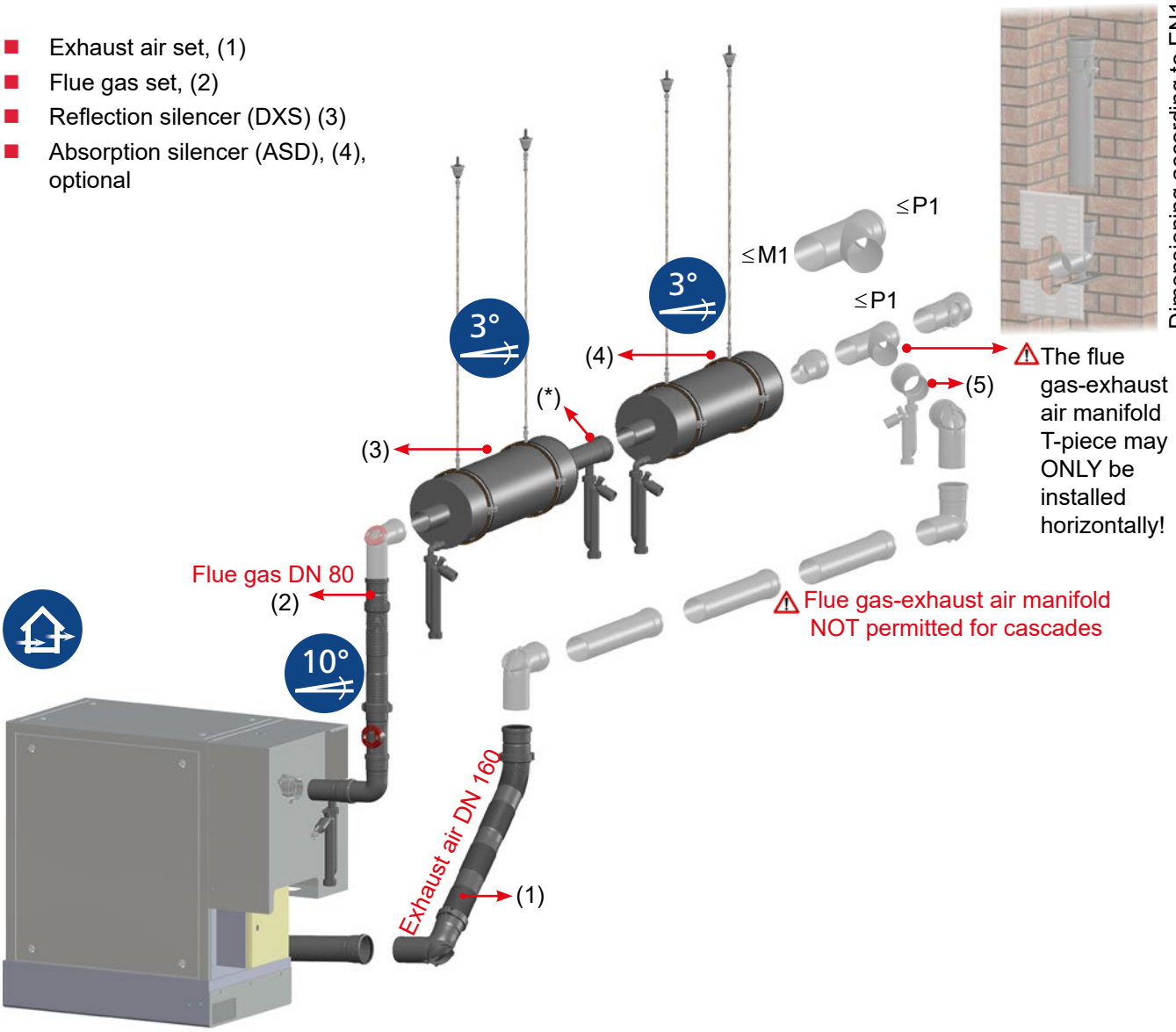
Notes:

- ☞ * RSS is integrated in the peak load boiler, otherwise request from ATEC.
- ☞ ** Condensate drain with trap, included in RXS Mandatory for RXS. Also see p. 21, item 15 / ATEC spare part number 440324
- ☞ For the construction of the cascade, see pages 25 to 29. Also observe ↗ PMH cascade Art. No. 10003653
- ☞ The RMB articles (black) can be supplemented as desired with standard articles (grey) from the ATEC price list.
- ☞ Exhaust air silencer on request from RMB.
- ☞ The cascade may consist of several CHP units and boilers up to a maximum of 1 MW

10. Description of neoTower® 25.0, 30.0

10.3 Flue gas-exhaust air manifold, with one or two silencers

- Exhaust air set, (1)
- Flue gas set, (2)
- Reflection silencer (DXS) (3)
- Absorption silencer (ASD), (4), optional



Dimensioning according to EN13384

Device representation may differ

Legend / Explanations:

Item	RMB No.	Description	Notes on installation
(1)	0120100	Exhaust air set	see page 20
(2)	0120000	Flue gas set	see page 19
(3)	3080176	RXS 1136 set	see Page 21
(4)	3080174 3080175	ASD 17 set ASD 15 set	see page 21

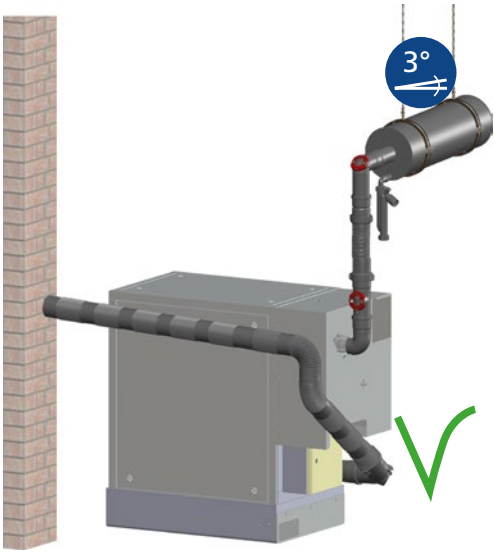
Item	ATEC No.	Description	Notes on installation
(5)	4348	Condensate trap	P1 200 Pa

Notes:

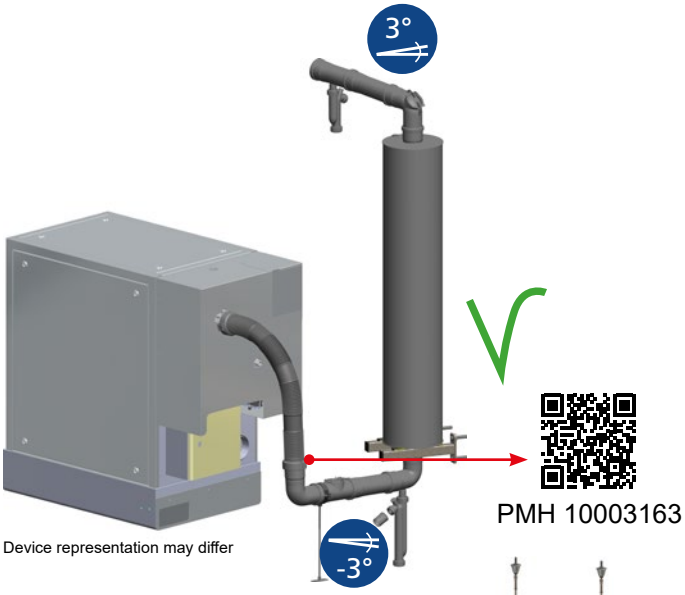
- * Condensate drain with trap, included in RXS Mandatory for RXS. Also see p. 21, item 15 / ATEC spare part number 440324
- The RMB articles (black) can be supplemented as desired with standard articles (grey) from the ATEC price list
- The devices 25.0 to 30.0 supply 150 Pa of flue-gas delivery pressure at the factory and can be adjusted up to 500 Pa depending on the requirements.
- Exhaust air silencer on request from RMB.

11. Description of neoTower® 5.0 - 30.0

11.1 Installation options of flexible connection line for neoTower® 5.0 - 30.0

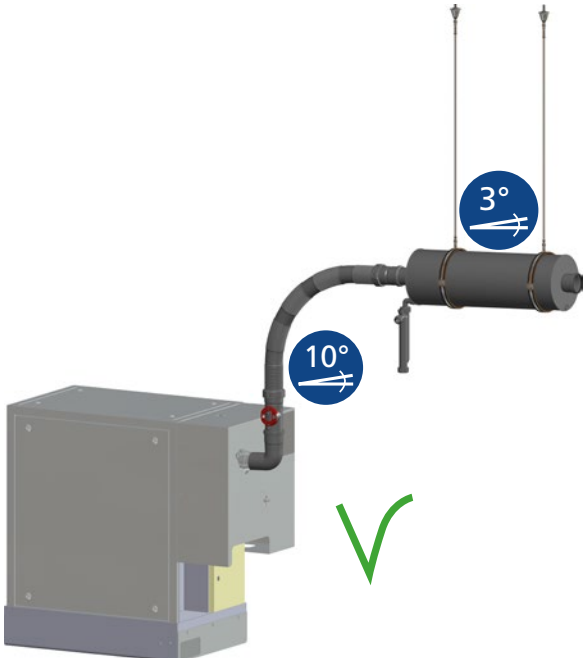


Device representation may differ

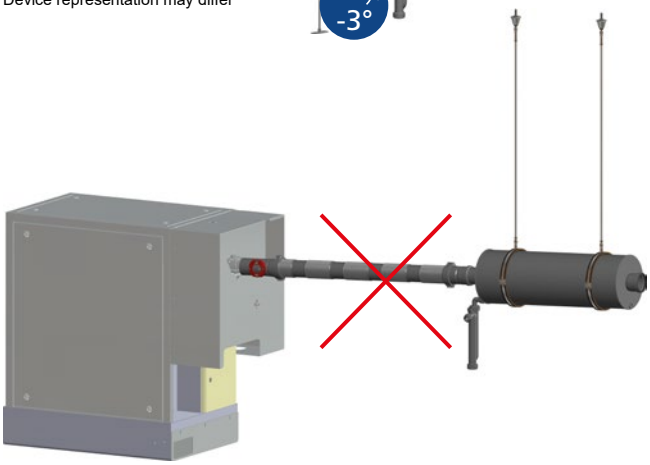


Device representation may differ

PMH 10003163



Device representation may differ

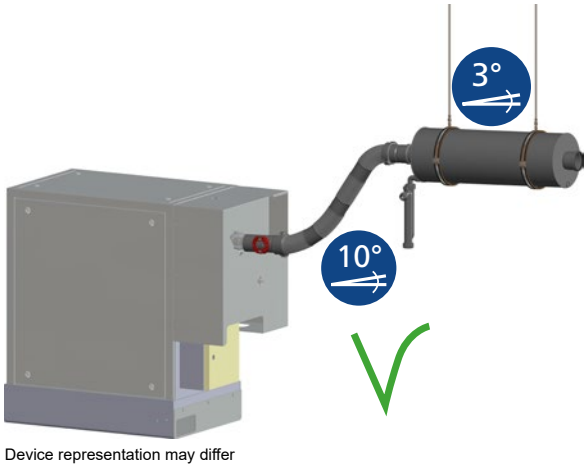


Device representation may differ

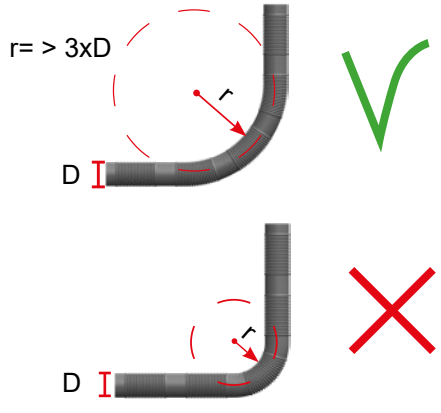
⚠ Vertical installation favoured. Alternatively with a slope (flue gas direction) of at least 10°, which means approx. 17 cm/m.

⚠ Avoidance of water pockets.

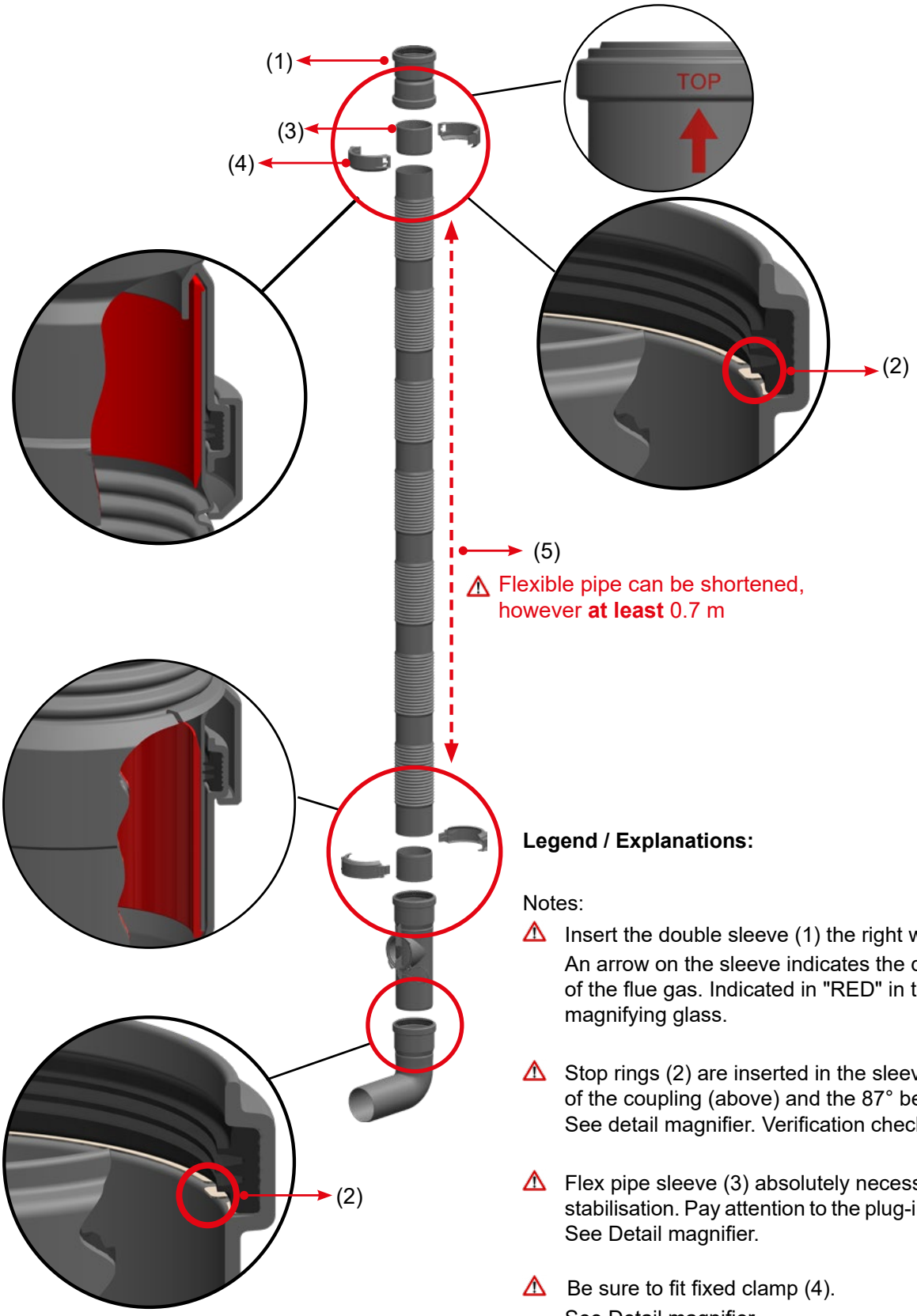
⚠ Bending radius (r) not smaller than 3x outer diameter (D) of the flexible flue pipe.



Device representation may differ



12. Flue gas set DN 80



Legend / Explanations:

Notes:

⚠ Insert the double sleeve (1) the right way round! An arrow on the sleeve indicates the direction of the flue gas. Indicated in "RED" in the magnifying glass.

⚠ Stop rings (2) are inserted in the sleeve of the coupling (above) and the 87° bend. See detail magnifier. Verification check!

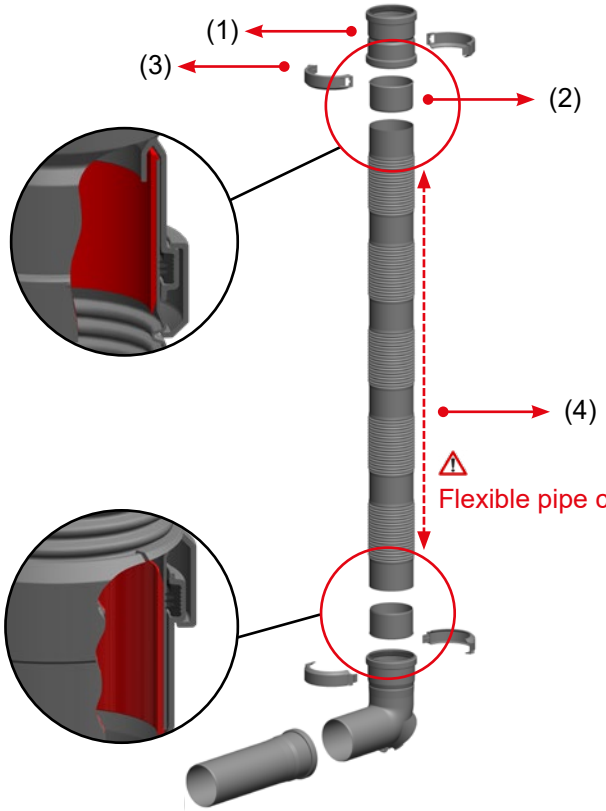
⚠ Flex pipe sleeve (3) absolutely necessary for stabilisation. Pay attention to the plug-in direction. See Detail magnifier.

⚠ Be sure to fit fixed clamp (4). See Detail magnifier.

⚠ Flex pipe (5) serves to decouple vibrations. Can be shortened to a minimum of 0.7 m.

☞ Length can be extended as required with stock items made of PolyTop (rigid/flex).

13. Exhaust air set, DN 100

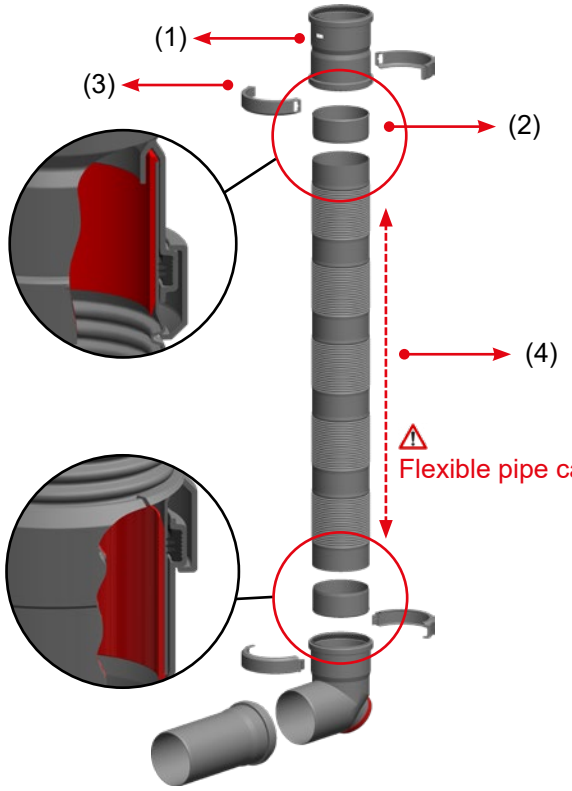


Legend / Explanations:

Notes:

- ☞ Insert the double sleeve (1) the right way round. An arrow on the sleeve indicates the direction of the flue gas.
- ☞ Flex pipe sleeve (2) absolutely necessary for stabilisation. Pay attention to the plug-in direction. See Detail magnifier.
- ☞ Be sure to fit fixed clamp (3). See Detail magnifier.
- ☞ Flex pipe (4) serves to decouple vibrations. Can be shortened to a minimum of 0.7 m.

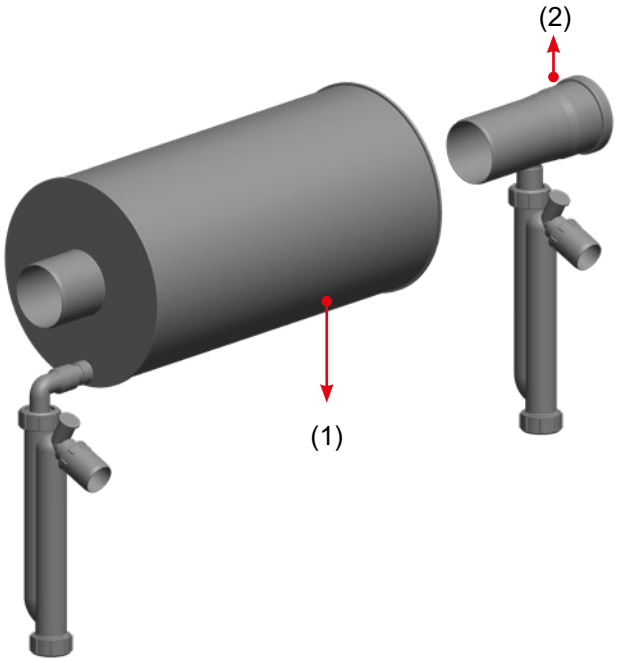
14. Exhaust air set, DN 160

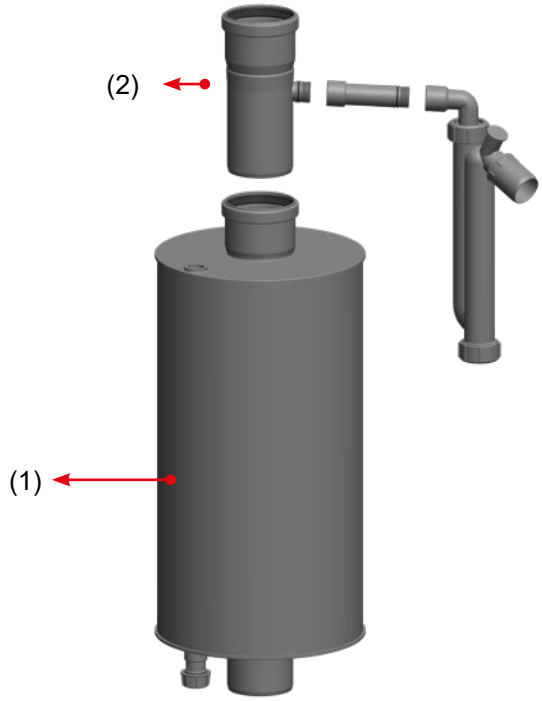


Notes:

- ☞ Insert the double sleeve (1) the right way round. An arrow on the sleeve indicates the direction of the flue gas.
- ☞ Flex pipe sleeve (2) absolutely necessary for stabilisation. Pay attention to the plug-in direction. See Detail magnifier.
- ☞ Be sure to fit fixed clamp (3). See Detail magnifier.
- ☞ Flex pipe (4) serves to decouple vibrations. Can be shortened to a minimum of 0.7 m.

15. RXS, DXS, ASD silencers





Legend / Explanations:

Notes:

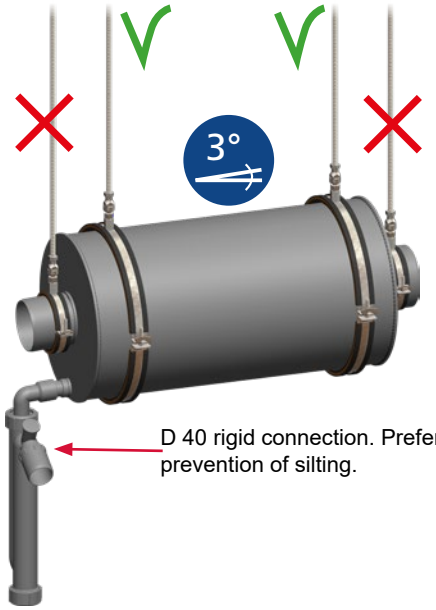
- ☞ The RXS/DXS dampens the low frequencies from approx. 50 Hz and provides vibration absorption.

  After the RXS/DXS (1), it is mandatory to use the included condensate drain (2). It reduces the amount of condensate returning, thereby improving the function of the RXS/DXS (1).

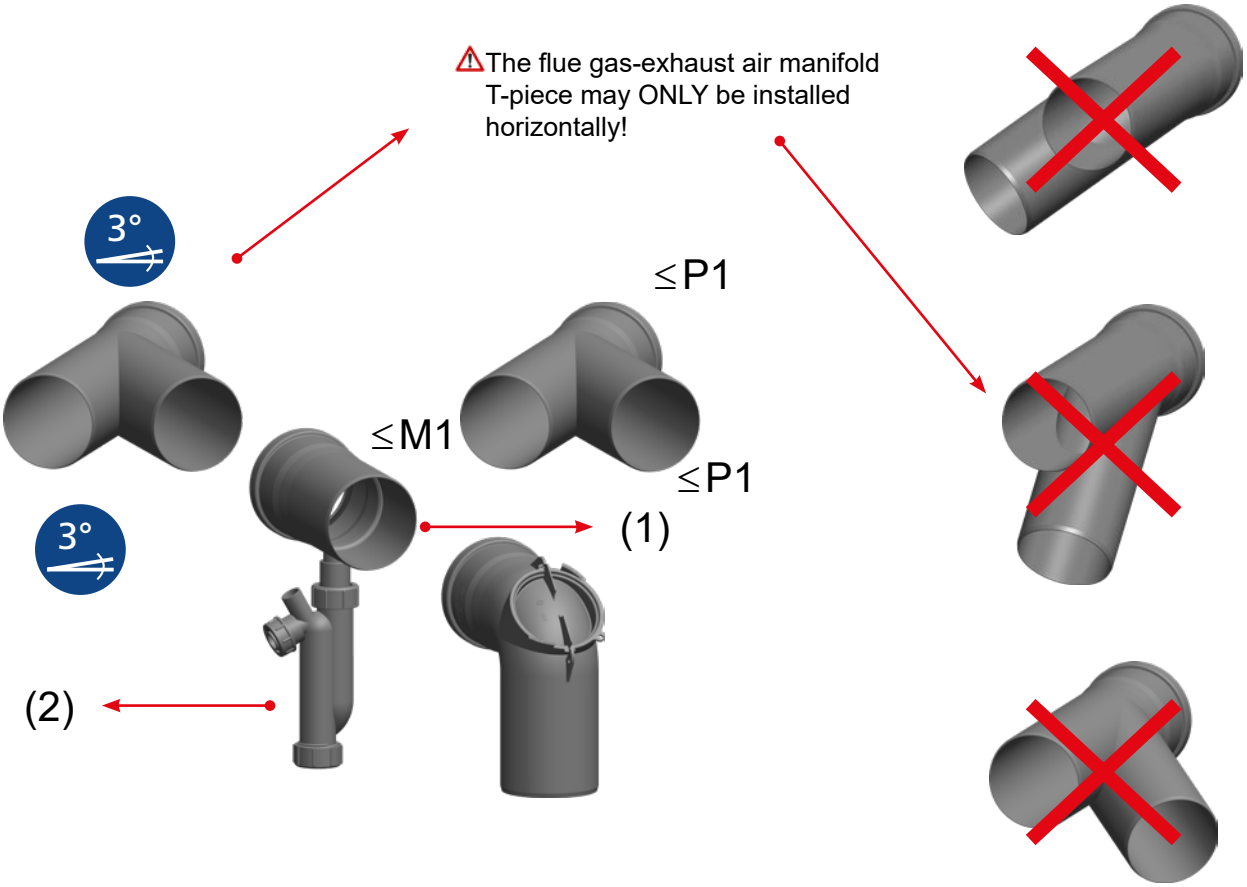
- ☞ In the sequence, the RXS/DXS (in the direction of the flue gas) must always be positioned first. Only then does the ASD follow.

- ☞ The silencers should be installed horizontally with a slope (flue gas direction) of at least 3° (approx. 5 cm/m). With on-site fastening, the silencers can also be installed vertically.

- ☞ For details on installation and use of fastening materials, see ↗ https://www.rmbenergie.com/downloadbereich/16_abgas_abluft/befestigung_fuer_schalldaempfer_und_verbindung-sleitung_-_planungs-und_montagehinweise.pdf



16. Exhaust air manifold

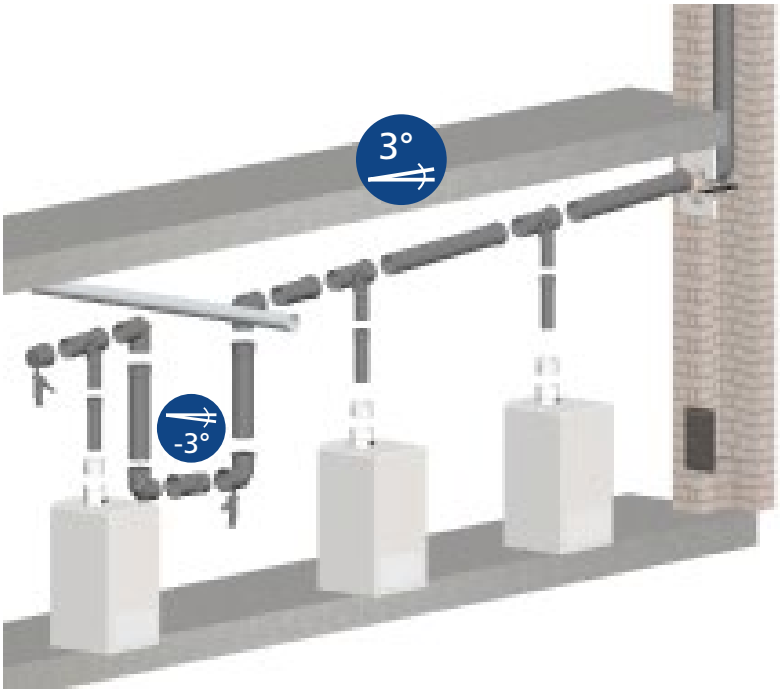


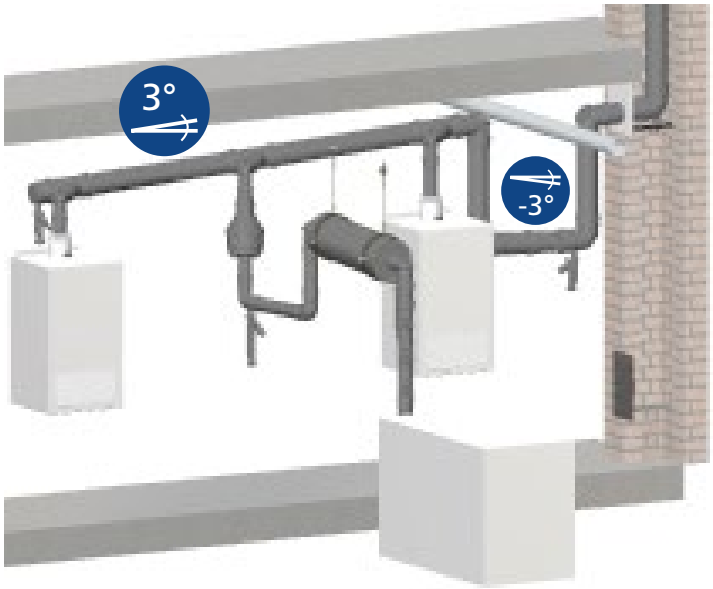
Legend / Explanations:

Notes:

- ☞ The exhaust air manifold connects to the branch of the flue pipe.
- ☞ The condensate drain (1) must be installed laterally, horizontally, but with a slope of 3° at the branch of the flue pipe. The exhaust air is therefore integrated laterally into the flue pipe at an angle of 42°.
- ☞ The condensate drain (1) must be installed horizontally with a slope of 3° to the CHP, or to the side connection and trap (2). The ATEC accessories are also equipped with drainage elbows for vertical installation.
- ⚠ The trap (2) must be completely filled with water before operating the CHP unit.
- ⚠ The exhaust air manifold may only be used for single assignment and not for cascades.

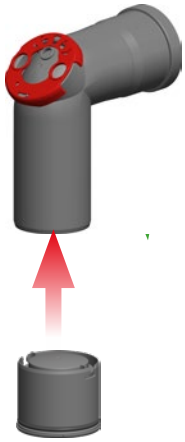
17. Installation solution counter-slope with lack of room height or other obstructions

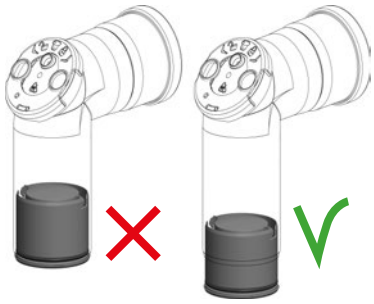


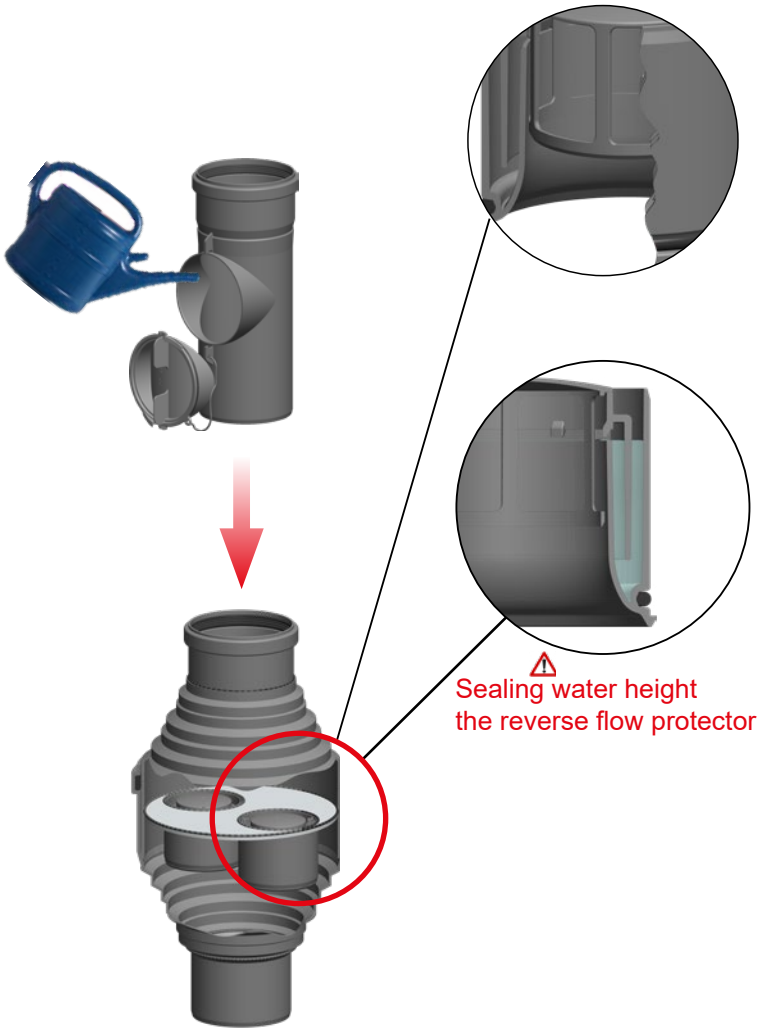


☞ Please note the ATEC information on the subject of counter slopes
↗ Article No. 10003163

18. Reverse flow protection, general operation and use







ATEC
ABGAS-TECHNOLOGIE
www.atec-abgas.de

Rückstromsicherung gemäß DVGW-G 635
TÜV-Gutachten A2040-00/13

Hier an dieser Position eingebaut:
(Nach Installation bitte Zutreffendes ankreuzen)

- ❑ Kontroll-Rohr einwandig
- ❑ Kontroll-Rohr konzentrisch
- ❑ 87°-Kontroll-Bogen einwandig
- ❑ 87°-Kontroll-Bogen konzentrisch
- ❑ im Kesselanschlußstutzen

	DN 80 ❑	DN 100 ❑	DN 110 ❑	DN 125 ❑	DN 160 ❑	DN 200 ❑
Bauhöhe (mm)	66	447	406	383	381	375
Durchmesser (mm)	80	100	110	125	160	200

Maximale Temperatur: 120 °C
Siphon: 350 Pa

03/01/2023 — Heating system construction Muster-
Montagedatum — Firma

10001638.0522

Legend / Explanations:

Notes:

⚠ The reverse flow protector must be installed completely, including the sealing ring, in the plug-in end.

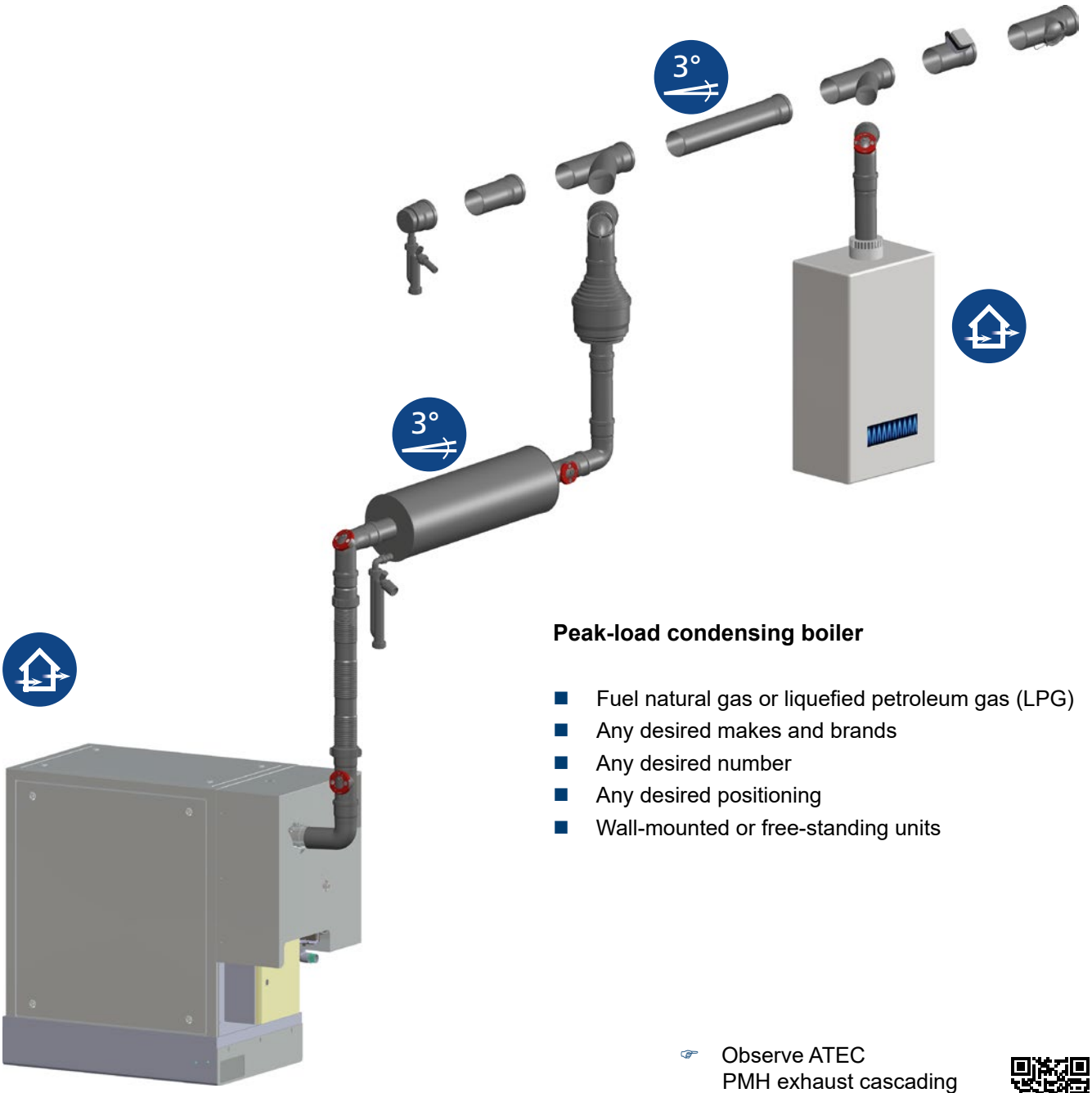
⚠ The reverse flow protector must be indicated externally with a sticker (included).
Shown opposite is an example of the corresponding ATEC sticker. Form fields must be filled in.

⚠ Reverse flow protectors have an internal trap. This must be completely filled during initial assembly.

⚠ The reverse flow protector above requires an inspection pipe or an inspection elbow for initial filling and continuous inspection.

19. Flue gas cascade for neoTower® according to DIBt Z-7.1-3538

19.1. Specifications of heat generators and CHP units with total nominal output ≤1 MW



Device representation may differ

Peak-load condensing boiler

- Fuel natural gas or liquefied petroleum gas (LPG)
- Any desired makes and brands
- Any desired number
- Any desired positioning
- Wall-mounted or free-standing units

☞ Observe ATEC PMH exhaust cascading
↗ Article No. 10003653

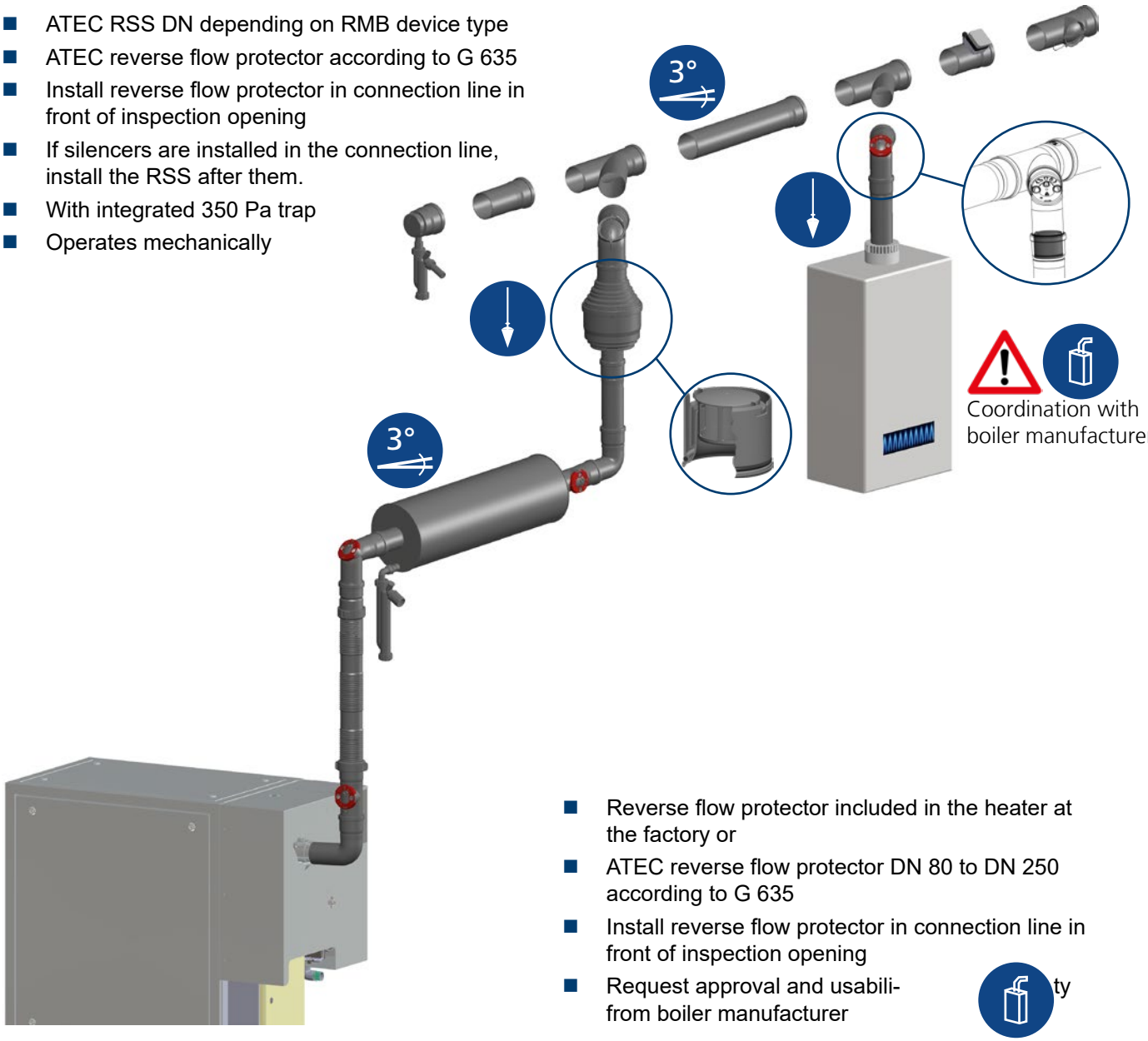
RMB neoTower® 2.0 to 50.0

- Fuel natural gas or liquefied petroleum gas (LPG)
- Electrical power up to 50 kW
- Combination with other makes and brands permitted
- Any desired number
- Any desired positioning

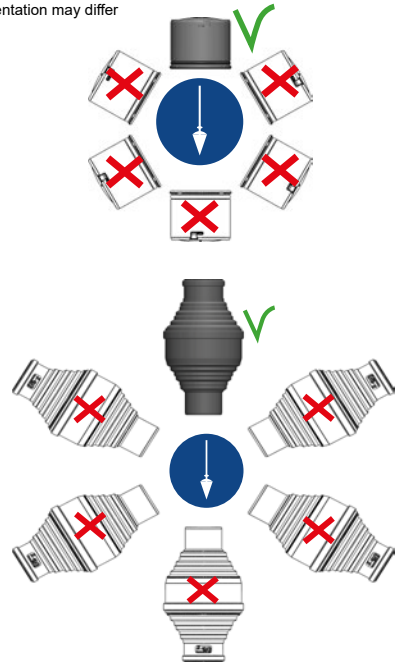
19. Flue gas cascade for neoTower® according to DIBt Z-7.1-3538

19.2. Technical requirement for RSS reverse flow protection in cascade

- ATEC RSS DN depending on RMB device type
- ATEC reverse flow protector according to G 635
- Install reverse flow protector in connection line in front of inspection opening
- If silencers are installed in the connection line, install the RSS after them.
- With integrated 350 Pa trap
- Operates mechanically



Device representation may differ



- Reverse flow protector included in the heater at the factory or
- ATEC reverse flow protector DN 80 to DN 250 according to G 635
- Install reverse flow protector in connection line in front of inspection opening
- Request approval and usability from boiler manufacturer

Notes:

⚠ The installation position of RSS reverse flow protectors must be observed. RSS included in the flue gas section of the unit at the factory for neoTower® LIVING.

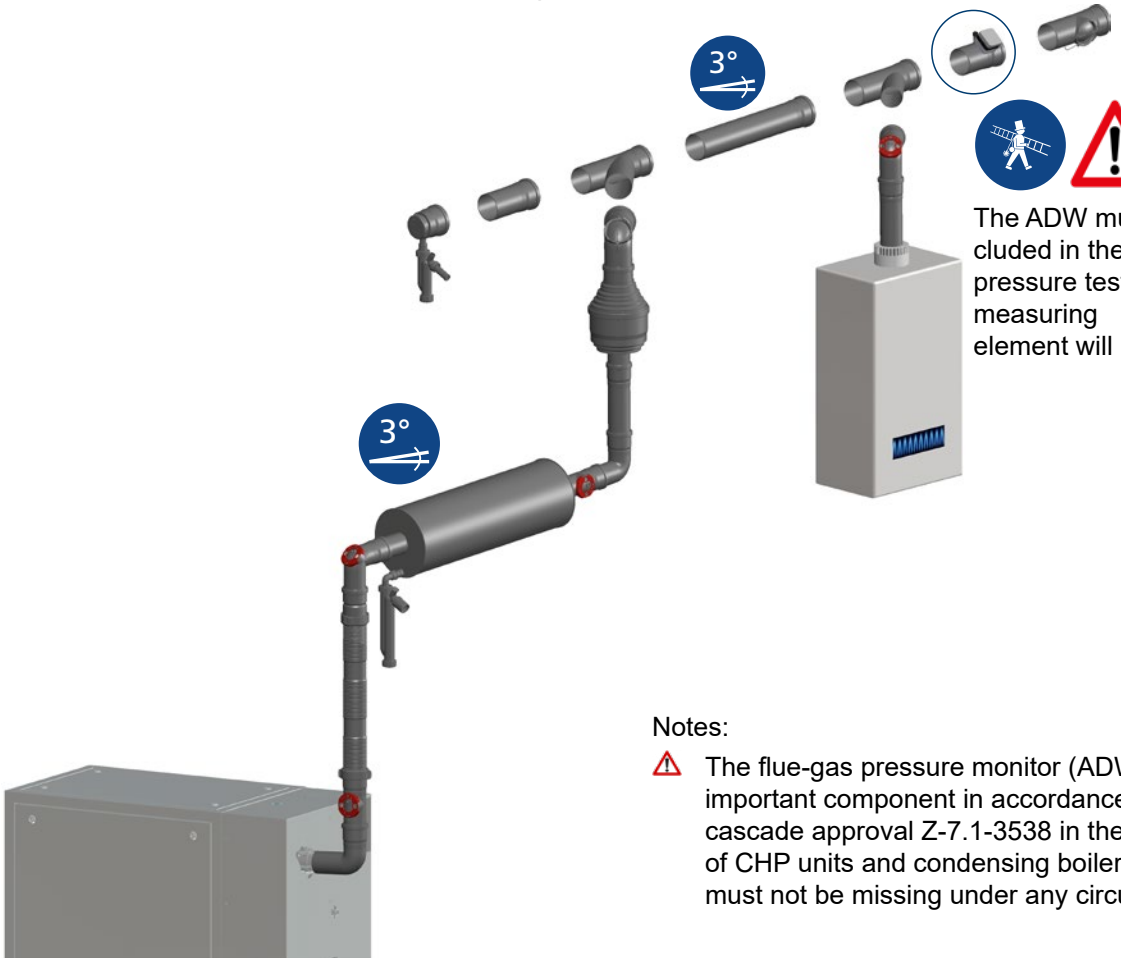
☞ Reverse flow protectors only operate vertically!

☞ The reverse flow protector must be easily accessible and replaceable for maintenance or inspection work. The large RSSs from DN 100 can be modified with a detachable connection of the outer housing.

⚠ Details on installation are provided on the following page.
Also see ATEC
↗ PMH Article No. 440743

19. Flue gas cascade for neoTower® according to DIBt Z-7.1-3538

19.3. Technical requirements of ADW flue-gas pressure monitor in cascade



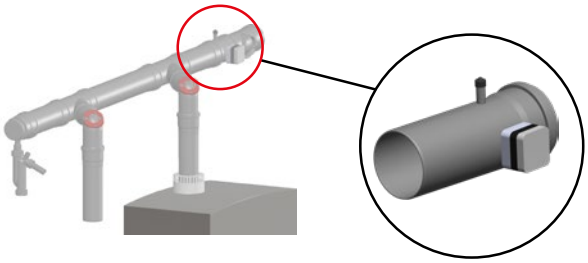
Device representation may differ

The ADW must not be included in the flue system pressure test, otherwise the measuring element will be destroyed.

- Pressure monitoring in manifold ≤ 50 Pa
- Make ATEC ADW DN 100 to 250
- Wired to safety chain of all gas devices in the cascade (see page 28)
- Positioning before entering the vertical section
- Position is clamped onto the Emergency-Stop Chain of the neoTower®, see RMB documents for the device

⚠ Condensate must not enter the flue-gas pressure monitor.

⚠ All settings and adjustment values only in accordance with approval Z-7.1-3538.



Notes:

⚠ The flue-gas pressure monitor (ADW) is an important component in accordance with flue gas cascade approval Z-7.1-3538 in the safety chain of CHP units and condensing boilers. The monitor must not be missing under any circumstances!

☞ The ADW is electrically wired according to the wiring diagram on page 28. It monitors thepressure in the manifold (max. 50 Pa.) If this is exceeded, it switches off all heat generators.

☞ The ADW is inserted into the cascade manifold after the last device inlet (in the direction of the flue gas) and upstream of the inspection piece, i.e. before entry into the vertical flue-gas pipe section.

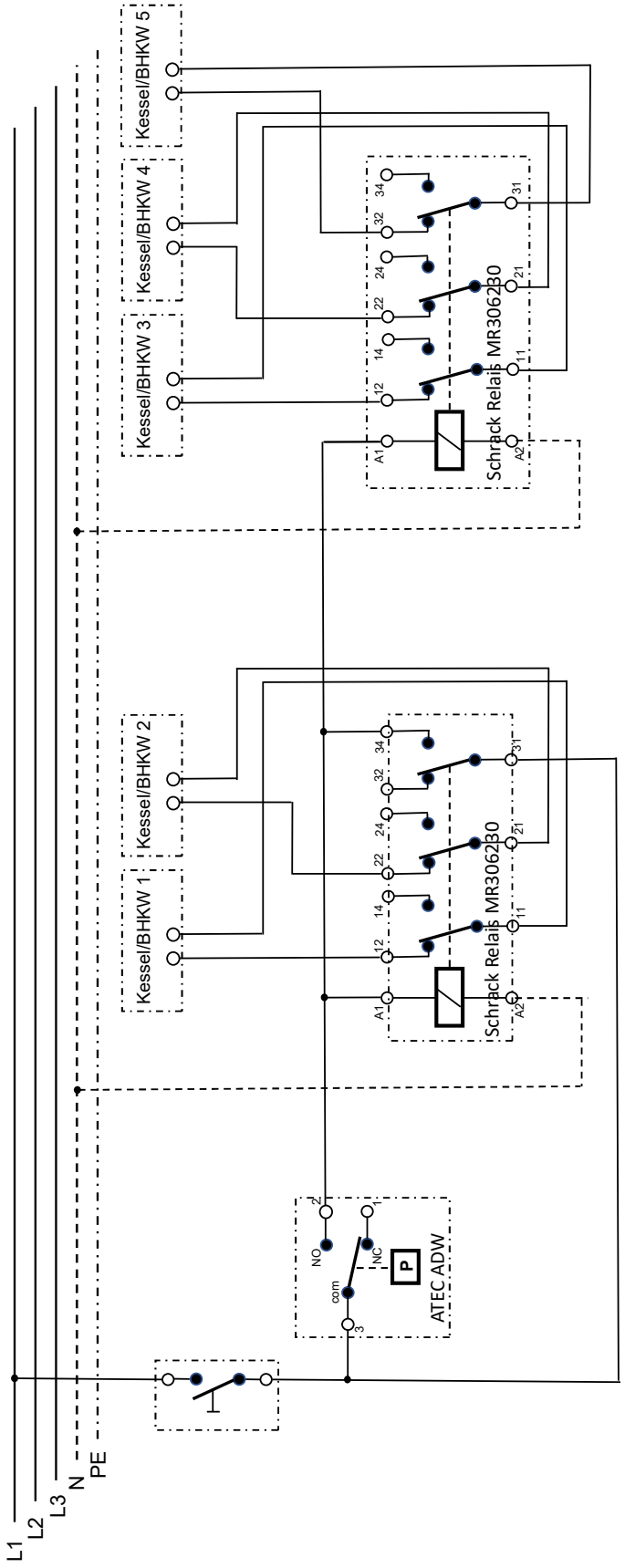
☞ As part of the system maintenance, the ADW must be must be checked or maintained at regular intervals. However, at least annually. For this purpose, it must be installed so that it is freely accessible.

⚠ The installation position of the ADW is important for the operational safety of the entire system. It can be installed vertically or horizontally. If the unit is installed in a horizontal position, attention must be paid to the flow of condensate.
Turn the ADW so that the pressure sensor is significantly above the condensate flow.

☞ The connection diagram for the control line can be found in the RMB control cabinet or on request at technischer_vertrieb_rmb@yanmar.com.

19. Flue gas cascade for neoTower® according to DIBt Z-7.1-3538

19.4. Electrical installation diagram for AWD flue-gas pressure monitor

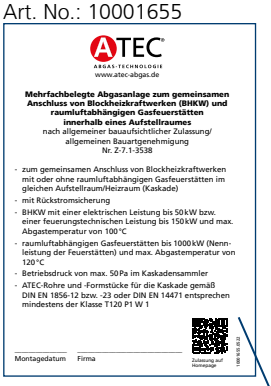


- In the fault-free operating state, all contactors/relays are de-energised. The boiler and CHP safety contacts are each on de-energised contacts of the contactors/relays.
- The ADW only switches over when the pressure in the cascade manifold exceeds 50 Pa and the contactors/relays open the safety chain of all units.
- Electrical wiring is carried out on site by a specialist technician/electrician
- Contactors/relays are included in the scope of delivery Specialist technician/electrician
- Wiring diagrams for the CHP unit on request from RMB technischer_vertrieb_rmb@yanmar.com

19. Flue gas cascade for neoTower® according to DIBt Z-7.1-3538

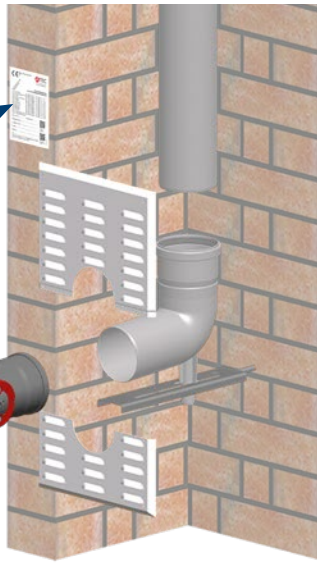
19.5. Flue system and flue gas routing markings

Attach the approval sticker Cascade CHP to the manifold
Art. No.: 10001655

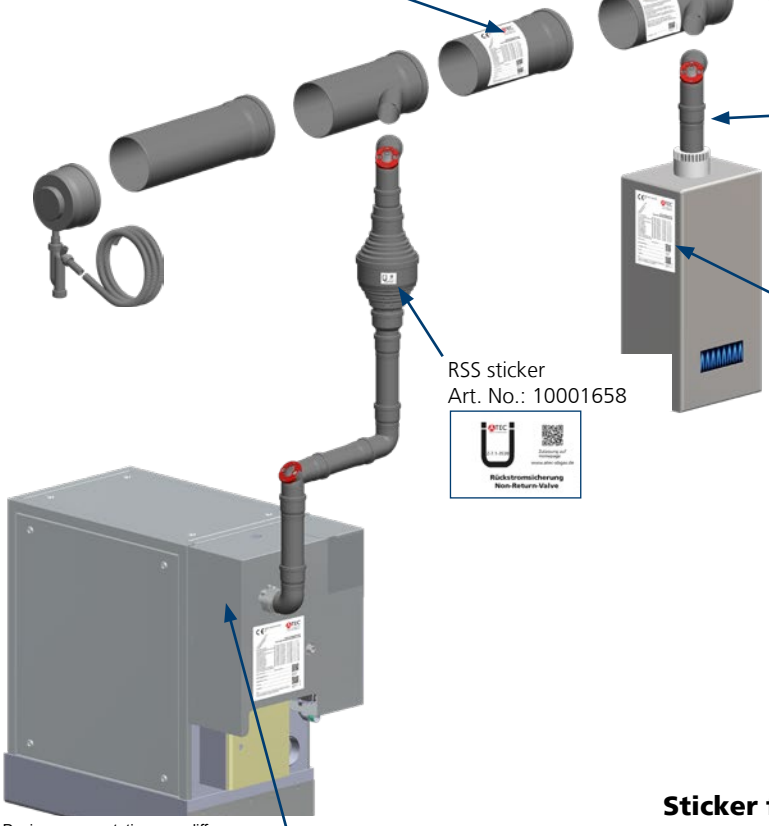


CE sticker 200 Pa=P1
Art. No.: 10001618

CE sticker 200 Pa=P1
CE sticker for the vertical section, depending on make and model



RSS sticker
Art. No.: 10001658



RSS sticker
Art. No.: 10001658

CE sticker 200 Pa=P1
Art. No.: 10001618

Device representation may differ

CE sticker 1,500 Pa= M1
Art. No.: 10001618

Sticker from ATEC

- CE sticker 10001618
- Sticker for RSS 10001658
- Sticker for cascade 10001655

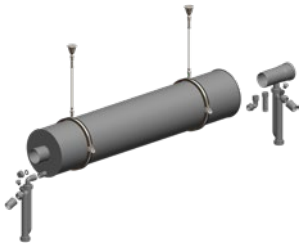
For additional information on CE sticker, see Explanatory video 10003518

20. Flue gas silencer

20.1. Reflection (RXS), double-pipe reflection (DXS) and absorption silencers (ASD) in various attenuating classes.

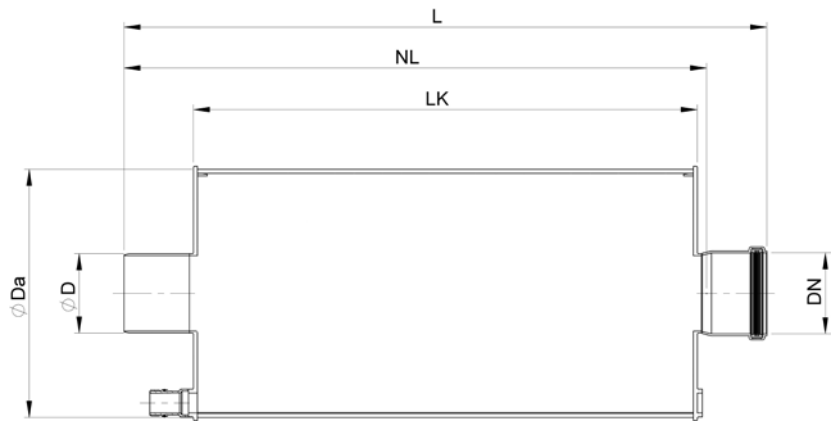
ASD

RXS-1136 / DXS-1135



Silencer model	RXS-1136	DXS-1135	ASD-15*	ASD-17
Article No.	3080176	3080230	3080175	3080174
	Technical data			
Material	PP	PP	PP	PP
Attenuating class in dB (DK)	-	-	25	35
Length of attenuator body in mm (LK)	1300	1300	500	750
Effective length in mm (NL)	1380	1380	588	838
Total length in mm (L)	1440	1440	648	898
Outside diameter in mm (Da)	250	250	250	250
Flue gas inlet in mm (D)	80	80	80	80
Flue gas outlet in mm (D)	80	80	80	80
Total weight in kg	5.5	5.5	5.9	7.7
Drag coefficient	22.4	11.2	0.1	0.1
Suitable for neoTower®	2.0 - 20.0	25.0 - 30.0	2.0 - 30.0	2.0 - 30.0

* Special solution



20. Flue gas silencer

20.1. Technical specifications and insertion loss of flue gas silencers

ASD, RXS & DXS:

- Silencer made of black polypropylene plastic (PP)
- Filling hydrophobic rock wool with ASD
- Standard DN 80 connections suitable for ATEC PolyTop
- Max. flue gas temperature 100 °C
- Overpressure-tight to 5,000 Pa
- Installation position horizontal or vertical
- Ball trap 200 mm sealing water height (pressure class M1)
- Trap outlet D 40 HT
- Additional condensate drain incl. trap for model RXS and DXS
- Fastening set included (not with ASD-K51)

Insertion loss De in dB(A) in individual one-third octave frequencies F [Hz]

Model	ASD-15	ASD-17	RXS-1136	RXS-1136 + ASD-17	DXS-1135	DXS-1135 + ASD-17
F [Hz]	De dB(A)	De dB(A)	De dB(A)	De dB(A)	De dB(A)	De dB(A)
25	3	3	-	6	7	9
31.5	3	4	-	8	7	10
40	4	5	3	14	14	16
50	4	6	16	19	22	25
63	6	7	1	18	15	17
80	7	10	11	26	14	16
100	9	13	29	41	29	32
125	12	16	18	28	14	16
160	15	21	15	27	17	20
200	18	26	12	32	12	15
250	22	32	9	29	11	14
315	27	39	13	29	6	9
400	32	45	12	30	8	10
500	39	45	6	30	11	14
630	45	45	4	24	11	14
800	45	45	7	18	9	11
1,000	45	45	6	25	13	16
1,250	45	45	5	29	14	18
1,600	45	45	-	18	10	14
2,000	45	45	-	18	7	10
2,500	45	45	-	15	6	10
3,150	45	45	-	10	6	10
4,000	45	45	-	10	11	14
5,000	45	45	-	9	11	13
6,300	40	45	-	9	11	12
8,000	22	35	-	6	12	12

Remark:
The limiting loss limits the maximum achievable insertion loss. This is because at high levels, instead of being reduced in the attenuating material, the sound is partly emitted via secondary paths, such as the silencer housing or the connection line. Limiting loss here at least 45 dB(A).

21. Safety checklist

All questions must be answered with a clear "OK". If the questions are unclear or the answer cannot be given with a clear "OK", caution is advised. Both ATEC and RMB will be happy to provide support here.

The following list is only an excerpt of questions to be considered and does not claim to be exhaustive.

General:

- ☐ Are all connections sealed? Pressure test with 200 Pa (P1).
- ☐ Are all connection lines from the CHP to the cascade manifold sealed? Pressure test with 1,500 Pa (M1).
- ☐ Is a planning and chimney cross-section dimensioning available according to EN 13384?
- ☐ Is the necessary slope always maintained in all sections? At least 3° (5 cm/m), or at least 10 ° (17 cm/m) for flexible line.
- ☐ Is the authorised district chimney sweep involved in the project?
- ☐ Are all fastenings sound and vibration-decoupled?
- ☐ Are all traps sufficiently filled before the first start-up?
- ☐ Are hanging components secured against loosening/falling down?
- ☐ Is the inlet to the shaft/chimney or wall soundproofed?
- ☐ Is the annular gap in the shaft, i.e. around the flue pipe, complied with and is the flue pipe back-ventilated using the co-current principle?
- ☐ Are the components freely accessible for maintenance/inspection?
- ☐ Do all sleeves point in the direction of the flue gas?
- ☐ Are all flue pipe sections marked with CE stickers?

Flexible flue-gas connection pipe:

- ☐ Has the slope been observed? At least 10°, or 17 cm/m.
- ☐ Are water pockets and therefore a pulling apart of the flue pipe avoided?
- ☐ Does the double sleeve point in the direction of the flue gas? Observe arrow on sleeve.
- ☐ Are the stop ring, flexible pipe sleeve and fixing clamp correctly applied?
- ☐ Is the flexible section (with or without 87° elbow), for vibration decoupling, connected directly to the device connection?
- ☐ Is the flexible part at least 0.7 m long?

Silencers (RXS/DXS and ASD):

- ☐ Silencers are not mandatory, but are recommended by RMB and ATEC. Have the installation conditions been checked and, if necessary, provided for in such a way that a silencer can also be retrofitted?
- ☐ Is/are the silencer(s) positioned so that the condensate can drain out via the trap? Minimum slope 3° or 5 cm/m.
- ☐ Silencers positioned vertically do not need to be connected to a trap. Is the condensate drain closed?
- ☐ Is the reflection silencer (RXS/DXS) installed upstream of the absorption silencer (ASD)?
- ☐ Are the sound-decoupled pipe clamps applied correctly?

Reverse flow protector (RSS) for flue gas cascade (except LIVING, as integrated):

- ☐ Reverse flow protectors are necessary for cascades. Are these planned and positioned correctly?
- ☐ Is the reverse flow protector of the CHP correctly positioned behind the silencer(s) and before entering the manifold?
- ☐ Is/are the reverse flow protector(s) installed vertically? NOT slanted/horizontal.
- ☐ Is an inspection element provided above the reverse flow protector(s) for testing and initial filling?
- ☐ Is/are the reverse flow protector(s) sufficiently filled with water when the system is put into operation?
- ☐ Has the necessary marking (sticker) been applied in a suitable place?

Flue-gas pressure switch (ADW) for flue gas cascade:

- ☐ Is the ADW positioned correctly? Namely after the last inlet (branch 42°) into the manifold?
- ☐ Is the ADW turned correctly and is the sensor outside the condensate flow?
- ☐ Is the ADW correctly connected and are all flue-gas cascade devices electrically integrated in the safety chain?
- ☐ Have pressure tests (limit pressure 50 Pa) been carried out to check switching off of all furnaces?

22. Cross-sectional dimensioning according to EN 13384-1 and based on EN 13384-2

Each system must be calculated and verified individually. Flue gas cascading of CHP units or CHP units with condensing boilers may only be calculated by ATEC according to the approval.
Please provide ATEC with all system data so that ATEC can individually determine the cross-section dimensioning for you free of charge.

The cross-section calculation must be submitted at the time of commissioning.

The online form "Cross-section calculation questionnaire" serves as a checklist. You will find the form in the download area at

↗ **www.rmbenergie.com/downloads/dokumente/**

23. Approval of cascade flue systems

For the construction of cascade flue systems with a combination of combined heat and power units and gas furnaces, a general construction type approval has been applied for from the Deutsches Institut für Bautechnik (German Institute for Construction Technology). This is registered under the number Z-7.1-3538.

Flue gas cascades are pressurised by the chimney sweep with a maximum of M1(1,500 Pa) in the connection line of the CHP(s), all other sections only with P1 (200 Pa).

Flue gas cascades must be certified for the customer and chimney sweep with a completed and signed specialist contractor declaration. You will find the specialist contractor form at

↗ https://oxomi.com/p/2024648/catalog/10262809?page=19

24. General information

These installation instructions do not claim to be complete. The installation is the responsibility of the specialist trade. We recommend coordinating this with the authorised district chimney sweep. When installing the flue systems, further building regulations, standards, codes and ordinances, the installation instructions for the
heating devices to be connected as well as the RMB installation instructions must be observed.

Please be sure to observe the usual protective measures.

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Please download the form first, then fill it out completely and send it by e-mail.

Documentation sheet for CHP and CHP condensing boiler cascades

Please send us the following documents:

- ❑ **Cross-section calculation according to EN13384**
- ❑ **Offer**
- ❑ **System already installed,**
  then enter the flue gas dimensions for DN below

Installation location of the system:

System ID No. _____

Furnaces: _____ _____ _____ _____

_____ _____ _____ _____

Model: _____ _____ _____ _____

_____ _____ _____ _____

Output: _____ _____ _____ _____

_____ _____ _____ _____

[ ] Number of furnaces

Room-air-dependent operating mode
- ❑ Cascade with separate Exhaust air routing
- ❑ Individual system without exhaust air inlet in flue pipe
- ❑ Individual system with exhaust air inlet in flue pipe

Connection lines for each unit:

		Device 1	Device 2	Device 3	Device 4
Connection line dia.	DN				
87° inspection elbow	Pc.				
87° elbow	Pc.				
45° elbow	Pc.				
Length of section	m				
Counter-slope in m	m				
RXS, DXS silencers	Pc.				
ASD silencers	Pc.				

Cascade line/manifold, DN dia.: _____

_____ x 45° elbow _____ x 87° inspection elbow _____ m counter-slope (Height difference)

_____ x 87° elbow _____ m length of section

Vertical section:
Vertical length of riser _____ m DN: dia. _____

Inspection opening in vertical section: ❑ yes

Shaft size (mm): round _____ square _____ x _____

Flexible pipe: ❑ yes

Outer wall installation WhitePoly: ❑ yes Wall clearance*: _____ mm

Outer wall installation IronPoly: ❑ yes Wall clearance*: _____ mm

Special surface: ❑ yes _____

Drawing (attach separate sheet if more space is required):

* Wall distance from wall to rear side of flue pipe

Date: _____

Responsible: _____

Deadline: _____

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Notes

YOUR PARTNER FOR CHP

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