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Air diffusers

Slot Diffusers Type TSD

Product overview



- 1 TSD diffuser face; 1, 2, 3 or 4 slots
- 2 Air control blade
- 3 End plate/angle (optional)
- 4 Concealed plenum fixing S11 (optional)
- 5 AKV TSD plenum box

- 6 Plenum box support hole (11 × 7)
- 7 Plenum box support bracket (11 × 7)
- 8 Spigot
- 9 Spigot damper (optional)

Fig. 1: TSD schematic diagram

Important notes

Information on the installation manual

This manual enables operating or service personnel to correctly install the product described below and to use it safely and efficiently.

It is essential that these individuals read and fully understand this manual before starting any work. The basic prerequisite for safe working is to comply with the safety notes and all instructions in this manual.

The local regulations for health and safety at work and general safety regulations also apply.

Qualified staff

Specialist personnel

Specialist personnel are individuals who have sufficient professional or technical training, knowledge and actual experience to enable them to carry out their assigned duties, understand any potential hazards related to the work under consideration, and recognise and avoid any risks involved.

Limitation of liability

The information in this manual has been compiled with reference to the applicable standards and guidelines, the state of the art, and our expertise and experience of many years.

The manufacturer does not accept any liability for damages resulting from:

- Non-compliance with this manual
- Incorrect use
- Operation or handling by untrained individuals
- Unauthorised modifications

The actual scope of delivery may differ from the information in this manual for special constructions, additional order options or as a result of recent technical changes.

Personal protective equipment

Personal protective equipment must be worn for any work in order to reduce health or safety hazards to the minimum.

The appropriate protective equipment for a job must be worn for as long as the job takes.

Industrial safety helmet

Industrial safety helmets protect suspended loads, and the effects stationary objects.



Industrial safety glasses

Industrial safety glasses protect the eyes from materials or debris and the effects of striking the head against stationary objects.



Protective gloves

Protective gloves protect hands from friction, abrasions, punctures, deep cuts, and direct contact with hot surfaces



Safety shoes

Safety shoes protect the feet and prevent slipping on a slippery floor.



Correct use

Air terminal devices are used for the ventilation of internal spaces in industrial and comfort areas.

The air terminal devices are connected to a supply air or extract air system (by others), which is typically connected to and air handling terminal unit (AHU, FCU etc.).

Air terminal devices supply cold or warm air to rooms (within the stated supply air to room air temperature differences).

Installation, operation and maintenance may have to meet increased hygiene requirements for certain areas of application.

The installation of air terminal devices in humid rooms, areas with potentially explosive atmospheres or rooms with dust-laden or aggressive air has to be assessed for each individual case.

Transport and storage

Delivery check

Upon delivery, carefully remove the packaging and check the unit for transport damage and completeness. In case of any damage or an incomplete shipment, contact the shipping company and your supplier immediately. Put the product back into its packaging after the delivery check to protect it from dust and contamination.



Fixing and installation material

Fixing and installation material is not part of the supply package (unless stated otherwise), but has to be provided by others; it has to be suitable for the installation situation.



Factory setting

The air control elements within TSD diffusers specified with alternating horizontal airflow are factory set. Changing this factory setting increases the commissioning time and cost. Be careful when you unpack and install the diffusers so as not to accidentally change their position.

Transport on site



CAUTION!

Danger of injury from sharp edges, sharp corners and thin sheet metal parts!

Sharp edges, sharp corners and thin sheet metal parts may cause cuts or grazes.

- Be careful when carrying out any work.
- Wear protective gloves, safety shoes and a hard hat.

Please note:

- Be careful when unloading or moving the product, and pay attention to the symbols and information on the packaging.
- If possible, take the product in its transport packaging up to the installation location.
- Use only lifting and transport gear designed for the required load.
- Always secure the load against tipping and falling.
- Do not move bulky items just by yourself. Get help to prevent injuries and damage.

Storage

Please note:

- Store the product only in its original packaging
- Protect the product from the effects of weather
- Protect the product from humidity, dust and contamination
- Storage temperature: -10 °C to 50 °C.
- Relative humidity: 95% max., no condensation

Packaging

Properly dispose of packaging material.

Technical data

Dimensions

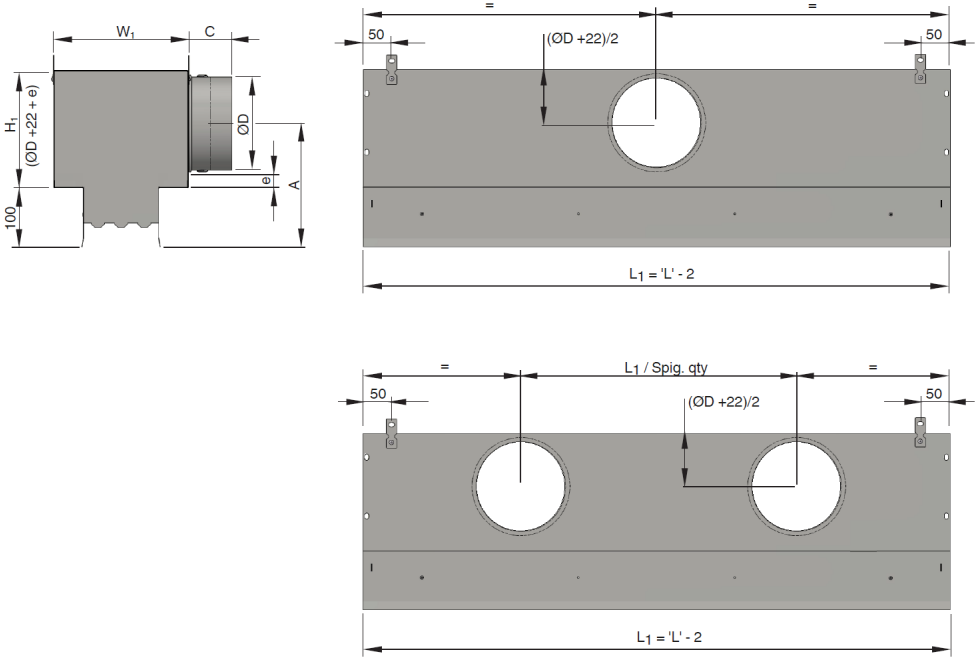


Fig. 2: Dimensions and spigot arrangement for construction ZH/AH

TSD type	W_1	$\varnothing D$	A^{**}	H_1	C
TSD15-1	145.5	123	174.0	145	40/75*
		138	181.5	160	
TSD15-2	180.0	138	181.5	160	
		158	191.5	180	
TSD15-3	214.5	158	191.5	180	
		198	211.5	220	
TSD15-4	249.0	198	211.5	220	
		248	236.5	270	

C*: Increase spigot length for M, MC damper options A**: Values for plenum with 'e' = 0

TSD type	W ₁	ØD	A**	H ₁	C
			[mm]		
TSD20-1	150.5	123	174.0	145	40/75*
		158	191.5	180	
TSD20-2	190.0	158	191.5	180	
		198	211.5	220	
TSD20-3	229.5	198	211.5	220	
		248	236.5	270	
TSD20-4	269	248	236.5	270	
		313	269.0	335	

C*: Increase spigot length for M, MC damper options A**: Values for plenum with 'e' = 0

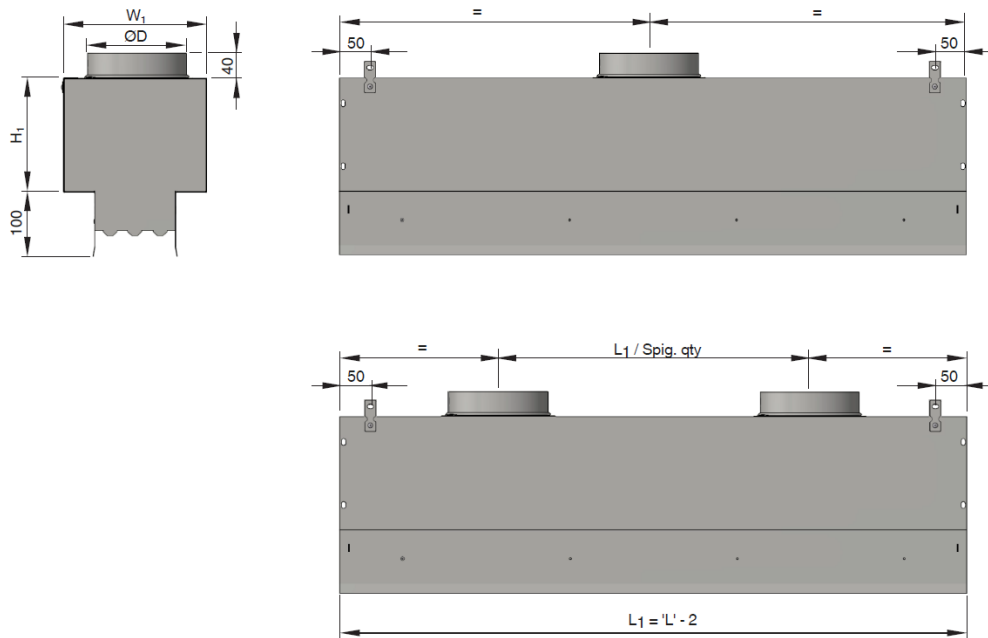


Fig. 3: Dimensions and spigot arrangement for construction ZV/AV

TSD type	W ₁	ØD	H ₁	
			[mm]	
TSD15-1	145.5	98	160	
TSD15-2	180.0	138	180	
TSD15-3	214.5	158	220	
TSD15-4	249.0	198	270	

TSD type	W ₁	ØD	H ₁
	[mm]		
TSD20-1	150.5	123	180
TSD20-2	190.0	158	220
TSD20-3	229.5	198	270
TSD20-4	269.0	248	335

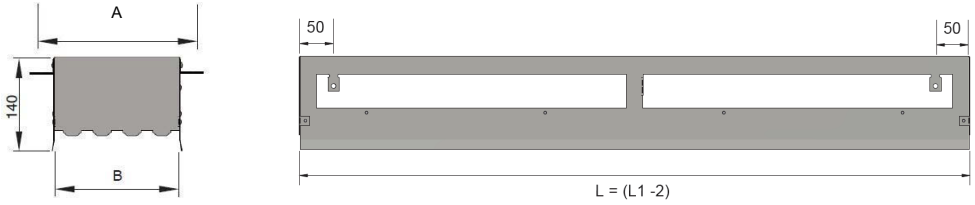
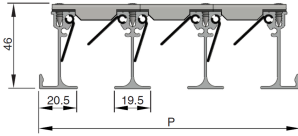


Fig. 4: Dimensions for construction RA

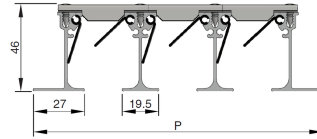
TSD type	B [mm]			
	1 Slot	2 Slot	3 Slot	4 Slot
TSD15-1	43.5	78.0	112.5	147.0
TSD15-2	48.5	88.0	127.5	167.0

$A = B + 44\text{mm}$

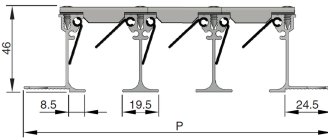
TSD-3-NF**



TSD-3-FL**



TSD-3-P**



TSD20-3-PL

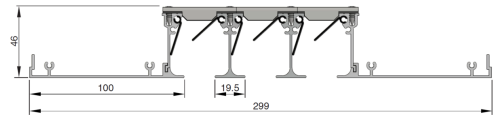
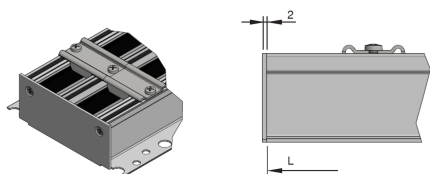


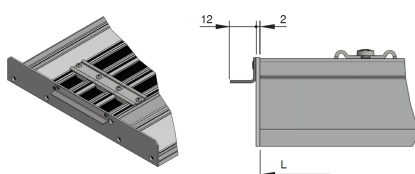
Fig. 5: Border options and dimensions

TSD type		P [mm]			
		1 Slot	2 Slot	3 Slot	4 Slot
NF	TSD15	56.0	90.5	125.0	159.5
	TSD20	61.0	101.5	140.0	179.5
FL	TSD15	69.0	103.5	138.0	172.5
	TSD20	74.0	113.5	153.0	192.5
P	TSD15	81.0	115.5	150.0	184.5
	TSD20	86.0	125.5	165.0	204.5
PL	TSD15	-	-	-	-
	TSD20	-	-	299.0	299.0

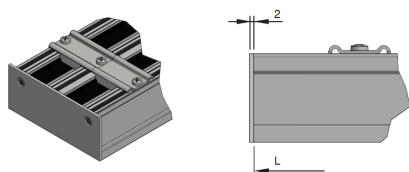
End Plate TSDxx-P-Px



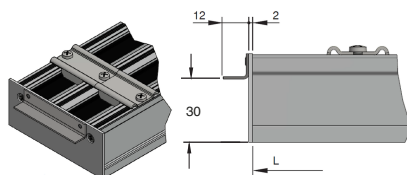
End Plate TSD20-PL-PL2



End Plate TSDxx-NF-Px



End Plate TSDxx-NF-Lx



End Angle TSDxx-FL-Ax

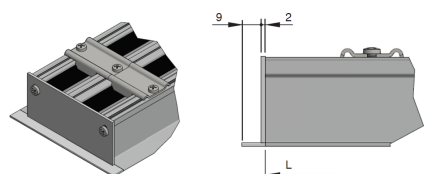


Fig. 6: End cap options and dimensions

TSD type		Ceiling Opening Size [mm]				Length
		Width				
		1 Slot	2 Slot	3 Slot	4 Slot	
NF	TSD15	57.5	92.0	126.5	161.0	L + 5.5
	TSD20	62.5	102.0	141.5	181.0	L + 5.5
FL	TSD15	57.5	92.0	126.5	161.0	L + 8.0
	TSD20	62.5	102.0	141.5	181.0	L + 8.0
P	TSD15	57.5	92.0	126.5	161.0	L + 5.5
	TSD20	62.5	102.0	141.5	181.0	L + 5.5
PL	TSD15	-	-	-	-	-
	TSD20	-	-	300.0	300.0	L + 5.5

Mitred Corner

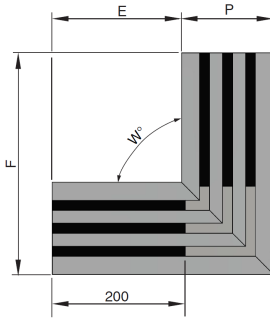


Fig. 7: Mitred corner options and dimensions

For dimension 'P', please refer to diffuser dimension pages.

TSD type	Angle W °	Border Type					
		FL		NF		P	
		E mm	F mm	E mm	F mm	E mm	F mm
TSD15-1	90	194.25	263.3	200.75	256.8	188.25	269.3
	135	197.62	226.2	200.3	223.5	195.13	228.7
TSD15-2	90	194.25	332.3	200.75	325.8	188.25	338.3
	135	197.62	254.8	200.3	252.1	195.13	257.3
TSD15-3	90	194.25	268.3	200.75	261.8	188.25	274.3
	135	197.62	228.3	200.3	225.6	195.13	230.8
TSD15-4	90	194.25	347.3	200.75	340.8	188.25	353.3
	135	197.62	261.0	200.3	258.3	195.13	263.5
TSD20-1	90	194.25	297.8	200.75	291.3	188.25	303.8
	135	197.62	240.5	200.3	237.8	195.13	243.0
TSD20-2	90	194.25	366.8	200.75	360.3	188.25	372.8
	135	197.62	269.1	200.3	266.4	195.13	271.6
TSD20-3	90	194.25	307.8	200.75	301.3	188.25	313.8
	135	197.62	244.6	200.3	241.9	195.13	247.7
TSD20-4	90	194.25	386.8	200.75	380.3	188.25	392.8
	135	197.62	277.4	200.3	274.7	195.13	279.8

Weights

TSD**...-FL/NF/P

Nominal length	Weight (kg)			
	Number of slots			
	1	2	3	4
300	0.3	0.5	0.8	1.0
600	0.6	1.0	1.5	1.9
900	0.9	1.6	2.2	2.8
1200	1.2	2.0	2.9	3.7
1500	1.6	2.6	3.6	4.6
1800	1.9	3.1	4.3	5.5

TSD**...-PL

Nominal length	Weight (kg)	
	Number of slots	
	3	4
300	1.1	1.3
600	2.2	2.5
900	3.2	3.7
1200	4.3	4.9
1500	5.3	6.1
1800	6.4	7.3

AKV-TSD15-...-ZH-...

Nominal length	Weight (kg)			
	Number of slots			
	1	2	3	4
300	2.2	2.5	2.9	3.3
600	3.6	4.0	4.6	5.3
900	5.0	5.5	6.3	7.2
1200	6.4	7.5	8.0	9.1
1500	8.3	9.0	10.2	11.6
1800	9.7	10.6	11.9	13.5

AKV-TSD20-...-ZH-...

Nominal length	Weight (kg)			
	Number of slots			
	1	2	3	4
300	2.3	2.7	3.2	3.9
600	3.8	4.4	5.1	6.1
900	5.3	6.1	7.0	8.2
1200	6.7	7.7	8.9	10.4
1500	8.7	9.9	11.3	12.6
1800	10.2	11.6	13.2	15.3

Technical data

Nominal lengths	300 – 1800 mm, in increments of 1mm
Number of slots	1, 2, 3 or 4
Minimum volume flow rate, with $\Delta t_z = -10$ K	3 l/s or 12 m³/h
Maximum volume flow rate, with $L_{WA} \cong 50$ dB(A)	360 l/s or 1297 m³/h
Supply air to room air temperature difference	-10 to +10 K

Assembly

General information

Personnel:

- Specialist personnel

Protective equipment:

- Industrial safety helmet
- Industrial safety glasses
- Protective gloves
- Safety shoes

Note:

- For room heights up to 4 m (lower edge of suspended ceiling)
- Flush ceiling installation
- Fix the product only to load-bearing structural elements.
- Load suspension systems only with the weight of the product. Adjacent components and connecting ducts must be supported separately.
- The air terminal devices must remain accessible for cleaning even after installation.
- Installation fixing materials which the manufacturer provides is usually supplied in an extra bag.

Before you install the product, take suitable precautions to protect air distribution components from contamination during installation (VDI 6022). If this is not possible, at least cover the product or take other precautions to protect it from contamination.

Ensure that all components are clean before you install them. If necessary, clean them thoroughly. If you have to interrupt the installation procedure, protect all openings from the ingress of dust or moisture.

Plenum installation

If possible, install the device before fixing the ceiling tiles; if this is not possible, remove the adjacent ceiling tiles.

Use only approved and adequately sized suspension systems (fixing material is not included in the supply package).

If you have to install larger devices, it is best to either ask someone to give you a hand or use a lift.

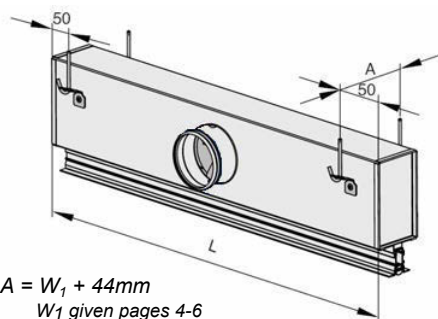


Fig. 8 Plenum box suspension

1. ▶ Fix the suspension parts such as ropes, cables or metal hangers to the ceiling. This fixing should be of a suitable type and load bearing capacity as determined by others.
2. ▶ Turn up the suspension lugs.

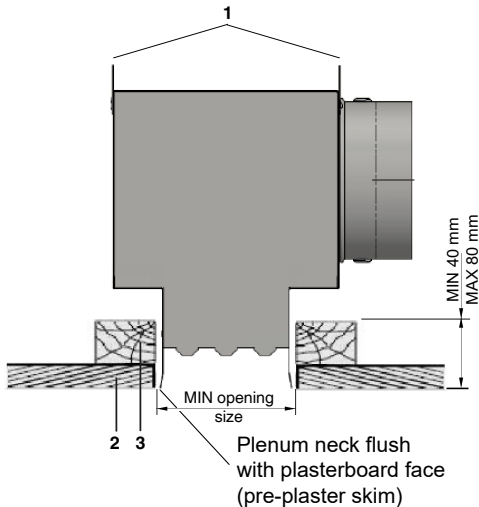


Fig. 9: Suspension lugs

3. ▶ Use all 4 of the available suspension lugs or at least 4 of the fixing holes on the plenum box, one in each corner.
4. ▶ Adjust the height of the suspended plenum box to align the lower edge of the plenum with the finished ceiling surface.

Plasterboard ceilings

For plasterboard ceiling applications, align the lower edge of the plenum with the unfinished plasterboard face (pre-skim)



1. Plenum supports (by others)
2. Plasterboard ceiling (by others)
3. Timber batten (by others)

Fig. 10: Plenum suspension for plaster-in installation

- MIN opening size for the plasterboard ceiling can be found on page 8 of this IOM
- Along each linear side of the opening, a support batten must be provided (typically wooden) to support the plasterboard opening and allow fixing screws for the diffuser face.
- Ensure combined depth of plasterboard and batten is between 40 mm and 80 mm

Diffuser installation

With the plenum box(es) installed and suspended to the correct height, the diffuser can be unpacked ready for installation.

- TSD diffusers are supplied with multiple fixing options depending on the installation situation
- For installation with TROX plenum boxes, type S11 fixings must be used. These fixings are supplied loose and should be installed onto the TSD diffuser by the equipment installer in the location of the installed plenum box(es).

Installation details - S11 fixing

- S11 fixings are supplied loose for assembly of AKV or RA plenums to the TSD diffuser.
- The fixings should be installed to the TSD diffuser by the equipment installer in the location of the installed plenum box(es).
- S11 fixings should be installed to the TSD diffuser in locations approximately 100mm in from each end of the installed plenum



WARNING!

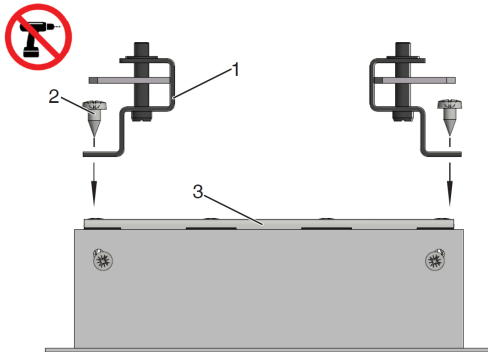
Overtightening of the fixing screws can result in mechanical failure!

- Fixing screws to install S11 fasteners to TSD diffusers should be hand tightened only.
- The use of power tools is prohibited and can result in stripped threads.

- Quantity of S11 fixings supplied with each TSD diffuser is based on the number of slots;

TSD**-1...2: 2x S11 fixings per diffuser

TSD**3...4: 4x S11 fixings per diffuser



- 1 S11 fixing
- 2 S11 fixing screws (2 per fixing)
- 3 TSD diffuser

Fig. 11: S11 fixing kit installation

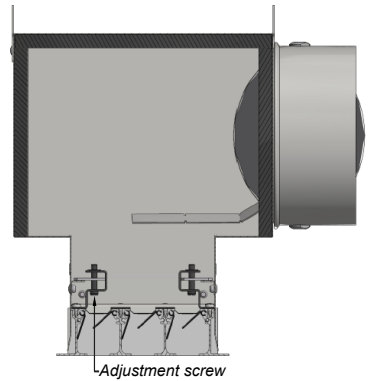


Fig. 14: S11 fixing kit with plenum

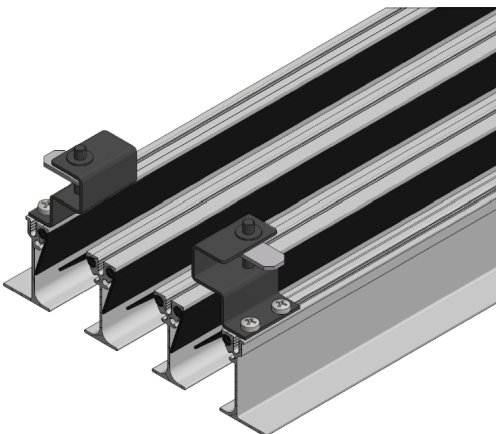


Fig. 12: S11 fixing kit



Fig. 13: S11 fixing kit layout

1. ▶ Install the S11 fasteners (2 or 4) to the TSD diffuser to suit the location of the installed plenum box(es). If necessary, offer up the diffuser to the installed plenum and mark the end of the plenum box(es) with removable tape to ensure correct installation.
2. ▶ With the S11 fasteners installed, offer up the diffuser to the installed plenum and push the diffuser into the plenum neck. Note, you may need to support the plenum box to prevent movement during this process.
3. ▶ With the weight of the diffuser supported, tighten the adjustment screw visible through the open slot on each S11 fastener until the diffuser is clamped to the plenum box.



WARNING!

Overtightening of the adjustment screws can result in mechanical failure!

- Adjustment screws on S11 fasteners should be hand tightened only.

4. ▶ If required, adjust the height of the assembled plenum box and diffuser using plenum supports to align with the ceiling.

Installing the diffuser (Finite)

1. ▶ The plaster-in diffuser should be installed into the builder's work opening, retaining the plastic film on the front of the diffuser to prevent marks during the installation.
2. ▶ Ensure the grille border is flat and level before fixing it in place. Secure using counter sunk head 3.5 drywall screws (by others) every 300mm. Screw through the holes in the border, through the plasterboard and into the timber batten behind.
3. ▶ Ensure the screw heads are driven firmly into the border and sit below the top edge of the grille border so they will not be visible when the border is plastered. The border should be firm with no movement. Jointing tape should be applied over the plaster frame to provide a good adhesion surface for the plaster skim.
4. ▶ Suitable site masking of the diffuser is required to prevent damage. The plaster can then be applied using the top edge of the diffuser border to level the plaster. Excess plaster should be cleaned off the inside of the diffuser & border before it dries to avoid staining or damage to the paint finish.



Fig. 15: Plaster-in installation

Installing the diffuser (Linear)

1. ▶ Linear diffusers will be supplied with alignment pins (details on page 15)
2. ▶ Before installing the grille border into the builder's work opening, arrange the grille sections next to each other on a clean, level surface with the alignment pins to hand to ensure a good fit prior to installation.
3. ▶ Insert the alignment pins halfway into the alignment ports located in the border extrusion on one grille section.
4. ▶ Then proceed as instructions for finite diffusers.



Linear lengths

Do not remove the tape that is present on diffusers sections without end caps. The alignment pins can be pushed through the tape.



Plaster-in diffusers

Plaster-in diffusers are not fixed to the plenum, this is to avoid any damage to the plaster.

Linear runs

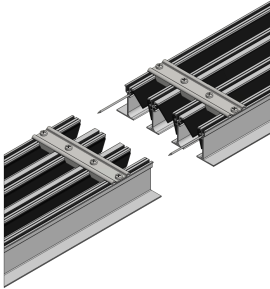


Fig. 16: Linking slot diffusers

- The supplied alignment pins help you align slot diffusers for a continuous linear arrangement.

1. ▶ Insert the alignment pins into the outer border section with 50% of the pin length visible.
2. ▶ Offer up adjacent section and ensuring the alignment pins are placed correctly, slide the section into place.

Note:
Alignment pins cannot be installed after diffuser installation

Alignment pins also used to align corner sections

Diffuser installation

- TSD diffusers are supplied with multiple fixing options depending on the installation situation
- For installation without TROX plenum boxes, type GP or SB fixings must be used. These fixings are supplied loose and should be installed onto the TSD diffuser by the equipment installer.

Installation details - GP fixing

- GP fixings are supplied loose for installation of TSD diffuser without plenum or with only a partial plenum.

- The fixings should be installed to the TSD diffuser by the equipment installer.
- GP fixings should be installed to the TSD diffuser in locations approximately 100mm in from each end of the diffuser



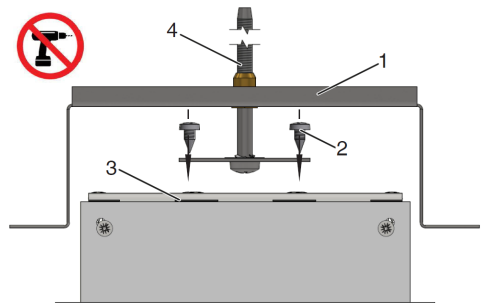
WARNING!

Overtightening of the fixing screws can result in mechanical failure!

- Fixing screws to install GP fixings to TSD diffusers should be hand tightened only.
- The use of power tools is prohibited and can result in stripped threads.

- Quantity of GP fixings supplied with each TSD diffuser is based on the whether the diffuser is supplied with or without a plenum;

2x GP fixings are supplied with each TSD diffuser section when specified. NB: 1x GP fixing is also supplied with each diffuser section when S11 fixings are specified to cover diffuser nominal lengths > plenum box length (border style FL, NF only).



- 1 GP fixing
- 2 GP fixing screws (2 per fixing)
- 3 TSD diffuser
- 4 GP clamp screw

Fig. 17: GP fixing kit installation

- GP fixings are designed to clamp the diffuser against the project ceiling system (ceiling depth between 1... 40mm). A minimum 25mm clearance should be provided to either side of the opening to facilitate installation with GP fixings.

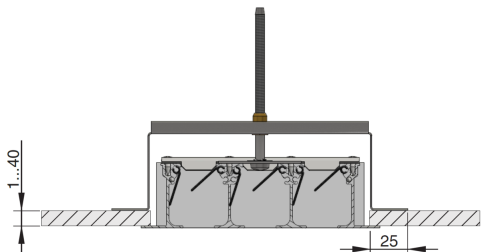


Fig. 18: GP fixing diffuser installation

- ▶ Install the GP fixings to the TSD diffuser. Fixings should be placed at the end of each diffuser section approximately 100mm in.
- ▶ With each GP fixing running parallel to the diffuser, insert the diffuser into the opening and once inserted, use a suitable tool to turn the GP perpendicular to the diffuser.
- ▶ With the GP fixing orientated across the opening, tighten the fixing screw through the diffuser face until the diffuser is fixed into the ceiling system.

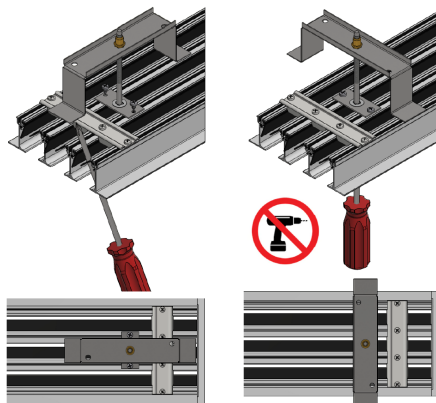


Fig. 19: GP fixing diffuser installation

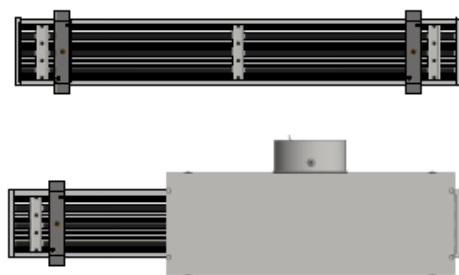


Fig. 20: GP fixing kit layout

Installation details - SB fixing

- SB fixings are supplied loose for installation of TSD diffuser without plenum or with only a partial plenum.
- The fixings should be installed to the TSD diffuser by the equipment installer.
- SB fixings should be installed to the TSD diffuser in locations approximately 100mm in from each end of the diffuser



WARNING!

Overtightening of the adjustment screws can result in mechanical failure!

- Fixing screws on GP fixing kits should be hand tightened only.

- Quantity of SB fixings supplied with each TSD diffuser is based on the whether the diffuser is supplied with or without a plenum;

4x SB fixings are supplied with each TSD diffuser section when specified. NB: 2x SB fixing is also supplied with each diffuser section when S11 fixings are specified to cover diffuser nominal lengths > plenum box length (border style FL, NF only).

WARNING!

Overtightening of the fixing screws can result in mechanical failure!

- Fixing screws to install SB fixings to TSD diffusers should be hand tightened only.
- The use of power tools is prohibited and can result in stripped threads.

- SB fixings are designed to facilitate support to the building structure via Ø6mm threaded rod or wire supports (by others). Fixings are accessed via the rear of the diffuser only so suitable access to the ceiling void shall be required. SB fixings can be bent to vertical position if required to suit installation method.

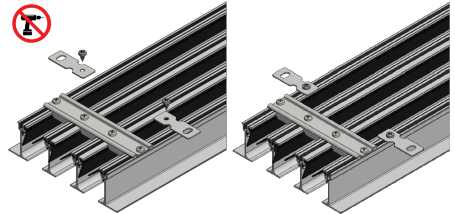
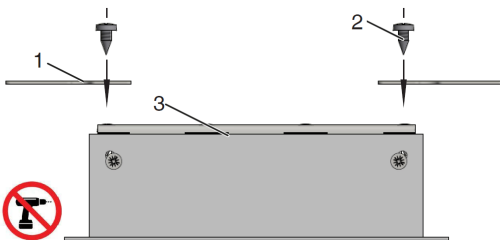


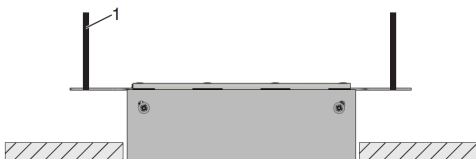
Fig. 23: SB fixing kit layout

- ▶ To install the SB fixing to the rear of the TSD diffuser. Fixings should be placed at the end of each diffuser section approximately 100mm in.
- ▶ With each SB fixing installed, suspend the diffuser using Ø6.0mm threaded rod or wire supports (by others) to secure the diffuser within ceiling system.



- 1 SB fixing (11 x 7 hole)
- 2 SB fixing screw (1 per fixing)
- 3 TSD diffuser

Fig. 21: SB fixing kit installation



- 1 M6 threaded rod or wire supports (by others)

Fig. 22: SB fixing diffuser installation

Installing the blanking plate

- Blanking plates, if supplied, must be fitted to the rear of the diffuser before it is installed into the builder's work opening.
 - Blanking plates and foam insulation are supplied loose, for site cutting and installation.
1. ▶ First determine the location for the blanking plate by offering the diffuser up to builder's work opening and mark the areas where plenums are not installed.
 2. ▶ Remove the grille from the opening and place face down on a suitable protected work surface, ensuring the area is free from debris to avoid damaging the painted surface.
 3. ▶ Cut the blanking plate and foam insulation to the required length/s to cover the areas marked as non-active.
 4. ▶ Remove foam's the self-adhesive backing and stick to the inside of the blanking tray.
 5. ▶ Place the blanking tray over the neck of the diffuser and secure into position by bending the blanking plate (both sides).

- In addition to bending the blanking plate the plate can be secured to position using the screws supplied with the blanking plate, if desired.
- When necessary blanking plates need to be cut around SB and GP fixing kits.



Fig. 25: Diffuser with Blanking plate

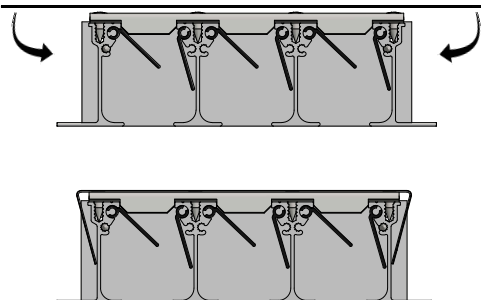

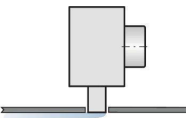
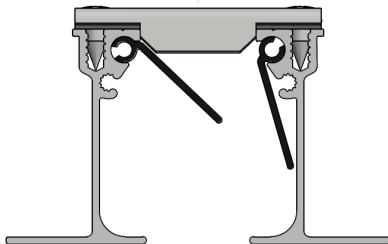

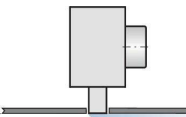
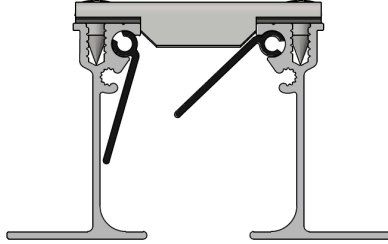
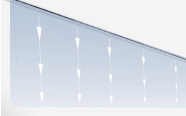
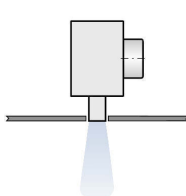
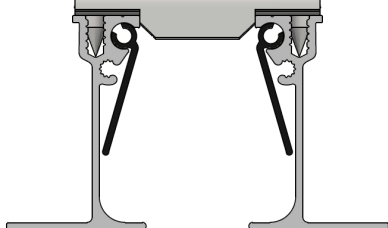

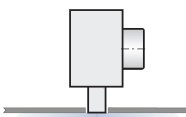
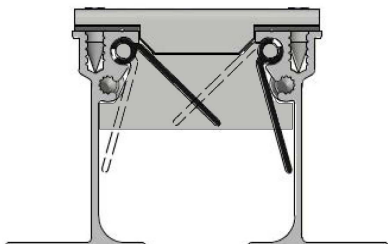


Fig. 24: Blanking plate installation

TSD, apart from the alternating discharge variant, is supplied with the blades in the closed position which need to be set on site by others. Setting the places is a two-hand operation, with hands at both ends of the blade, to avoid deforming the blade. A non-metallic tool may be required to create a gap between the extrusion and the blade. The blade should be opened until it hits the stop and can be opened no further. It is common for TSD to be selected with slots discharging to both sides of the diffuser, please refer to TROX schedule for slot configuration. Alternating discharge diffusers will have the blades set in the factory.

Air discharge – ceiling installation

Air discharge	Setting of the air control blades		
One-way horizontal air discharge to the left			
One-way horizontal air discharge to the right			
Vertical air discharge			
Alternating air discharge			

Volume flow rate balancing

When several diffusers are connected to just one volume flow controller, it may be necessary to balance the volume flow rates.

Slot diffusers with plenum box and damper blade (variant -M*): The damper blade can be adjusted even after the diffuser face has been installed.

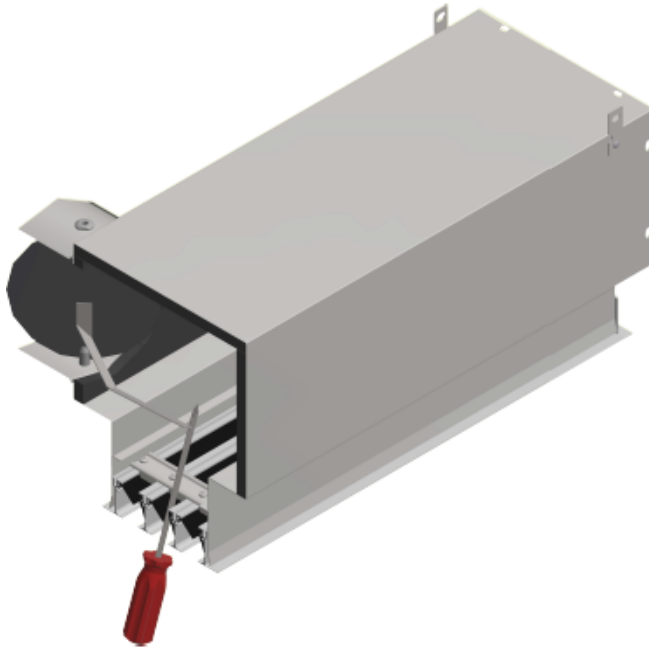


Fig. 26: Setting the damper blade, e.g. with a screwdriver

Maintenance and cleaning

Please note:

- The cleaning intervals given in the VDI 6022 standard apply.
- Clean surfaces with a damp cloth.
- Use only common household cleaners, do not use any aggressive cleaning agents.
- Do not use cleaning agents that contain chlorine.
- Do not use equipment for removing stubborn contamination, e.g. scrubbing sponges or scouring cream, as it may damage the surfaces.