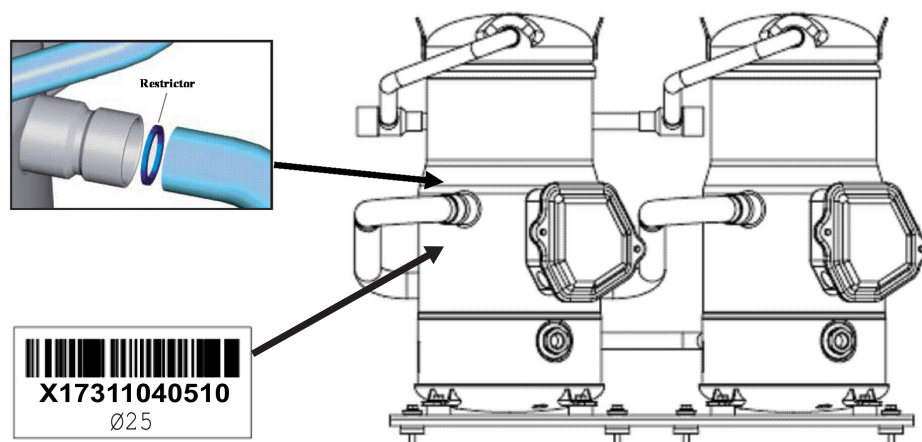


Installation Instructions

Restrictor

For Replacement Compressor



⚠ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

Introduction

Read this manual thoroughly before operating or servicing this unit.

Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

- ⚠ WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
- ⚠ CAUTION** Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
- NOTICE** Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants.

Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury. All field wiring **MUST** be performed by qualified personnel. Improperly installed and grounded field wiring poses **FIRE** and **ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in **NEC** and your local/state/national electrical codes.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury. Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, **MUST** follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- Before installing/servicing this unit, technicians **MUST** put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). **ALWAYS** refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.
- When working with or around hazardous chemicals, **ALWAYS** refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labeling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.
- If there is a risk of energized electrical contact, arc, or flash, technicians **MUST** put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, **PRIOR** to servicing the unit. **NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

⚠ WARNING**Follow EHS Policies!**

Failure to follow instructions below could result in death or serious injury.

- All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.
- Non-Trane personnel should always follow local regulations.

⚠ WARNING**R-410A Refrigerant under Higher Pressure than R-22!**

Failure to use proper equipment or components as described below, could result in equipment failing and possibly exploding, which could result in death, serious injury, or equipment damage.

The units described in this manual use R-410A refrigerant which operates at higher pressures than R-22. Use ONLY R-410A rated service equipment or components with these units. For specific handling concerns with R-410A, please contact your local Trane representative.

⚠ WARNING**Explosion Hazard and Deadly Gases!**

Failure to follow all proper safe refrigerant handling practices could result in death or serious injury. Never solder, braze or weld on refrigerant lines or any unit components that are above atmospheric pressure or where refrigerant may be present. Always remove refrigerant by following the guidelines established by the EPA Federal Clean Air Act or other state or local codes as appropriate. After refrigerant removal, use dry nitrogen to bring system back to atmospheric pressure before opening system for repairs. Mixtures of refrigerants and air under pressure may become combustible in the presence of an ignition source leading to an explosion. Excessive heat from soldering, brazing or welding with refrigerant vapors present can form highly toxic gases and extremely corrosive acids.

⚠ WARNING**Explosion Hazard!**

Failure to follow these instructions could result in death or serious injury or equipment or property-only damage.

Use only dry nitrogen with a pressure regulator for pressurizing unit. Do not use acetylene, oxygen or compressed air or mixtures containing them for pressure testing. Do not use hydrogen mixtures containing refrigerant and air above atmospheric pressure for pressure testing as they may become flammable and could result in an explosion.

Refrigerant, when used as a trace gas should only be mixed with dry nitrogen for pressurizing units.

⚠ WARNING**Hazardous Service Procedures!**

Failure to follow all precautions in this manual and on the tags, stickers, and labels could result in death or serious injury.

Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the following instructions: Unless specified otherwise, disconnect all electrical power including remote disconnect and discharge all energy storing devices such as capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. When necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been trained in handling live electrical components perform these tasks.

⚠ WARNING**Hazardous Conditions!**

Failure to follow these instructions can cause serious injury or death or damage to the equipment. Observe and follow the "Warning" and "Notices" labels on the compressor.

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Installation

Uneven size tandems and all trio compressor sets require that a restrictor be placed in the correct location to properly balance the oil in the compressors. Table 2, p. 5, Table 3, p. 6, and Table 4, p. 8 provide the information for the correct location and selection of the restrictor.

The service compressor is shipped with the necessary restrictor(s) packaged in individual bags and labelled with the restrictor mnemonic part number on the outside of the bag. Another label is also included inside the bag; the X1731***** number identifies the restrictor. In addition, the restrictor is physically marked on the face with the part number extension and ID size. Example: 51-25 stamped on the face of the restrictor. Drawing X17311040510, 51 is the extension. 25 mm is the ID.

It is possible when removing a restrictor that the restrictor that is in the compressor does not match the number of the restrictor that ships with the service compressor. The reason for this is that the restrictor part number is dependent on the product type and manufacturing location and if it was originally packaged in a bag or not. See Table 1 for equivalent restrictor face stamping number and mnemonic part number cross reference.

Table 1. Service part restrictor identification

Compressor Model	MNE	Label	Restrictor		
			ID Size (mm)	Face Stamping Number	
				Equivalent Restrictors	
CSHD 110, 120, 125, 155	RSR00235	X17311040510	25	51-25	01-25
CSHD 120	RSR00348	X17311040570	22.5	57-22.5	07-22.5
CSHD 125	RSR00237	X17311040530	23	53-23	03-23
CSHD 142	RSR00238	X17311040540	27	54-27	04-27
CSHD 161	RSR00240	X17311040560	26	56-26	06-26
CSHN 184, 250	RSR00244	X17311028540	26	54-26	04-26
CSHN 176, 184, 250, 315	RSR00241	X17311028510	31	51-31	01-31
CSHN 184, 250	RSR00242	X17311028520	33	52-33	02-33
CSHN 184	RSR00366	X17311028560	32	56-32	06-32

Figure 1. Labels

Label inside the bag:



Label outside the bag:



⚠ WARNING

Refrigerant under High Pressure!

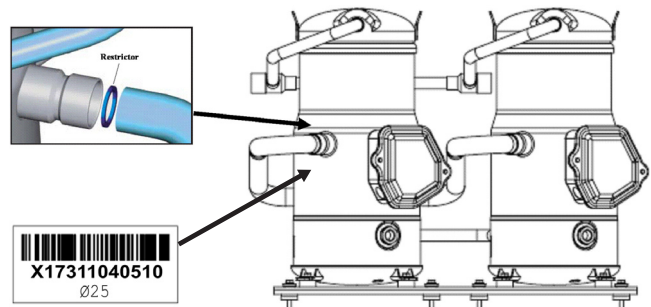
Failure to follow instructions below could result in an explosion which could result in death or serious injury or equipment damage. System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or refrigerant additives.

⚠ WARNING

Explosion Hazard and Deadly Gases!

Failure to follow all proper safe refrigerant handling practices could result in death or serious injury. Never solder, braze or weld on refrigerant lines or any unit components that are above atmospheric pressure or where refrigerant may be present. Always remove refrigerant by following the guidelines established by the EPA Federal Clean Air Act or other state or local codes as appropriate. After refrigerant removal, use dry nitrogen to bring system back to atmospheric pressure before opening system for repairs. Mixtures of refrigerants and air under pressure may become combustible in the presence of an ignition source leading to an explosion. Excessive heat from soldering, brazing or welding with refrigerant vapors present can form highly toxic gases and extremely corrosive acids.

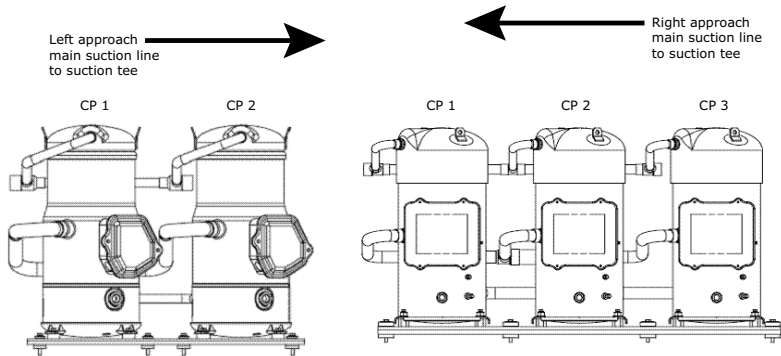
Figure 2. Restrictor installation



Install restrictor in the suction inlet of the replacement compressor. Insert the tube into the suction connection and use the tube to seat the restrictor firmly into the suction connection. Braze the suction tube to the compressor.

After completing the brazing of the suction tube, attach the label included inside the bag to the compressor near the suction connection. This will enable future identification of the restrictor.

Figure 3. Determining suction approach



The suction approach is the direction from which the unit suction piping enters the compressor tandem or trio set when viewed from the front, terminal box side. This must be

determined to use [Table 2, p. 5](#), [Table 3, p. 6](#), and [Table 4, p. 8](#); it is also used in determining the correct compressor to receive the restrictor.

Table 2. Restrictor selection and location

Product Line						Compressor Position			Suct. Appr.	Restrictor Size (ID mm) and Location			Trane Part Number w/Bag and Label	Mnemonic #
Clks	Clks	Clks	Clks	Clks	Macon	CP1	CP2	CP3		CP1	CP2	CP3		
IPAK II	IPAK	Voyager 3	Odyssey	RA	CSC									
	S*HL*40					CSHD092	CSHD110		right		25		X17311040510	RSR00235
	S*HL*40/48 G					CSHD110	CSHD110		right	Not Req.				
	S*HL*20/24 G					CSHD125	CSHD125		right	Not Req.				
			TTA240 F			CSHD120	CSHD120		left	Not Req.				
	S*HL*20			RAUJC20 RAUJC40		CSHD120	CSHD120		right	Not Req.				
					S*RF*30 S*RF*35	CSHD120	CSHD120		center	Not Req.				
	S*HL*25					CSHD125	CSHD142		right	26			X17311040560	RSR00240
	S*HL*50					CSHD120	CSHD136		right	26			X17311040560	RSR00240
	S*HL25/29 G			RAUJC25		CSHD125	CSHD161		right	25			X17311040510	RSR00235
	S*HL*50/59 G					CSHD142	CSHD142		right	Not Req.				
		TC/TE/YC 330				CSHD142	CSHD161		left	27			X17311040540	RSR00238
	S*HL*60			RAUJC50		CSHD142	CSHD161		right	27			X17311040540	RSR00238
		TC/TE/YC 360				CSHD161	CSHD161		left	Not Req.				
	S*HL*30 S*HL*60/73 G					CSHD161	CSHD161		right	Not Req.				
		TC/TE/YC 420				CSHD161	CSHD183		left	26			X17311040560	RSR00240
	S*HL*30/36 G					CSHD161	CSHD183		right	26			X17311040560	RSR00240
		TC/TE/YC 600				CSHD155	CSHD183		left	25			X17311040510	RSR00235
					S*RF*40	CSHD183	CSHD120		center		22.5		X17311040570	RSR00348
	S*HL*70/80			RAUJC30		CSHD183	CSHD183		right	Not Req.				
					S*RF*50	CSHD183	CSHD183		center	Not Req.				
					S*RF*60	CSHD183	CSHD183		center	Not Req.				
					S*WF*85	CSHD183	CSHD183		center	Not Req.				
				RAUJC60		CSHD175	CSHD175		right	Not Req.				
	S*HL*75/89 G					CSHN184	CSHN250		right	31			X17311028510	RSR00241
	S*HL*75					CSHN176	CSHN240		right	31			X17311028510	RSR00241
S*HJ090 S*HJ100	SXHK*90					CSHN250	CSHN250		left	Not Req.				
S*HJ090 S*HJ100	SXHK*90								right	Not Req.				

Installation

Table 2. Restrictor selection and location (continued)

Product Line						Compressor Position			Suct. Appr.	Restrictor Size (ID mm) and Location			Trane Part Number w/Bag and Label	Mnemonic #
Clks	Clks	Clks	Clks	Clks	Macon	CP1	CP2	CP3		CP1	CP2	CP3		
IPAK II	IPAK	Voyager 3	Odyssey	RA	CSC									
S*HJ105 S*HJ118	SXHK*11 SXHK*12					CSHN250	CSHN315		left	31			X17311028510	RSR00241
S*HJ105 S*HJ118	SXHK*11 SXHK*12								right	31			X17311028510	RSR00241
S*HJ120 S*HJ128	SXHK*13					CSHN315	CSHN315		left	Not Req.				
S*HJ120 S*HJ128	SXHK*13								right	Not Req.				
S*HJ130 S*HJ140						CSHN315	CSHN374		left	31			X17311028510	RSR00241
S*HJ130 S*HJ140									right	31			X17311028510	RSR00241
S*HJ150 S*HJ162						CSHN374	CSHN374		left	Not Req.				
S*HJ150 S*HJ162									right	Not Req.				
				RAUJD80		CSHN176	CSHN176	CSHN176	left			31	X17311028510	RSR00241
				RAUJD100		CSHN184	CSHN184	CSHN250	left	33	33		X17311028520	RSR00242
				RAUJD120		CSHN250	CSHN250	CSHN250	left			33	X17311028520	RSR00242

Notes:

1. IPAK RT G high efficiency air cooled unit—digit G listed in Position 21–38 in model number.
2. IPAK RT sizes 24, 29, 36, 48, 59, 73, 80, 89 are evaporative cooled condenser models.

Table 3. Units with microchannel (MCHE) condensers

Product Line						Compressor Position			Suct. Appr.	Restrictor Size (ID mm) and Location			Trane Part Number w/Bag and Label	Mnemonic #
Clks	Clks	Clks	Clks	Clks		CP1	CP2	CP3		CP1	CP2	CP3		
IPAK II	IPAK	Voyager 3	Odyssey	RA										
	S*HL*40 S*HL*40 V (circuit 2 only)					CSHD092	CSHD110		right		25		X17311040510	RSR00235
	S*HL*40 G					CSHD110	CSHD110		right	Not Req.				
	S*HL*20 S*HL50			RAUJC20 RAUJC40		CSHD120	CSHD120		right	Not Req.				
	S*HL*25 S*HL*50G S*HL*50 V (circuit 2 only)					CSHD125	CSHD142		right	26			X17311040560	RSR00240
	S*HL*20 G					CSHD125	CSHD125		right	Not Req.				
	S*HL25 G			RAUJC25		CSHD125	CSHD161		right	25			X17311040510	RSR00235
	S*HL*55					CSHD142	CSHD142		right	Not Req.				
		TC/TE/YC 330				CSHD142	CSHD161		left	27			X17311040540	RSR00238
	S*HL*60 S*HL*55 V (circuit 2 only)			RAUJC50		CSHD142	CSHD161		right	27			X17311040540	RSR00238
		TC/TE/YC 360				CSHD161	CSHD161		left	Not Req.				
	S*HL*30 S*HL*60 G					CSHD161	CSHD161		right	Not Req.				
						CSHD155	CSHD155		left	Not Req.				
		TC/TE/YC 420				CSHD161	CSHD183		right	26			X17311040560	RSR00240
	S*HL*30 G S*HL*60 V (circuit 2 only)					CSHD161	CSHD183		right	26			X17311040560	RSR00240
		TC/TE/YC 600				CSHD155	CSHD183		left	25			X17311040510	RSR00235
									right	25			X17311040510	RSR00235
				RAUJC60		CSHD175	CSHD175		right	Not Req.				
	S*HL*70/80			RAUJC30		CSHD183	CSHD183		right	Not Req.				

Table 3. Units with microchannel (MCHE) condensers (continued)

Product Line					Compressor Position			Suct. Appr.	Restrictor Size (ID mm) and Location			Trane Part Number w/Bag and Label	Mnemonic #
Clks	Clks	Clks	Clks	Clks	CP1	CP2	CP3		CP1	CP2	CP3		
IPAK II	IPAK	Voyager 3	Odyssey	RA									
	S*HL*75 G S*HL*70 V (circuit 2 only)				CSHN184	CSHN250		right	31			X17311028510	RSR00241
	S*HL75				CSHN176	CSHN240		right	31			X17311028510	RSR00241
S*HJ090	SXHK*90				CSHN250	CSHN250		left	Not Req.				
S*HJ090	SXHK*90				CSHN250	CSHN250		right	Not Req.				
S*HJ090 V (circuit 1 only) S*HJ105 V (circuit 1 only)					CSHN184	CSHN184	CSHN184	right	32		31	X17311028560 X17311028510	RSR00366 RSR00241
S*HJ105	SXHK*11 SXHK*12				CSHN250	CSHN315		left	31			X17311028510	RSR00241
S*HJ105	SXHK*11 SXHK*12				CSHN250	CSHN315		right	31			X17311028510	RSR00241
S*HJ120	SXHK*13				CSHN315	CSHN315		left	Not Req.				
S*HJ120	SXHK*13				CSHN315	CSHN315		right	Not Req.				
S*HJ120 V (circuit 1 only)					CSHN184	CSHN184	CSHN250	right	32	31		X17311028560 X17311028510	RSR00366 RSR00241
S*HJ130					CSHN315	CSHN374		left	31			X17311028510	RSR00241
S*HJ130					CSHN315	CSHN374		right	31			X17311028510	RSR00241
S*HJ130 V (circuit 1 only)					CSHN184	CSHN184	CSHN315	right	32	31		X17311028560 X17311028510	RSR00366 RSR00241
S*HJ150					CSHN374	CSHN374		left	Not Req.				
S*HJ150					CSHN374	CSHN374		right	Not Req.				
S*HJ150 V (circuit 1 only)					CSHN250	CSHN184	CSHN374	right	31	26		X17311028510 X17311028540	RSR00241 RSR00244
				RAUJD80	CSHN176	CSHN176	CSHN176	left			31	X17311028510	RSR00241
				RAUJD100	CSHN184	CSHN184	CSHN250	left	33	33		X17311028520	RSR00242
				RAUJD120	CSHN250	CSHN250	CSHN250	left			33	X17311028520	RSR00242

Notes:

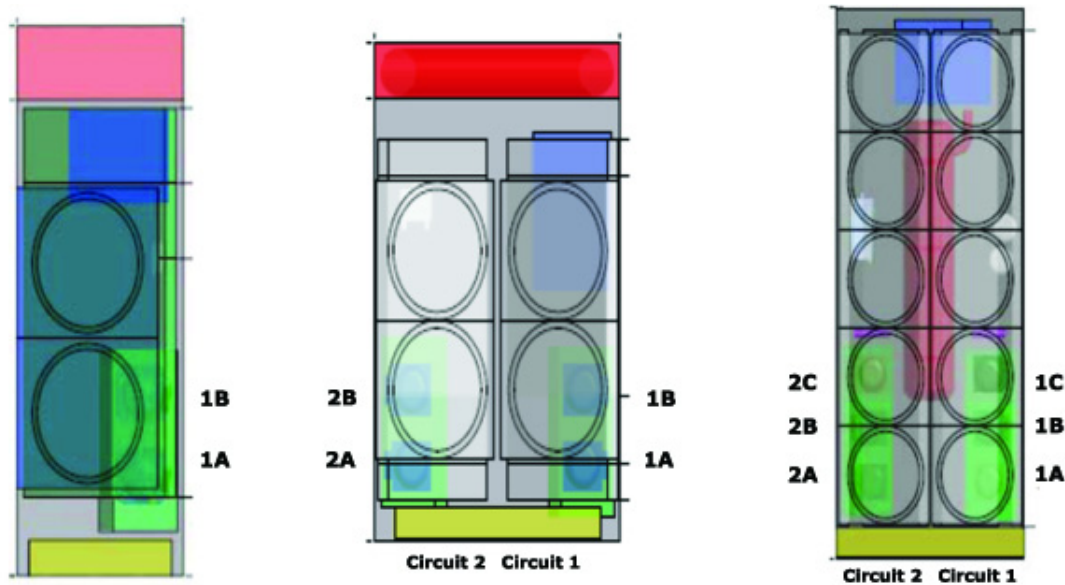
1. IPAK RT G high efficiency unit—indicated by G in digit 26 of model number.
2. IPAK RT sizes 24, 29, 36, 48, 59, 73, 80, 89 are evaporative cooled condenser models.
3. IPAK RT 20 to 75 ton MCHE digit 10 design Sequence E.
4. Voyager 3 MCHE: no change in compressors digit 10 design sequence F.
5. IPAK RT 90 to 130 ton MCHE: no change in compressors digit 10 design sequence D.
6. IPAK II RT 90 to 150 ton MCHE: no change in compressors digit 10 design sequence P.
7. RAUJ split system 20 to 60 ton MCHE: no change in compressors digit 10 design sequence C.
8. RAUJ split system 20 to 120 ton MCHE: no change in compressors digit 10 design sequence B.
9. IPAK RT v eFlex™ variable speed unit - indicated by V in digit 26 of model number.

Installation

Table 4. Scroll chillers

Unit Size	Compressor Model						Restrictor Size		Location		Circuit 1		Circuit 2	
	Circuit 1			Circuit 2			Circuit		Circuit		Trane Part Number w/Bag Label	Mnemonic Part #	Trane Part Number w/Bag Label	Mnemonic Part #
	1A	1B	1C	2A	2B	2C	1	2	1	2				
Single														
CGAM020	CSHD125	CSHD125					None							
CGAM026	CSHD161	CSHD161					None							
CGAM030	CSHN184	CSHN184					None							
CGAM035	CSHN184	CSHN250					31		1A		X17311028510	RSR00241		
Tandem														
CGAM040	CSHD125	CSHD125		CSHD125	CSHD125		None							
CGAM052	CSHD161	CSHD161		CSHD161	CSHD161		None							
CGAM060	CSHN184	CSHN184		CSHN184	CSHN184		None							
CGAM070	CSHN184	CSHN250		CSHN250	CSHN184		31	31	1A	2B	X17311028510	RSR00241	X17311028510	RSR00241
CGAM080	CSHN250	CSHN250		CSHN250	CSHN250		None							
CGAM090	CSHN250	CSHN315		CSHN315	CSHN250		31	31	1A	2B	X17311028510	RSR00241	X17311028510	RSR00241
CGAM100	CSHN315	CSHN315		CSHN315	CSHN315		None							
CGAM110	CSHN315	CSHN374		CSHN374	CSHN315		31	31	1A	2B	X17311028510	RSR00241	X17311028510	RSR00241
CGAM120	CSHN374	CSHN374		CSHN374	CSHN374		None							
Trio														
CGAM130	CSHN250	CSHN250	CSHN315	CSHN315	CSHN250	CSHN250	31	33	1A and 1B	2B and 2C	X17311028510	RSR00241	X17311028520	RSR00242

Figure 4. Scroll chillers



Notes

Trane and American Standard create comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or americanstandardair.com.

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