



ES Service Information

File In/With:	N/A	SI0129	
		New	9-05
Equipment Affected:	See Below		
Copeland Compressor Replacement and Piping Modifications			

Equipment Affected:

- YPAL0050 - YPAL0105 "Style B" and early "Style C"
- YCAL0014 - YCAL0080 (60 Hz) "Style B" and early "Style C"
- YCAL0043 - YCAL0253 (50Hz) "Style B" and early "Style C"
- YCUL0016 - YCUL0086 (60 Hz)"Style B" and early "Style C"
- YCUL0045 - YCUL0275 (50Hz) "Style B" and early "Style C"

**YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C
COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS**

General

Beginning in the fall of 2004, Copeland compressors used in YCAL/YCUL/YPAL Style C models, changed from a 4-pipe system to a 3-pipe system as a result of a Copeland compressor design change to reduce cost. The original compressor design used a 4-pipe system on YCAL/YCUL/YPAL Style B and early Style C consisting of discharge, suction, pressure equalization (1 3/8") pipe, and oil equalization (3/8") lines. The new compressor design utilizes a 3-pipe system consisting of discharge, suction, and (7/8") combination pressure/oil equalization lines. Examples of the original 4-pipe and new 3-pipe piping schemes showing separate and combined pressure and oil equalization are shown in FIGURE 1.

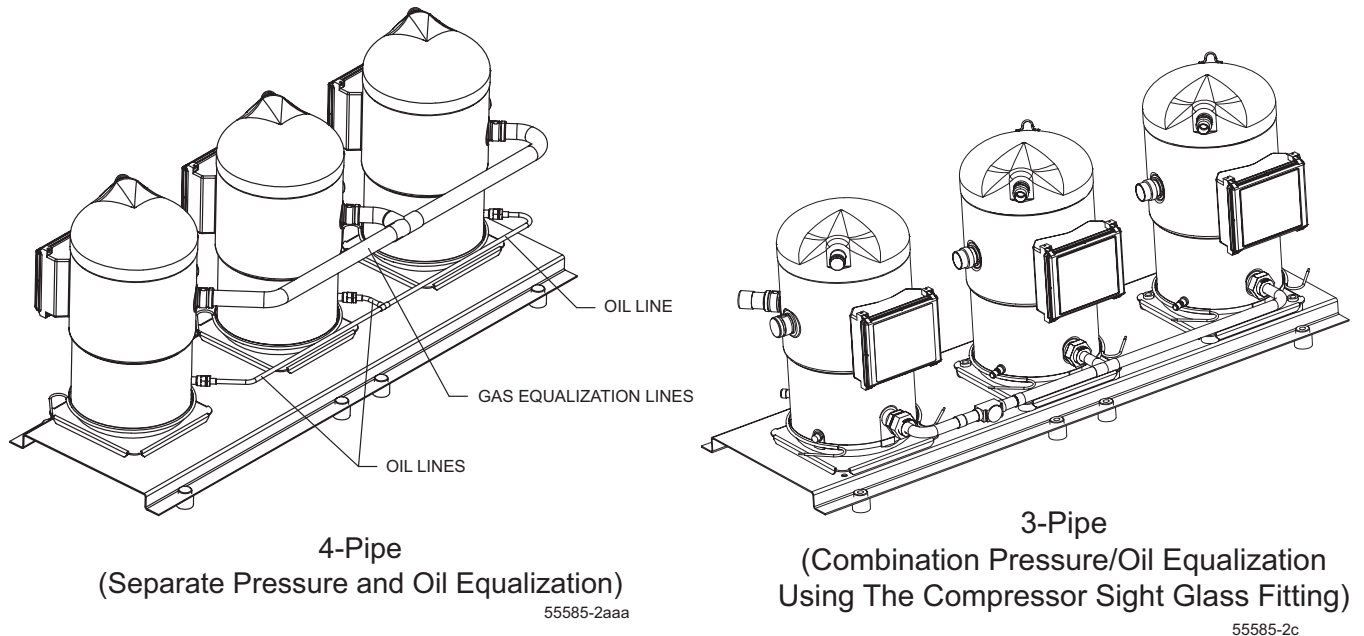


FIGURE 1 – 4-PIPE AND 3-PIPE COMPRESSOR PIPING EXAMPLES

As a result of the change, replacing a defective compressor in the field on a product manufactured prior to the Fall of 2004 will require a field piping modification. From the Fall of 2004 through the Summer of 2005, Copeland temporarily supplied a replacement compressor that would allow installation into a 4-pipe system. These compressors are no longer being manufactured. The compressor piping on a 4-pipe system must now be modified from the original 4-pipe system to a 3-pipe system. This change will not affect the operation or the reliability of the unit. The 4-pipe system has proven reliability on models 0014-0086 and 0043-0275 (50Hz), while the 3-pipe system has a proven reliability record on the larger models 0090-0140 and 0287-0377 (50Hz).

YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS

Parts Requirements

When ordering compressors, examine the system and determine if a 3-pipe or 4-pipe system exists using the examples in FIGURE 1. If a 4-pipe system exists, order a compressor using the original part number from the unit replacement parts list, which should compare to the part numbers provided in TABLE 1. A 4-pipe compressor may be supplied while still available, depending on stock in various warehouses. Otherwise, a 3-pipe equivalent will be substituted. The model number on the original** compressor should also match the model numbers in TABLE 1. The original** 4-pipe system compressors can be easily identified by the -472 suffix in the model number of the compressor, while the original** 3-pipe system compressor model number will have a -222 suffix. 3-pipe system compressors are assigned different part numbers 015-04009-101 to -106 (R22) and 015-04009-301 to -306 (R407C). See TABLE 3, Page 13. **If a 4-pipe system exists, order kit # 015-04023-000. This kit will allow installation of the new compressor and conversion to a 3-pipe system.**

Keep in mind that once a 4-pipe system is modified to a 3-pipe system, 3-pipe system compressors should be ordered as replacements, if future compressor replacements occur. It is acceptable to have both a 4-pipe and a 3-pipe system in a dual system unit, after a compressor change is made.

TABLE 1 – ORIGINAL 4-PIPE COMPRESSOR PART NUMBERS

ORIGINAL 4-PIPE COMPRESSOR MODEL*	ORIGINAL PART NUMBER
ZR90K3-TW_-472** (R22)	015-02895-101 (200-230, 60Hz), 015-02895-102 (380, 60Hz), 015-02895-104 (460, 60Hz & 400, 50Hz), 015-02895-105 (575, 60Hz), 015-02895-106 (200, 50Hz)
ZR90K3E-TW_-472** (R407C)	015-02895-301 (200-230, 60Hz), 015-02895-302 (380, 60Hz), 015-02895-304 (460, 60Hz & 400, 50Hz), 015-02895-305 (575, 60Hz), 015-02895-306 (200, 50Hz)
ZR12M3-TW_-472** (R22)	015-02896-101 (200-230, 60Hz), 015-02896-102 (380, 60Hz), 015-02896-104 (460, 60Hz & 400, 50Hz), 015-02896-105 (575, 60Hz), 015-02896-106 (200, 50Hz)
ZR12M3E-TW_-472** (R407C)	015-02896-301 (200-230, 60Hz), 015-02896-302 (380, 60Hz), 015-02896-304 (460, 60Hz & 400, 50Hz), 015-02896-305 (575, 60Hz), 015-02896-306 (200, 50Hz)
ZR16M3-TW_-472** (R22)	015-02897-101 (200-230, 60Hz), 015-02897-102 (380, 60Hz), 015-02897-104 (460, 60Hz & 400, 50Hz), 015-02897-105 (575, 60Hz), 015-02897-106 (200, 50Hz)
ZR16M3E-TW_-472** (R407C)	015-02897-301 (200-230, 60Hz), 015-02897-302 (380, 60Hz), 015-02897-304 (460, 60Hz & 400, 50Hz), 015-02897-305 (575, 60Hz), 015-02897-306 (200, 50Hz)
ZR19M3-TW_-472** (R22)	015-02894-101 (200-230, 60Hz), 015-02894-102 (380, 60Hz), 015-02894-104 (460, 60Hz & 400, 50Hz), 015-02894-105 (575, 60Hz), 015-02894-106 (200, 50Hz)
ZR19M3E-TW_-472** (R407C)	015-02894-301 (200-230, 60Hz), 015-02894-302 (380, 60Hz), 015-02894-304 (460, 60Hz & 400, 50Hz), 015-02894-305 (575, 60Hz), 015-02894-306 (200, 50Hz)

*NOTE: TW_ in the model numbers above includes TW5, TW7, TWD, TWE and TWC.

**NOTE: Replacement 4-pipe compressor part numbers will carry a "-972" suffix instead of "-472". This suffix designates the compressor as a replacement part. Replacement 3-pipe compressor model numbers will carry a "-722" suffix instead of "-222".

YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS

Piping Components

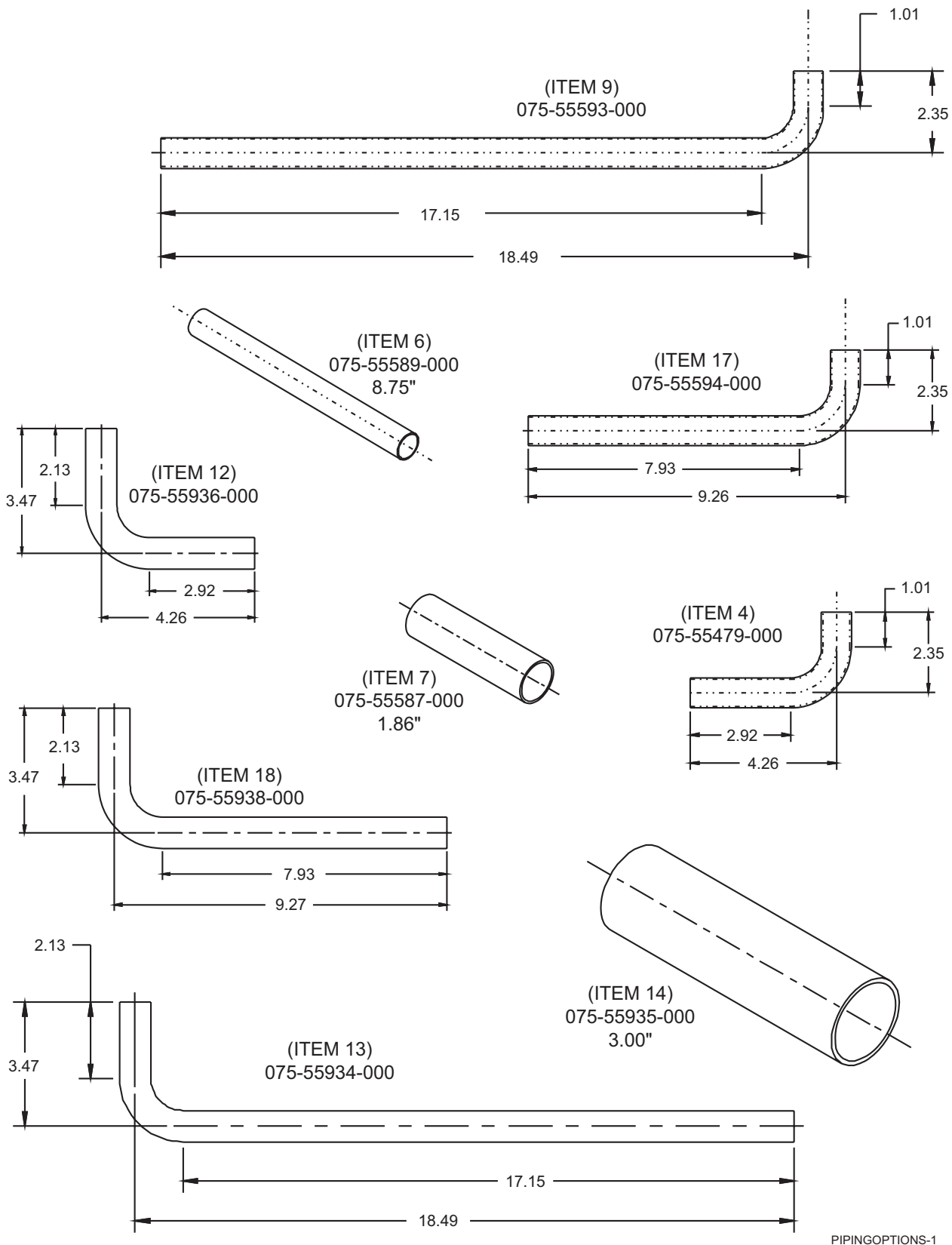
TABLE 2 provides a list of the parts contained in the piping kit. FIGURE 2 on page 6 can be used to help identify each piece of piping. NOTE: Not all items on the bill of materials below will be used. Usage will depend upon the number of compressors in the system (tandem or trio), the number of compressors to be replaced, and the location of the compressor(s) to be replaced.

A Piping Kit will consist of the following parts:

TABLE 2 – PIPING KIT PART # 015-04023-000 COMPONENTS

Item #	Part Number	Description	Qty
1	028-15077-000	GASKET (1.50" OD x 1.38" ID)	3
2	023-21925-000	NUT (7/8" OD TUBE)	3
3	023-21926-000	SLEEVE (7/8" OD TUBE)	3
4	075-55479-000	PIPE (OIL/GAS EQUALIZATION)	1
5	026-41616-000	SIGHT GLASS INDICATOR	1
6	075-55589-000	PIPE (OIL/GAS EQUALIZATION)	1
7	075-55587-000	PIPE (OIL/GAS EQUALIZATION)	1
8	023-09759-000	TEE (7/8 x 7/8 x 7/8)	1
9	075-55593-000	PIPE (OIL/GAS EQUALIZATION)	1
10	023-21977-000	O-RING	2
11	023-21970-000	ROTOLOCK FITTING (1 3/4" - 12)	2
12	075-55936-000	PIPE (OIL/GAS EQUALIZATION)	1
13	075-55934-000	PIPE (OIL/GAS EQUALIZATION)	1
14	075-55935-000	PIPE (OIL/GAS EQUALIZATION)	1
15	023-16255-000	PIPE CAP (3/8")	3
16	023-13393-000	PIPE CAP (1-3/8")	3
17	075-55594-000	PIPE (OIL/GAS EQUALIZATION)	1
18	075-55938-000	PIPE (OIL/GAS EQUALIZATION)	1
9000	075-55585-000	KIT DRAWING	1
----	SI0129	RETROFIT INSTRUCTION	1

**YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C
COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS**



PIPINGOPTIONS-1

FIGURE 2 – PIPING COMPONENTS (REF. TABLE 2, PAGE 3)

YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS

Installation Procedure

1. Be sure the kit contains all the parts listed in the bill of materials.
2. Remove the refrigerant from the system with the defective compressor(s) using environmentally friendly procedures. If the system has compressor isolation valves, the valves can be closed and only the refrigerant in the compressor(s) will need to be removed.
3. Temporarily remove the center vertical support from the frame rail on YCAL/YCUL models 0014-0040 and YCAL/YCUL models 0043-0121 (50Hz). The rail will later be notched and refitted. See FIGURE 3 below:

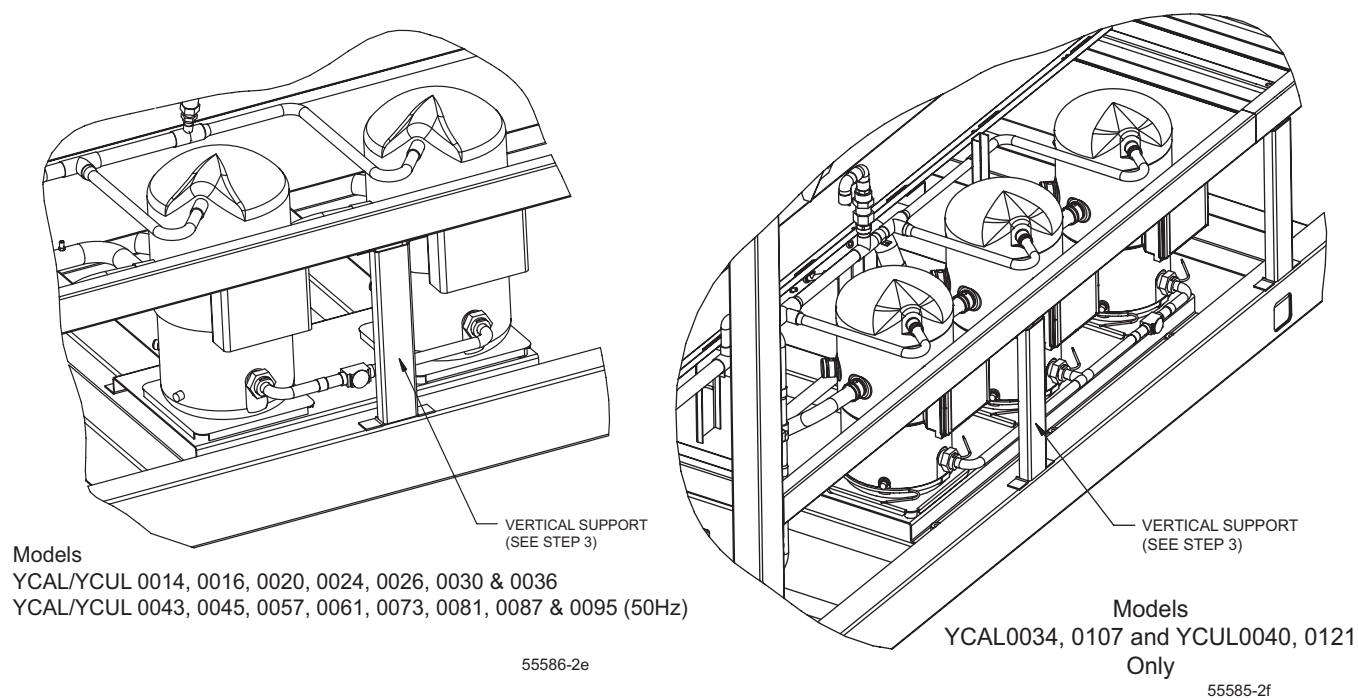


FIGURE 3 – FRAME RAIL REMOVAL

4. Cut the oil and gas equalization lines 2” from the end of the compressor connections. See FIGURE 4 on the following page. Take special care not to spill oil when the lines are cut. ***Oil will run out of the compressors and lines. Be sure to take steps to catch it.***
5. Cut the suction and discharge line(s) of the failed compressor(s) to within approximately 1” of the compressor connections.

YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS

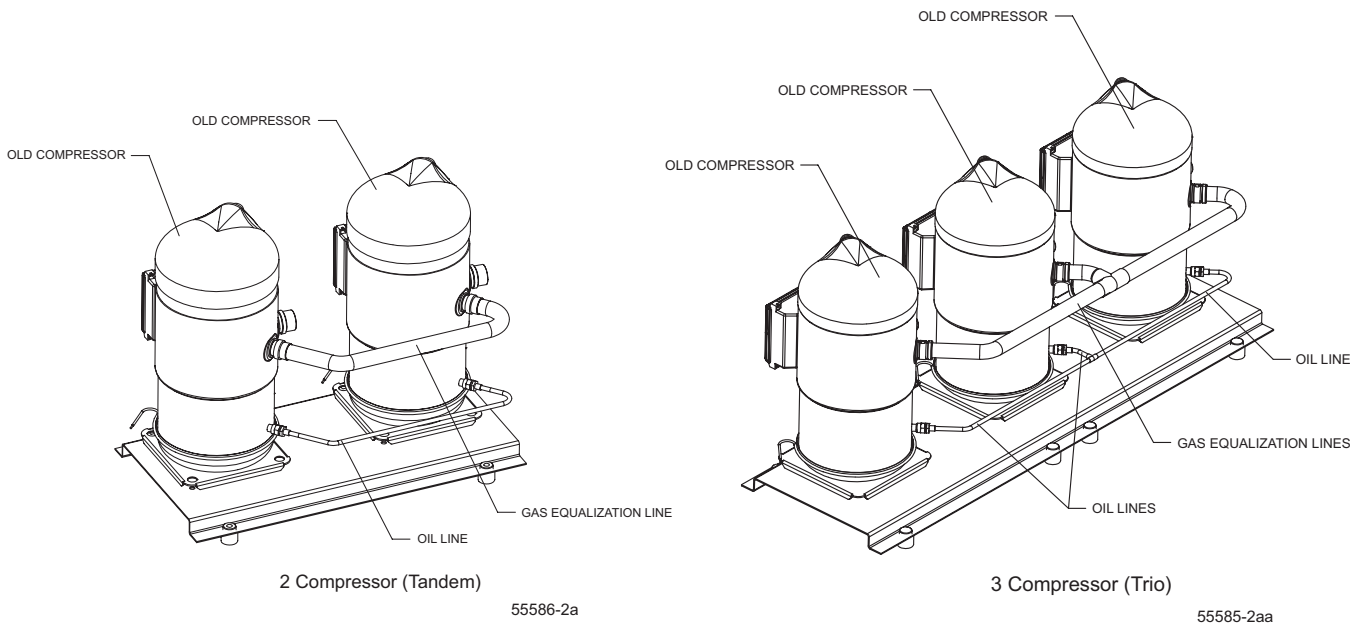


FIGURE 4 – OIL AND PRESSURE EQUALIZATION LINE REMOVAL

6. Remove the failed compressor(s) and replace it (them) with the new one(s). Refer to Service Information letter SI0074 for return of the failed compressor.
7. Braze item 15 (PIPE CAP) and item 16 (PIPE CAP) into the oil and gas equalization line 2" stubs still connected to each *compressor that will not be replaced*, as shown in FIGURE 5 on the following page. ***When brazing the cap to the oil line connection, it is recommended the line should be disconnected from the compressor to avoid damage to the seal at the compressor connection.*** Be sure to always use a nitrogen purge when brazing the pipe and caps. Always use Silfoss 15 (15% brazing rod) when brazing piping. Place wet paper towels or heat sink compound on the compressor connections to avoid damaging the compressor or the existing braze joint.

YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS

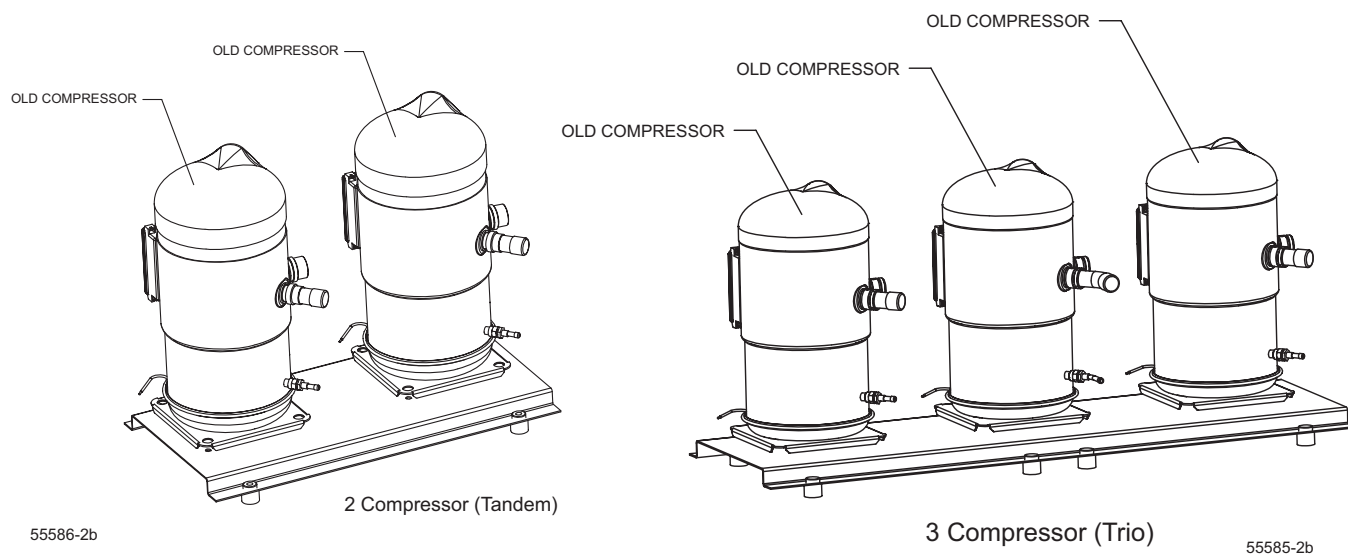
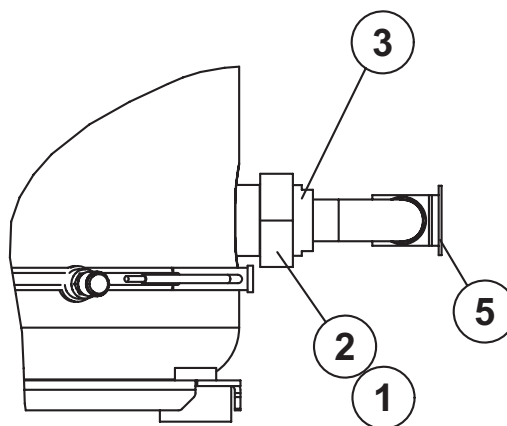


FIGURE 5 – CAPPING OFF GAS EQUALIZATION LINES ON 4-PIPE SYSTEM COMPRESSORS

Braze the suction and discharge lines into the replacement compressors with field supplied pipe and couplings as needed. Always use Silfoss 15 (15% brazing rod) when brazing piping. Be sure to use a nitrogen purge and wet paper towels or heat sink compound on the compressor connections to avoid damaging the compressor or existing braze joint from excessive heat.

8. Remove the sight glasses from both the existing and new compressors to allow installation of the combination gas/oil equalization line.
9. Install Items 1 (Gasket), 2 (Compressor Nut), and 3 (Sleeve) in each "new" compressor sight glass threaded fitting. Loosely thread the connection together. **DO NOT tighten at this time.** After the piping is brazed in step 11, final torque item 2 against item 3 to 125-133 ft-lbs to obtain a metal-to-metal contact as shown in FIGURE 6.



New Compressor

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FIGURE 6 – GASKET, NUT AND SLEEVE INSTALLATION (REF. TABLE 2, PAGE 3)

YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS

10. Install Items 10 (O-ring) and 11 (Rotolock Fitting) into each "old" compressor sight glass threaded fitting. Torque Item 11 into the compressor to 133-177 ft-lbs as shown in FIGURE 7. Install Items 1 (Gasket), 2 (Compressor Nut), and 3 (Sleeve) in each Rotolock fitting. Loosely thread the connection together. **DO NOT tighten at this time.** After the piping is brazed in step 11, final torque item 2 against item 11 to 125-133 ft-lbs as shown in FIGURE 7. Be sure to hold Item 11 with a wrench while tightening Item 2 as shown in FIGURE 7.

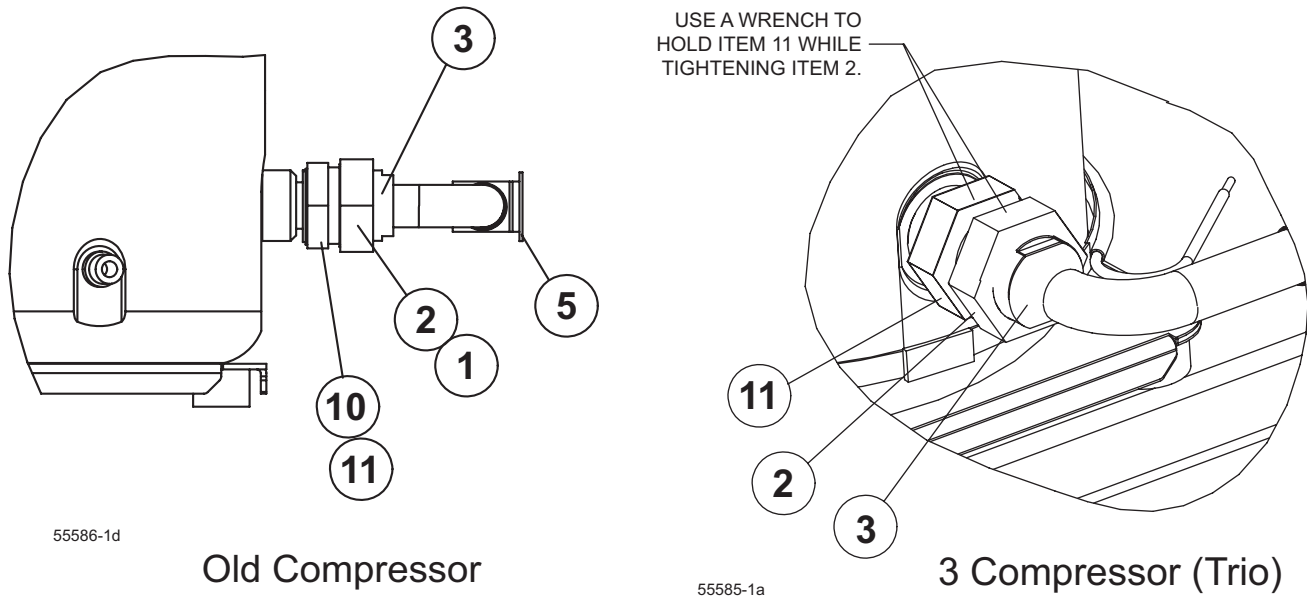


FIGURE 7 – OLD COMPRESSOR ROTOLOCK AND GASKET/NUT/SLEEVE INSTALLATION
(REF. TABLE 2, PAGE 3)

YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS

11. Install gas equalization and oil piping using the pieces shown in the following drawings. Locate the sight glass according to the location(s) the new compressors are installed. Install the sight glass at a 90 degree angle (horizontal) as shown in the drawings. See the following drawings in Fig. 8 for location of the sight glass. Be sure the sight glass is installed to avoid interference with the frame rail and be clearly visible. Remove the piping assembly from the compressor connections to braze the assembly. Also remove the gasket (1) while brazing. This will assure the o-ring (10) and gasket (1) are not damaged by the heat. Braze using Silfoss 15 (15% brazing rod). Be sure to use a nitrogen purge and wrap the sight glass with wet paper towels when brazing. Fit the completed piping assembly to the compressors and tighten the threaded fittings as outlined in Steps 9 and 10 (see pages 9 and 10).

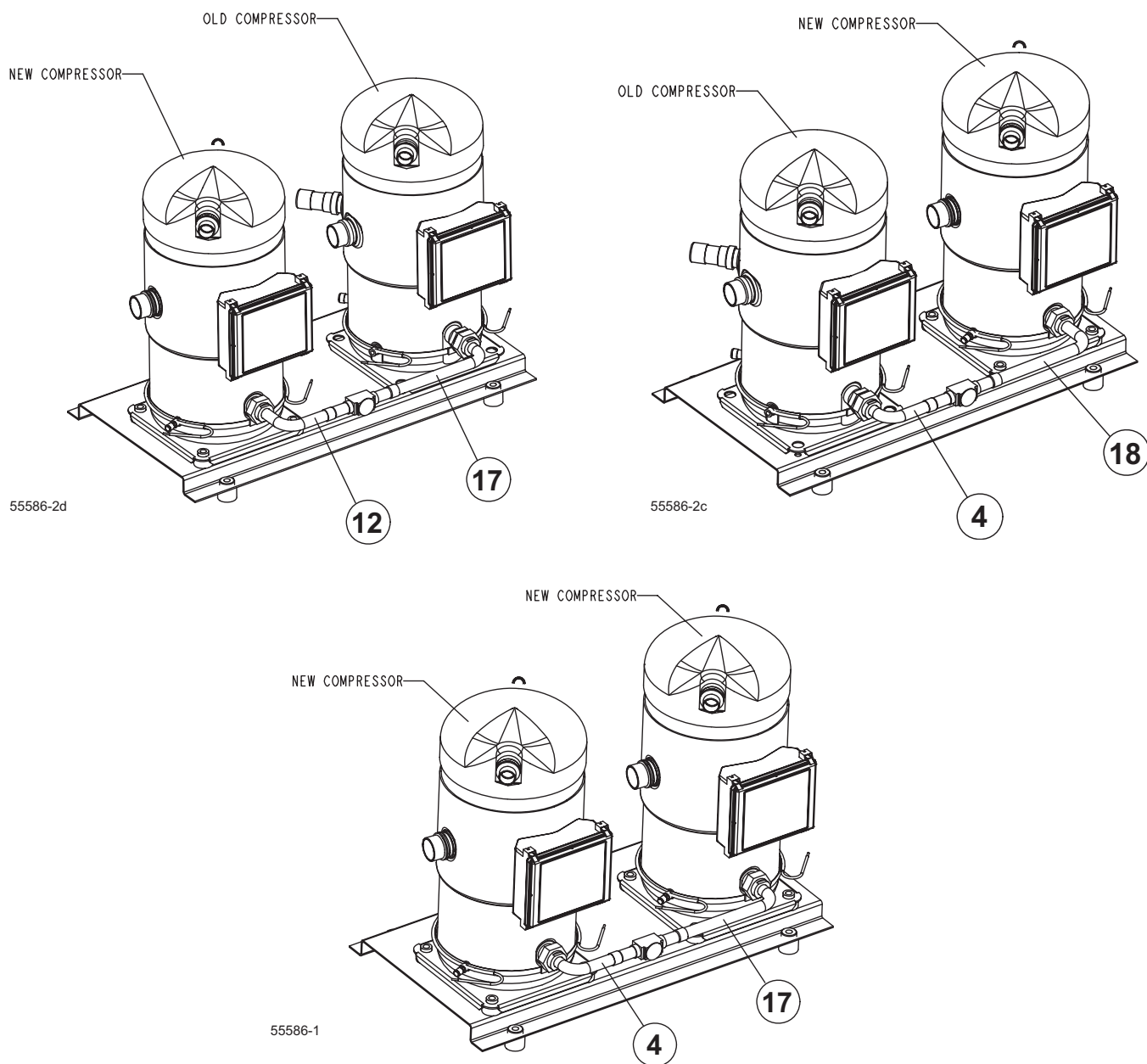


FIGURE 8 – TANDEM COMPRESSOR PIPING INSTALLATION (REF. TABLE 2, PAGE 3)

**YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C
COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS**

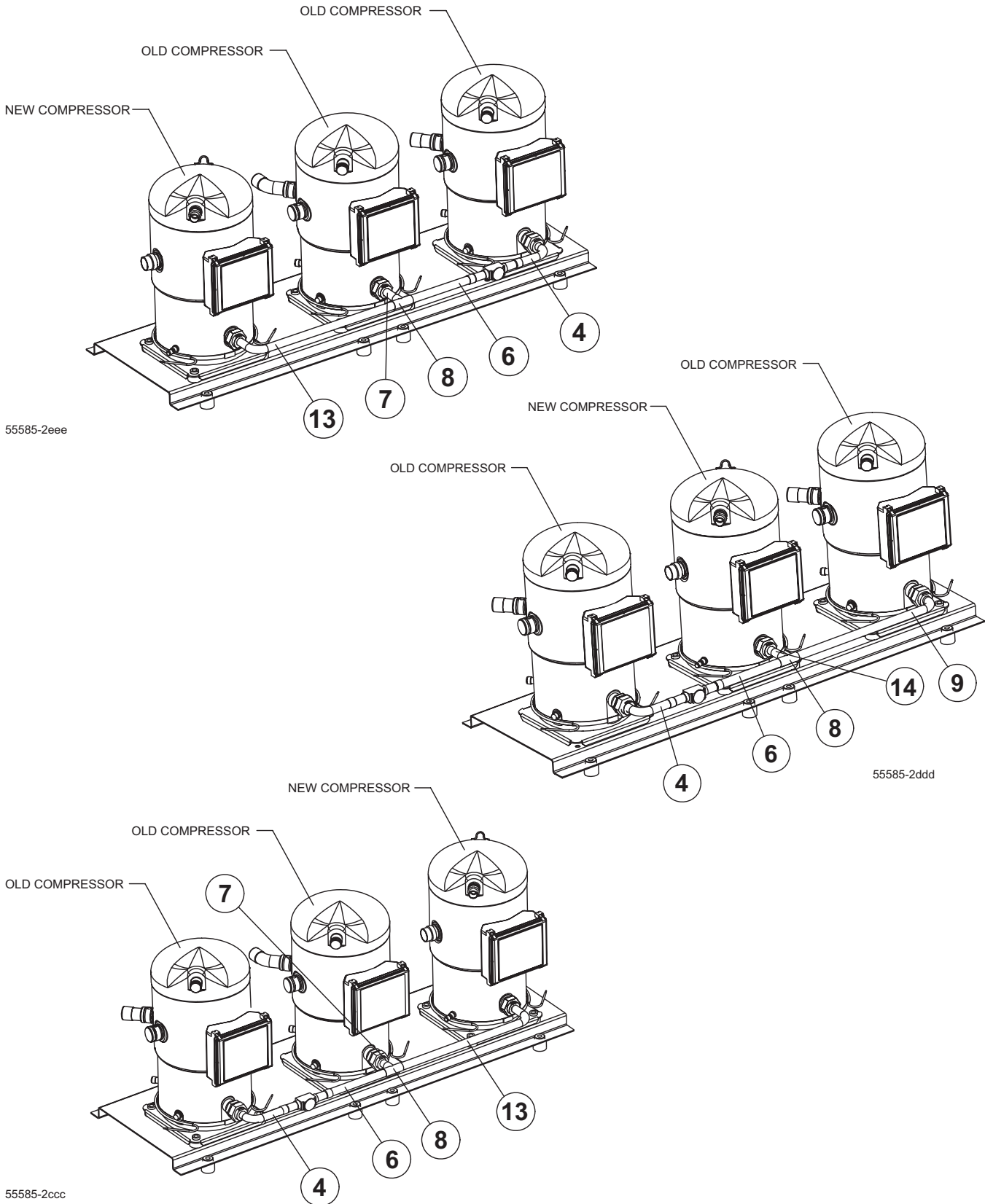


FIGURE 9 – TRIO COMPRESSOR PIPING INSTALLATION (REF. TABLE 2, PAGE 3)

**YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C
COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS**

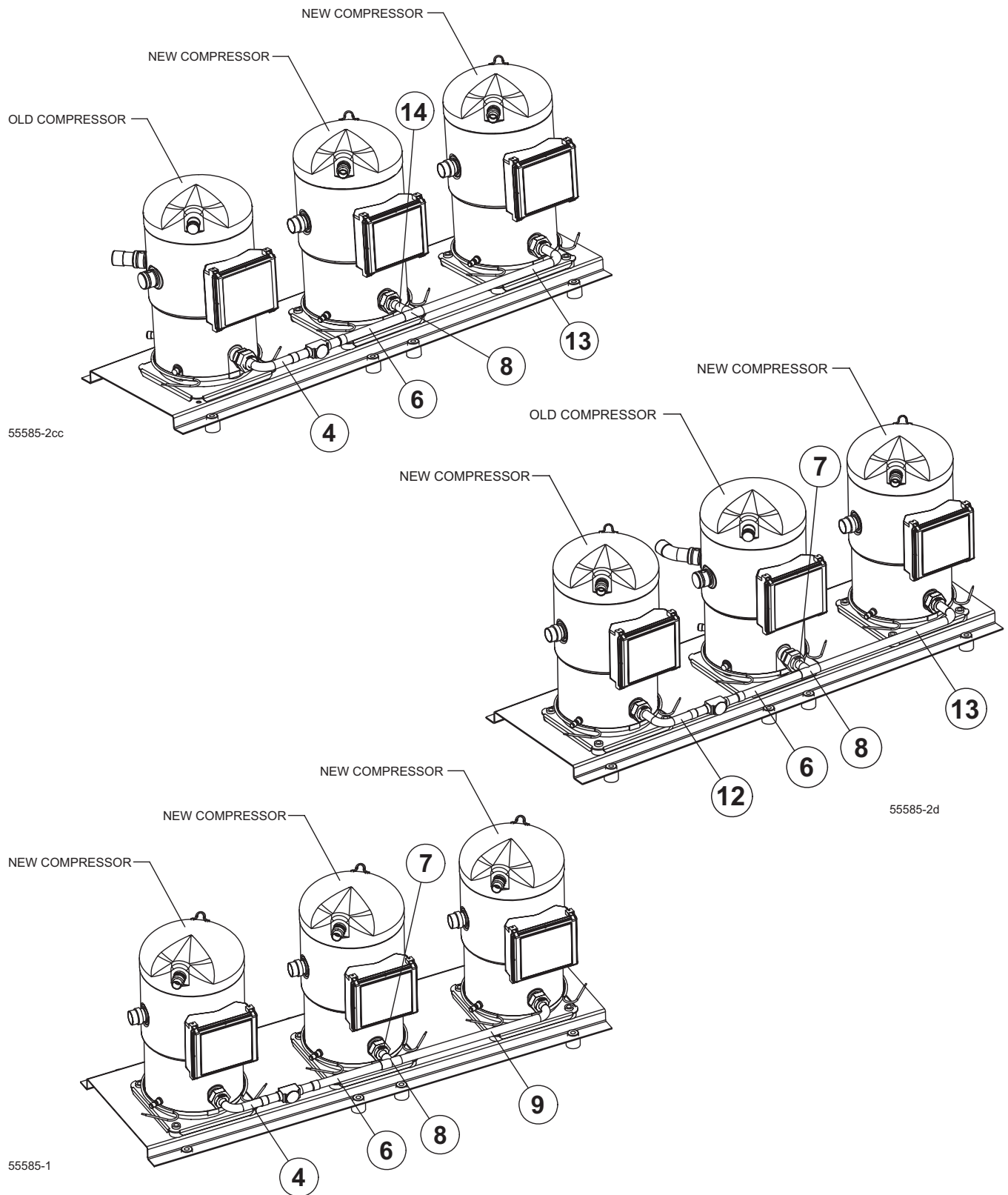
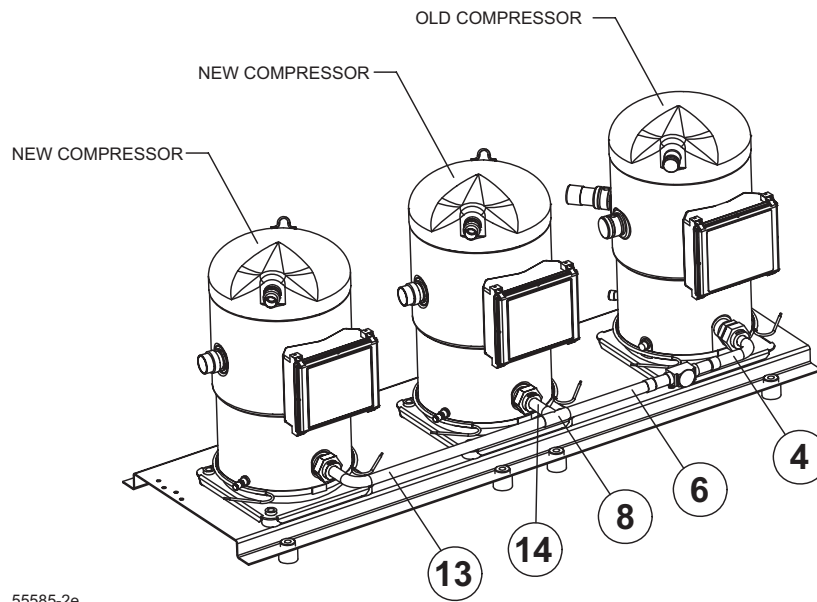


FIGURE 9 (CONT'D) – TRIO COMPRESSOR PIPING INSTALLATION (REF. TABLE 2, PAGE 3)

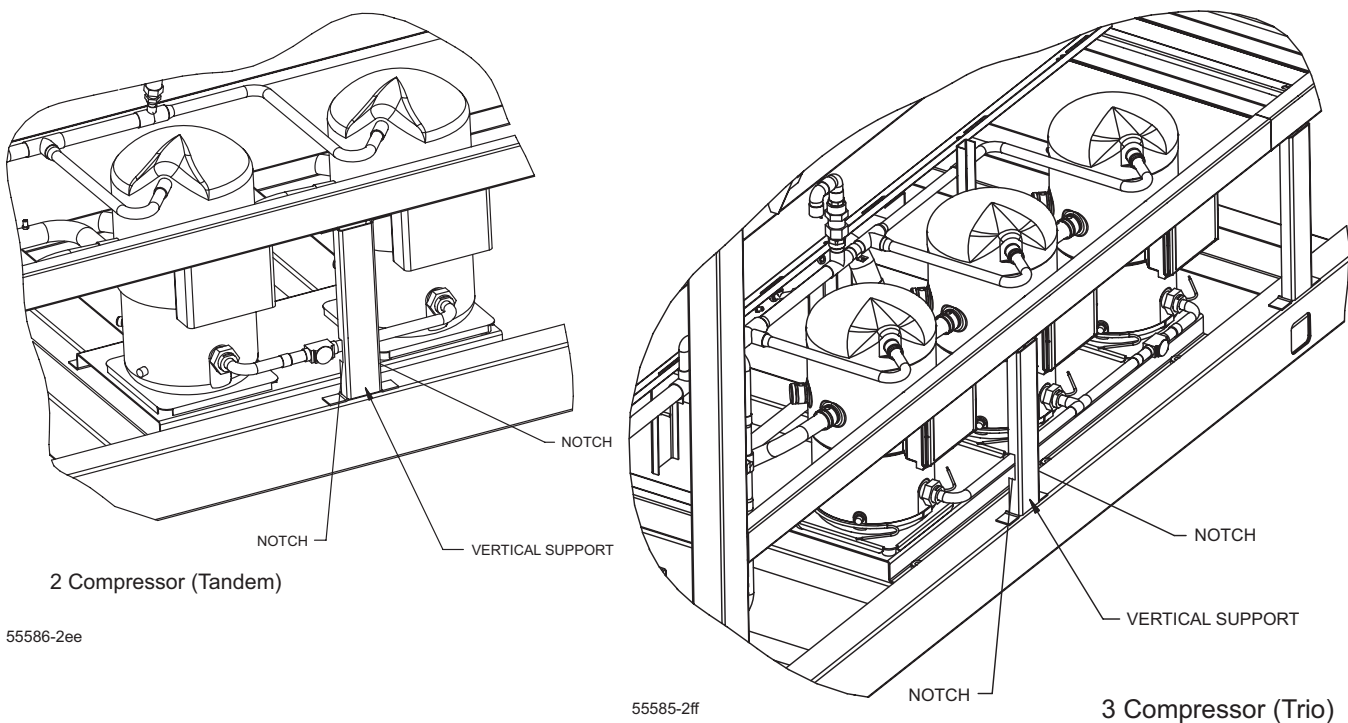
YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS



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FIGURE 9 (CONT'D) – TRIO COMPRESSOR PIPING INSTALLATION (REF. TABLE 2, PAGE 3)

12. Cut two 0.375" notches in the center support of the YCAL0014-0034, YCAL0043-0107 (50Hz), YCUL0016-0040 and YCUL0045-0121 (50Hz) as shown in FIGURE 10. Re-install the center support and check for interference. Further modify the notch as required.



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FIGURE 10 – NOTCHING AND RE-INSTALLING THE SUPPORT

YCAL0014-0253/YCUL0016-0275 AND YPAL0050-0105 Styles B & Early C COPELAND COMPRESSOR REPLACEMENT AND REQUIRED PIPING MODIFICATIONS

13. Evacuate the system to 500 microns and assure the system holds a vacuum. Add oil, if needed, to bring the level to between $\frac{1}{4}$ and $\frac{1}{2}$ of the sight glass. Recharge the system as needed. Run the system and assure subcooling is 12°F-15°F. Recheck oil levels. During operation, oil splashing should be visible in the sight glass or there should be visible evidence of oil flowing in the equalizing pipe below the level of the sight glass. Once the system is in full operation, an oil level should be visible in the sight glass after the compressors have been turned off at the end of operating the system fully loaded for about 10 minutes. Do not overfill the oil. Too much oil in the system will cause poor Thermal Expansion Valve (TXV) control and potential compressor failure.

OIL PART NUMBERS			
R-22	(1) 5 Gallon Container	"F" Oil	011-00434-000
R-407C	(6) 1 Gallon Container	"V" Oil	011-00948-000

Installing Compressors in 3-Pipe Systems

Once a system has been converted to a 3-pipe system or if the unit was built as a 3-pipe system, only minor piping modifications should be needed to replace a compressor and compressors can be ordered using TABLE 3 below. On a system modified to a 3-pipe system, replacing any remaining original 4-pipe compressor will require the gas/equalization line to be lengthened with a short piece of piping obtained in the field or as an individual piece from the piping kits.

TABLE 3 – 3- PIPE COMPRESSOR PART NUMBERS

3-PIPE COMPRESSOR MODEL*	NEW PART NUMBER
ZR90K3-TW_-222** (R22)	015-04009-101 (200-230, 60Hz), 015-04009-102 (380, 60Hz), 015-04009-104 (460, 60Hz & 400, 50Hz), 015-04009-105 (575, 60Hz), 015-04009-106 (200, 50Hz)
ZR90K3E-TW_-222** (R407C)	015-04009-301 (200-230, 60Hz), 015-04009-302 (380, 60Hz), 015-04009-304 (460, 60Hz & 400, 50Hz), 015-04009-305 (575, 60Hz), 015-04009-306 (200, 50Hz)
ZR12M3-TW_-222** (R22)	015-04010-101 (200-230, 60Hz), 015-04010-102 (380, 60Hz), 015-04010-104 (460, 60Hz & 400, 50Hz), 015-04010-105 (575, 60Hz), 015-04010-106 (200, 50Hz)
ZR12M3E-TW_-222** (R407C)	015-04010-301 (200-230, 60Hz), 015-04010-302 (380, 60Hz), 015-04010-304 (460, 60Hz & 400, 50Hz), 015-04010-305 (575, 60Hz), 015-04010-306 (200, 50Hz)
ZR16M3-TW_-222** (R22)	015-04011-101 (200-230, 60Hz), 015-04011-102 (380, 60Hz), 015-04011-104 (460, 60Hz & 400, 50Hz), 015-04011-105 (575, 60Hz), 015-04011-106 (200, 50Hz)
ZR16M3E-TW_-222** (R407C)	015-04011-301 (200-230, 60Hz), 015-04011-302 (380, 60Hz), 015-04011-304 (460, 60Hz & 400, 50Hz), 015-04011-305 (575, 60Hz), 015-04011-306 (200, 50Hz)
ZR19M3-TW_-222** (R22)	015-04008-101 (200-230, 60Hz), 015-04008-102 (380, 60Hz), 015-04008-104 (460, 60Hz & 400, 50Hz), 015-04008-105 (575, 60Hz), 015-04008-106 (200, 50Hz)
ZR19M3E-TW_-222** (R407C)	015-04008-301 (200-230, 60Hz), 015-04008-302 (380, 60Hz), 015-04008-304 (460, 60Hz & 400, 50Hz), 015-04008-305 (575, 60Hz), 015-04008-306 (200, 50Hz)

*NOTE: TW_ in the model numbers above includes TW5, TW7, TWD, TWE and TWC.

**NOTE: Replacement 3-pipe compressor part numbers will carry a "-722" suffix instead of "-222". This suffix designates the compressor as a replacement part.

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