



*Tecumseh*



**SECTION III (COMMERCIAL)**

FH<sup>2</sup> REPLACING FH

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Tecumseh Products Company – May, 2020

*Cooling for a Better Tomorrow™*



*Tecumseh*



The Next Generation



*Cooling for a Better Tomorrow™*



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**1** Why FH<sup>2</sup> ?

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**2** The new FH<sup>2</sup>

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**4** FH<sup>2</sup> vs Competition

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▼ AGENDA



# 1- Why FH<sup>2</sup> ?

# Our customers are telling us, they need:

- ▶ **A sustainable solution**
  - ▶ FH<sup>2</sup> has been designed to be used with Mid-GWP refrigerant and will be the platform supporting the next Low-GWP generation.
- ▶ **A significant positive impact on their system**
  - ▶ FH<sup>2</sup> is more compact, quieter and more efficient in a similar cooling capacity range.
- ▶ **An easy transition**
  - ▶ Same Reciprocating (Piston) Reliable technology, very well perceived and understood on commercial system,
  - ▶ Same footprint .... as our Famous FH range.

▶ FH<sup>2</sup> : A Product ready for the future!

## 2- The New FH<sup>2</sup>



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# Value proposition



## ▶ Performance

Efficiency is a key differentiator.  
FH<sup>2</sup> has been designed to succeed on our customers Energy requirements.

## ▶ Product offering

Only one size for a full cooling capacity range. Main European voltages available from launch.

## ▶ Robust

Decision to keep reciprocation technology to meet the rough conditions of commercial refrigeration applications where reliability is a must.

## ▶ Customization

This platform is delivered from Europe. It allows to provide many variants in an efficient way.

## ▶ Eco-friendly

Compatible with Mid-GWP refrigerants R452A, R448A\*, R449A\*, R513A and will support R455A/R454C and R1234yf refrigerants.

# FH<sup>2</sup>



▶ FH<sup>2</sup>: the key Values for our Customers.

\* Refer to Tecumseh Guide lines



## 3- FH<sup>2</sup> vs FH

Similar platforms

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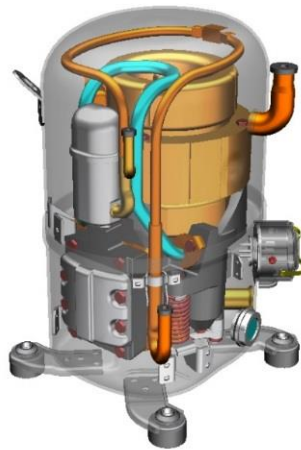
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# Similar platforms

Same technology (Piston), architecture, number of Cylinders (2), footprint.  
Different positions for Tubing/ Spud and terminal

### FH



Electrical terminal in lower housing

Suction spud/ tube Process tube in Upper Housing

Discharge spud, Sight glass, Crank case heater in lower Housing

Suction connection	Rotalock 1" ¼ - 12UNF 2A
Discharge connection	Rotalock 1" - 14UNS 2A

### FH<sup>2</sup>



Electrical terminal in upper housing

Suction connection	Rotalock 1" ¼ - 12UNF 2A
Discharge connection	Rotalock 1" ¼ - 12UNF 2A

▶ FH<sup>2</sup>: Easy transition from FH.



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# Key benefits



	FH <sup>2</sup>	FH	Comments
<b>Efficiency</b>	FH <sup>2</sup> is 5 to 20% better		
<b>Sound (dBA)</b>	FH <sup>2</sup> is 1 to 3dB quieter with less Low frequencies		
<b>Height (mm)</b>	354	350, 370, 390	<b>One Height</b> for entire FH <sup>2</sup> platform <b>Compact by 36mm</b>
<b>Models</b>	HBP: 4522 to <b>4544</b> LBP: 2480 to 2511	HBP: 4522 to 4540 LBP: 2480 to 2511	FH <sup>2</sup> has a similar capacity range in LBP and <b>a wider HBP</b>
<b>Displacement (cm<sup>3</sup>)</b>	40 to 68	40 to 74	FH <sup>2</sup> has <b>a better volumetric efficiency</b>
<b>Advantages</b>	More efficient, quieter, more compact and wider cooling capacity	Reliable design for “commercial” market	FH <sup>2</sup> provides <b>better performances</b> based on the Tecumseh’s design and reliability knowledge

 FH<sup>2</sup>: keep the best, Exceed key values.

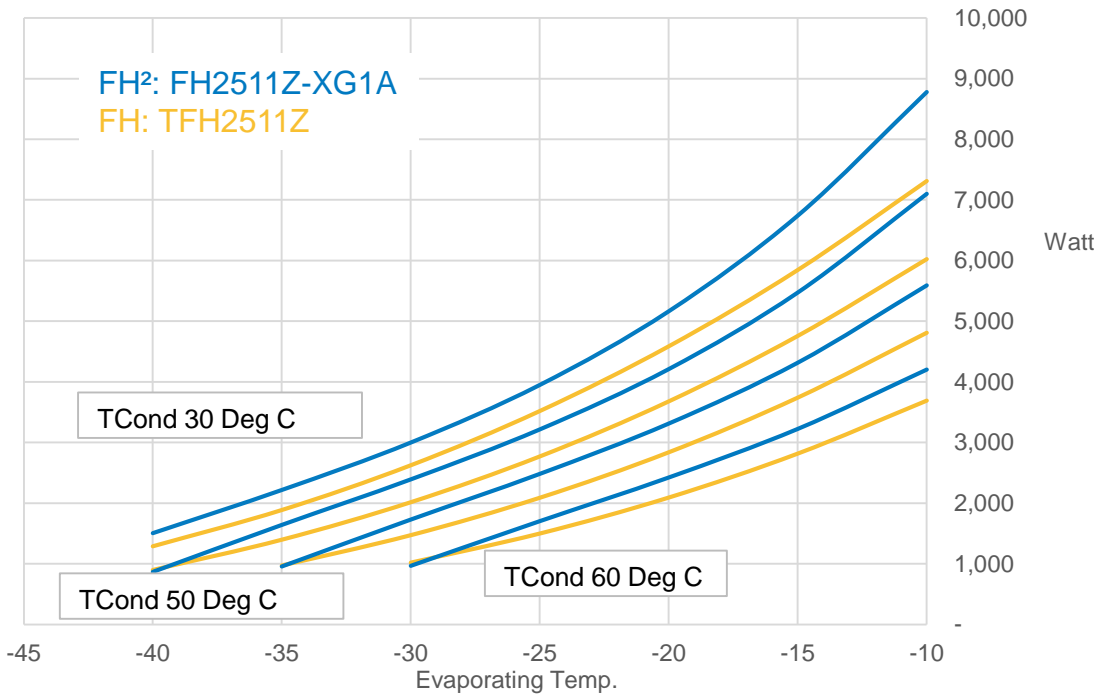


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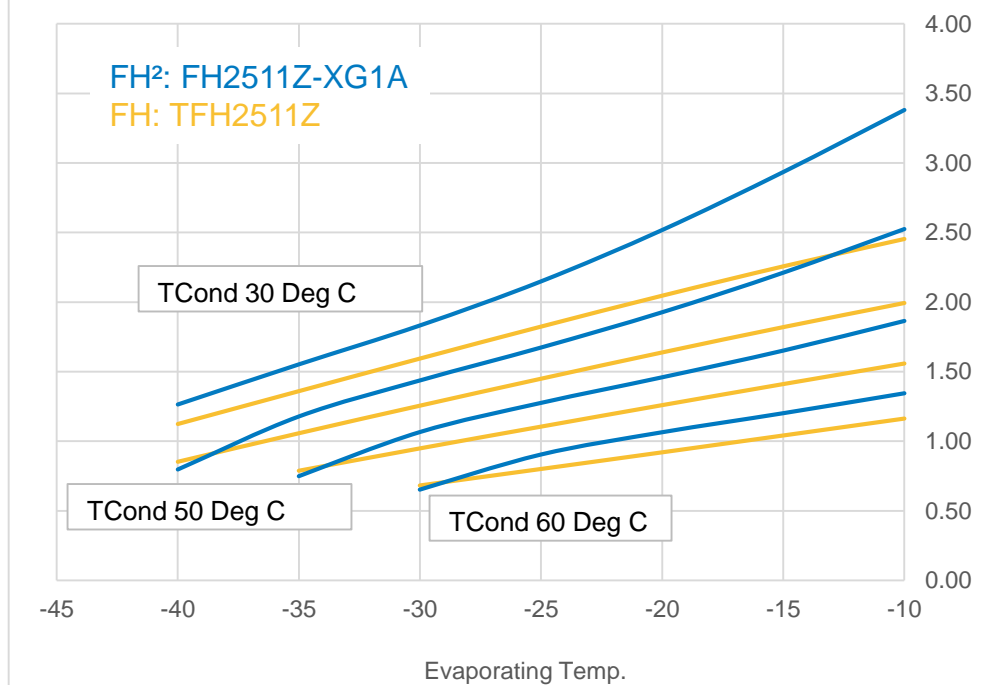
# LBP Performances



### Cooling Capacity



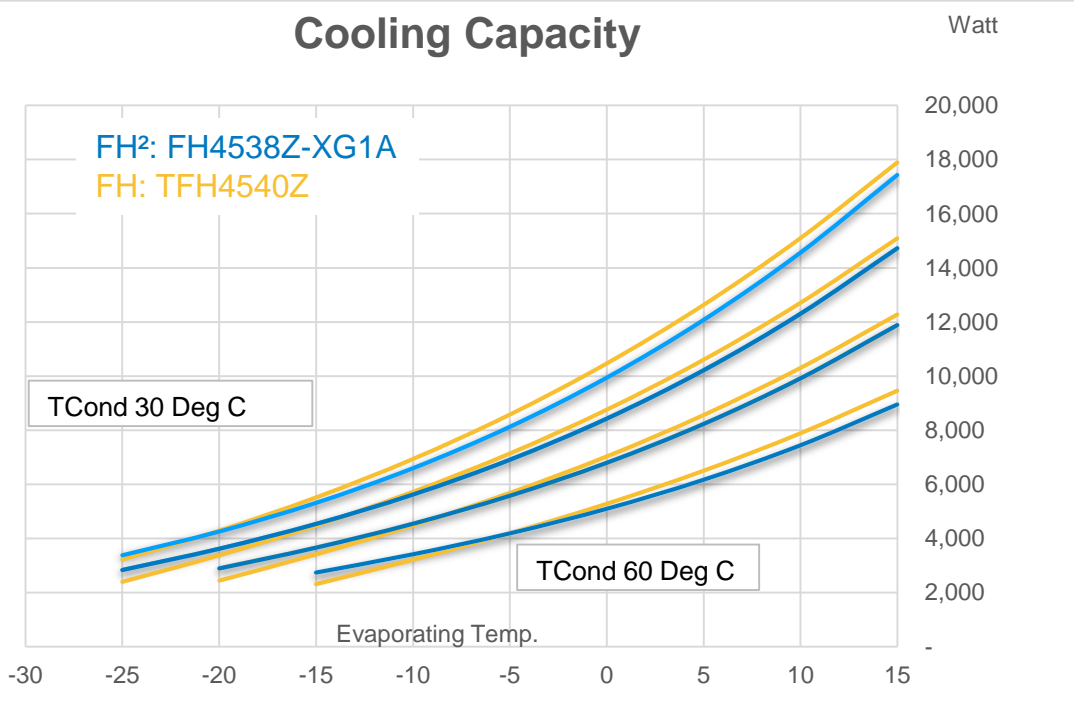
### COP



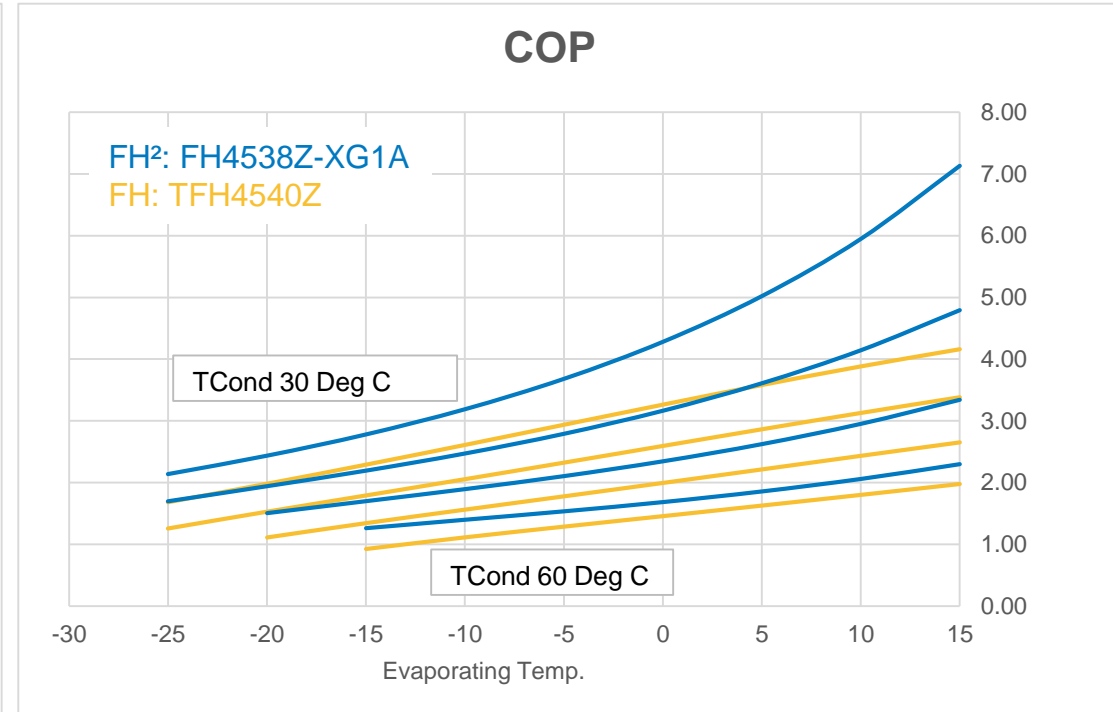
▶ FH<sup>2</sup>: 15 to 20% better cooling capacity and efficiency

\*The Performances are Subjected to revision

## Cooling Capacity



## COP



▶ FH<sup>2</sup>: 15 to 20% better efficiency

\*The Performances are Subjected to revision

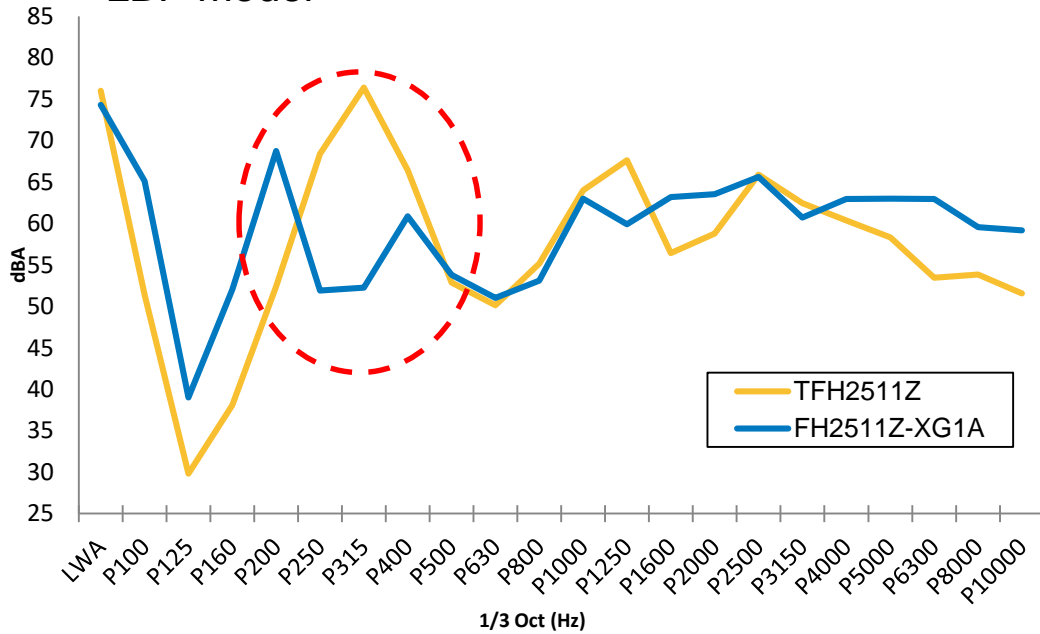


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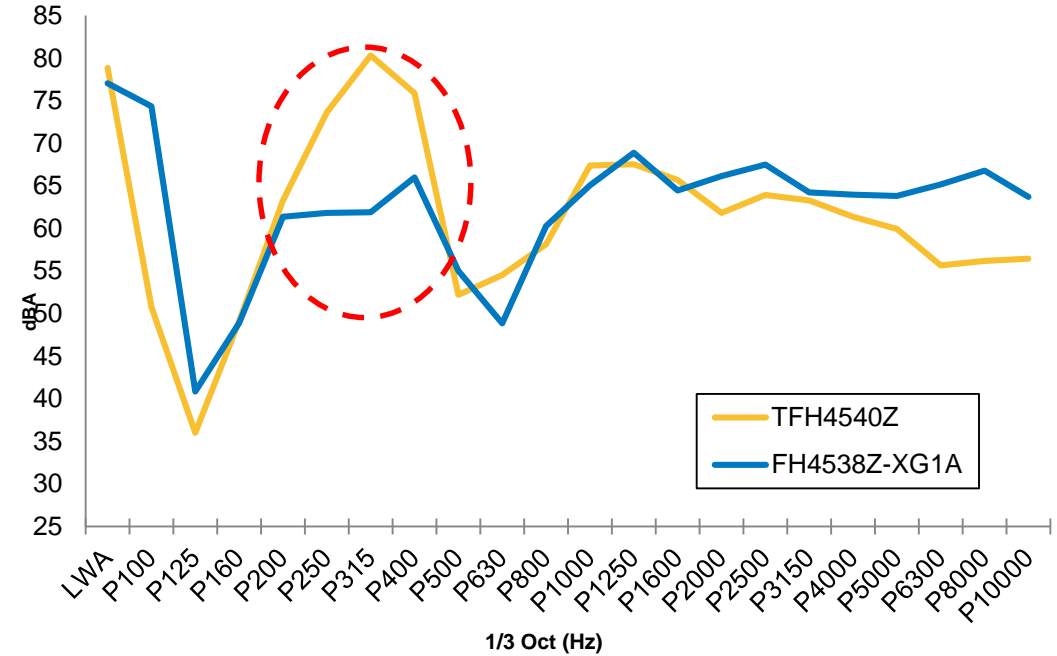
# Acoustic



### LBP model



### HBP model



▶ FH<sup>2</sup>: significant drop in low frequencies (up to -15dBA) – Quieter in the appliance

\*The Performances are Subjected to revision

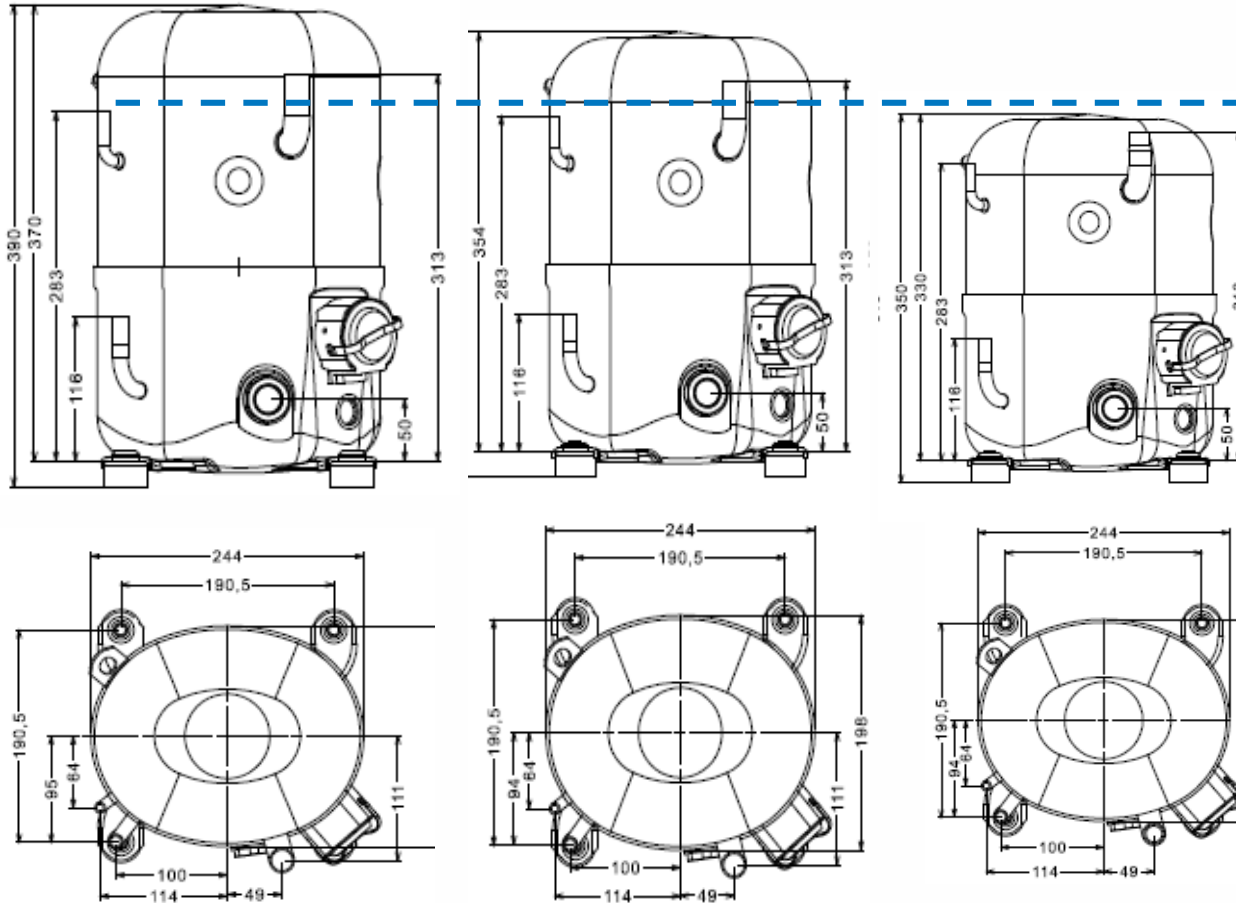


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# Comparison FH vs FH<sup>2</sup> (Tube)

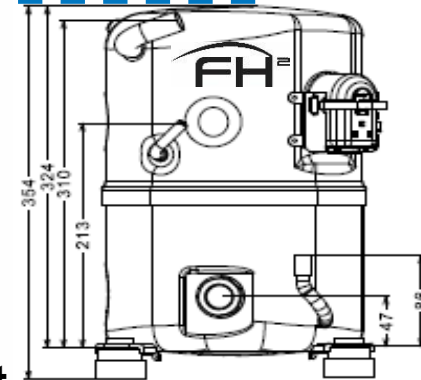


The suction, discharge and process tube location, orientation and the diameters are different in FH<sup>2</sup> Important to verify the system tube routing and wiring harness in the application

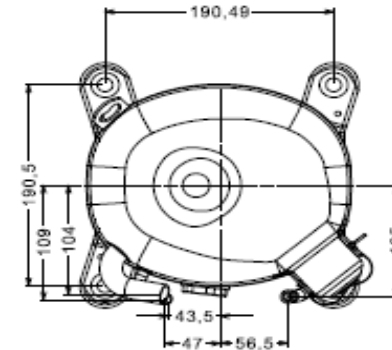


3 Different heights :350,374,390mm,  
Mounting Hole distance 190.5X190.5mm

**FH**



**Compact**



One Height for FH<sup>2</sup>:354mm,  
190.5X190.5mm Mounting Hole distance

**FH<sup>2</sup>**



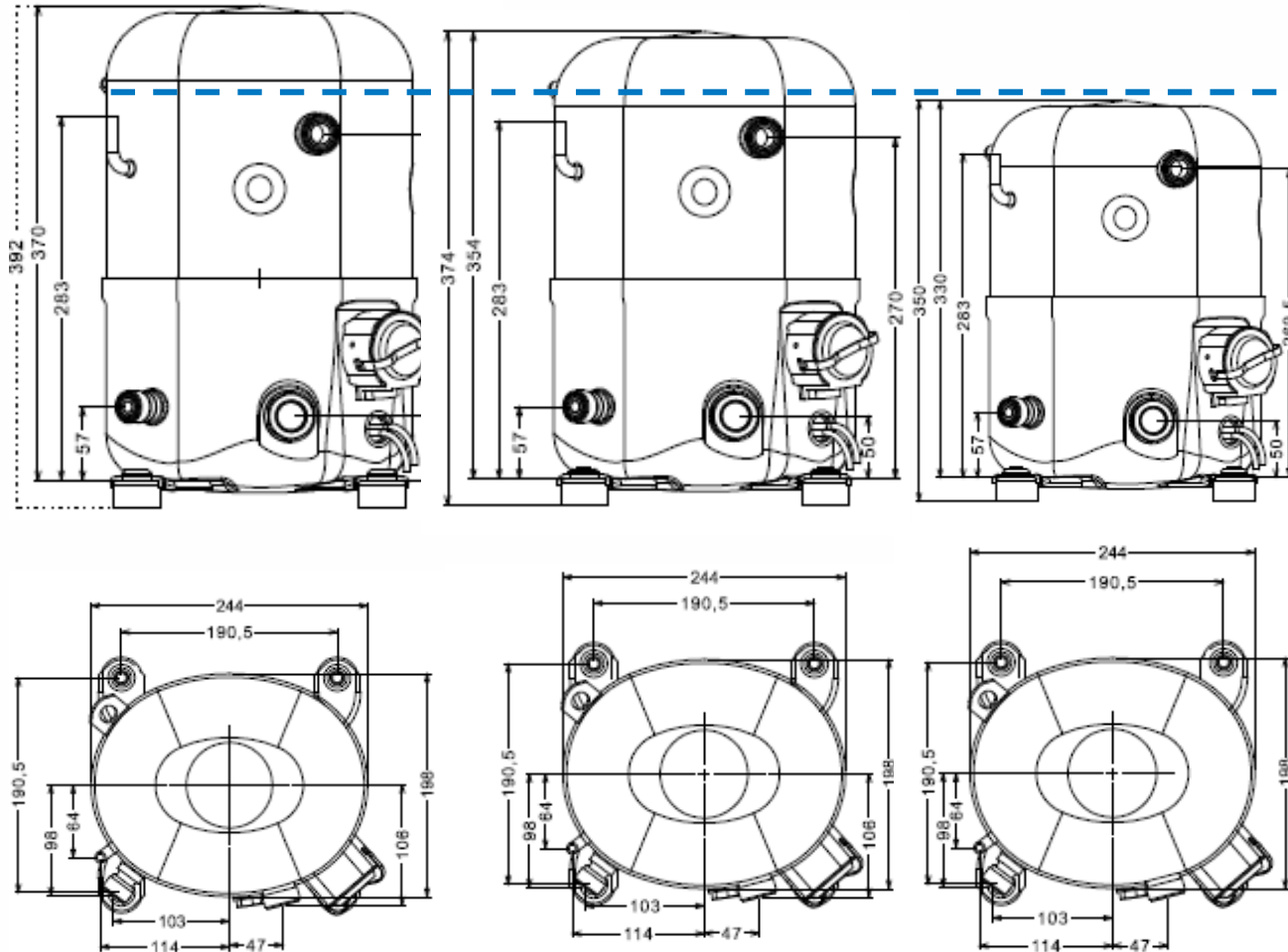


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# Comparison FH vs FH<sup>2</sup> (Spud)



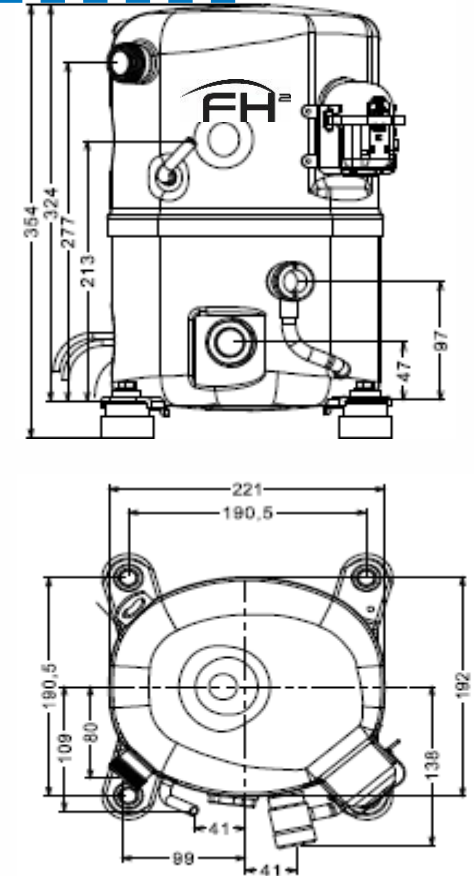
The suction ,discharge Spuds and process tube location and the diameters are different in FH<sup>2</sup> Important to verify the system tube routing and wiring harness in the application



3 Different heights :350,374,390mm,  
Mounting Hole distance 190.5X190.5mm

**FH**

**Compact**



One Height for FH<sup>2</sup>:354mm,  
190.5X190.5mm Mounting Hole distance

**FH<sup>2</sup>**





# FH vs FH<sup>2</sup> : Model wise Height Summary

FH Model	Height Including Grommets (mm)	FH <sup>2</sup> All Models	Height Including Grommets (mm)
TFH4540Z (KZ,TZ)	<b>390</b>	<b>FH<sup>2</sup></b>	<b>354</b>
FH4540Z(FZ,HZ,GZ)			
FH4531Z(FZ,HZ,GZ)			
FH2480Z(FZ,HZ,GZ)			
FH2511Z(FZ,HZ,GZ)			
FH4522Z(FZ,HZ,GZ)	<b>374</b>		
FH4524Z(FZ,HZ,GZ)			
FH4525Y(FZ,HZ,GZ)			
TFH4522Z(TZ,KZ)			
TFH4524Z(TZ,KZ)			
TFH4531Z(TZ,KZ)			
TFH4518Y(TZ,KZ)			
TFH4525Y(TZ,KZ)			
TFH2480Z(TZ,KZ)			
TFH2511Z(TZ,KZ)			
FH4518Y (FZ,HZ,GZ)			



# Product Range



## Single Phase

XC: 220-240V/50Hz/1~  
Previous FZ is replaced by XC

## Three Phases

KZ: 220V/50Hz/3~  
220V/60Hz/3~  
XG: 380-420V/50Hz/3~  
460V/60Hz/3~  
Previous TZ is replaced by XG

## XN voltage will cover HZ and GZ

XN: 200-220V/50Hz/1~  
208-230V/60Hz/1~  
GZ: 208-220V/50Hz/1~  
HZ: 208-220V/60Hz/1~

		Model	XG	XC	KZ	XN
<b>R404A, R452A, R449A* &amp; R448A*</b>	LBP	FH2480Z	x	x	x	x
		FH2511Z	x	x	x	x
	HBP	FH4522Z	x	x	x	
		FH4524Z	x	x	x	x
		FH4532Z	x	x	x	x
		FH4538Z	x	x	x	x
		FH4544Z	x		x	
<b>R134a &amp; R513A</b>	HBP	FH4518Y	x	x		
		FH4525Y	x	x		

\* Refer to Tecumseh Guide lines

 **FH<sup>2</sup>: A complete range Available**



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# Cross Ref and nomenclature



## LBP R404A equivalent

FH	FH <sup>2</sup>
TFH2480Z-KZ	FH2480Z-KZ1A
FH2480Z-FZ	FH2480Z-XC3A
TFH2480Z-TZ	FH2480Z-XG1A
FH2480Z-GZ	FH2480Z-XN3A
FH2480Z-HZ	FH2480Z-XN3A
TFH2511Z-KZ	FH2511Z-KZ1A
FH2511Z-FZ	FH2511Z-XC3A
FH2511Z-FZ	FH2511Z-XC3A
TFH2511Z-TZ	FH2511Z-XG1A
FH2511Z-GZ	FH2511Z-XN3A
FH2511Z-HZ	FH2511Z-XN3A

## R134a equivalent

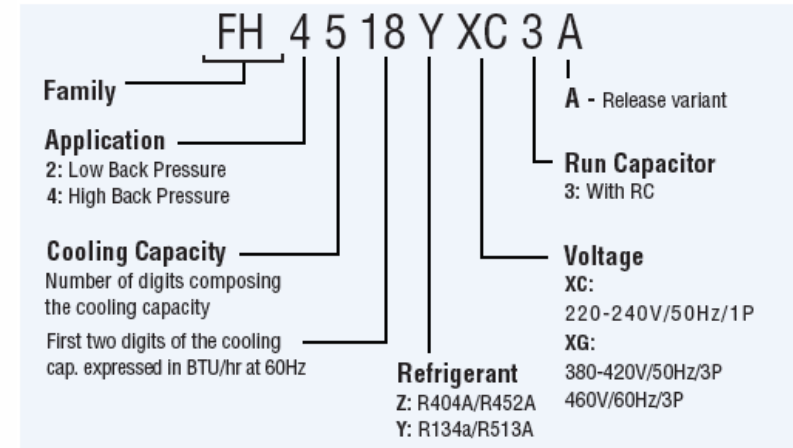
FH	FH <sup>2</sup>
TFH4518Y-TZ	FH4518Y- XG1A
FH4518Y-FZ	FH4518Y-XC3A
FH4525Y-FZ	FH4525Y-XC3A
TFH4525Y-TZ	FH4525Y-XG1A

## HBP R404A equivalent

FH	FH <sup>2</sup>
TFH4522Z-KZ	FH4522Z-KZ1A
FH4522Z-FZ	FH4522Z-XC3A
TFH4522Z-TZ	FH4522Z-XG1A
TFH4524Z-KZ	FH4524Z-KZ1A
FH4524Z-FZ	FH4524Z-XC3A
TFH4524Z-TZ	FH4524Z-XG1A
FH4524Z-HZ	FH4524Z-XN3A
FH4524Z-GZ	FH4524Z-XN3A
TFH4531Z-KZ	FH4532Z-KZ1A
FH4531Z-FZ	FH4532Z-XC3A
TFH4531Z-TZ	FH4532Z-XG1A
FH4531Z-HZ	FH4532Z-XN3A
FH4531Z-GZ	FH4532Z-XN3A
TFH4540Z-KZ	FH4538Z-KZ1A
FH4540Z-FZ	FH4538Z-XC3A
TFH4540Z-TZ	FH4538Z-XG1A
FH4540Z-HZ	FH4538Z-XN3A
FH4540Z-GZ	FH4538Z-XN3A

## 2 new Models in FH<sup>2</sup>

FH	FH <sup>2</sup>
Not Applicable	FH4544Z-KZ1A
Not Applicable	FH4544Z-XG1A



**FH<sup>2</sup> will use a new designation like: FH2511Z-XG instead of TFH2511Z**