

SUBJECT: Steering Extremity Limit Feature - Appearing in: CCU Firmware v5.60H or later and CartTools V6.24.15

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E76 STEERING EXTREMITY FAULT

- This error was introduced in firmware V5.18 but was only possibly triggered during Magnetic Calibration.
- Starting in firmware V5.60H the use of this error is expanded to include new maximum steering limits on the Model 100 and 300 CCU AGVs.
- These limits are enforced to prevent an undetectable unsafe state of following magnetic path.
- These limits are NOT enforced on vehicles with no steering potentiometer, while SmartSteering, or reversing using a fixed guidance sensor.
- On the 100 the default limit is 75 degrees from center (3 Bins)
- On the 300 the default limit is 68 degrees from center (6 Bins)
 - Reference later in this document for a detailed explanation of “Definition of Bins”.
 - Also see later in this document for “Measured Examples of Steering Limits”.

Temporarily Relaxing the Steering Limits

- Three new CartTools commands were added for this Steering Extremity OverRide (SEOR)
- These commands appear in CartTools v6.24.15 or later
 - Ask for a new copy from Daifuku
- If you are still using CartTools V5
 - reference “Adding SEOR Commands to CartTools V5” later in this document.

Command> SEOR Parameter: Distance

- This command has a single parameter which allows the default Steer Extremity Distance to be overridden when activated by the SEOR Activate Override command.
- Parameter Range 0-127
 - 0 means to use the default Steer Extremity Distance value
 - 1-127 represents the distance (in inches) with which to override the default Steer Extremity Distance

Command> SEOR Parameter: Bins

- This command allows the default Steer Extremity # of Bins to be overridden when activated by the SEOR Activate Override command. This command has two parameters to allow the number of Bins to be overridden in a direction-dependent fashion:
- Left (i.e., CCW Steering) parameter range 0-15
 - 0 means to use the default Steer Extremity # of Bins
 - 1-15 represents the number of Bins with which to override the default Steer Extremity number of Bins
- Right (i.e., CW steering) [parameters same as above]

SEOR Parameter: Bins (8) (2)

8	▼	Right
2	▼	Left

Command> SEOR Activate Override

- This command is utilized in conjunction with SEOR Parameter: Distance and SEOR Parameter: Bins.
- The single parameter associated with this command establishes the distance which the default Steer Extremity parameters are to be overridden.
- 0 means to Cancel the command. This would be used to terminate a prior SEOR Activate Override command early.
- 1-127 represents the number of inches to override the default Steer Extremity parameters
- If desired, the effective distance of this command can be extended simply by re-executing it prior to the distance expiration of the previous invocation (e.g., the command sequence of SEOR Activate 127”, Wait for Distance 100”, SEOR Activate 127”; would allow the default Steer Extremity parameters to be overridden for 227”).

Example for a 100TT with Left Turn Problem:

- Let's assume you find a Left turning path that causes an E74.
- This example code sets the Left limit to 2 bins rather than the default of 3. Opening up the limit to trigger the error. The Right parameter is left at the default.
- The SEOR Parameter: Distance of 12, declares that the limit allowed at 2 bins is 12", while in the turn.
- The SEOR Active Override of 24, declares that the parameters will be changed for the next 24". After, the parameters are returned to default.
- Execution of commands could be delayed to execute at the proper time by using commands like Wait Until Inches Traveled.
- This code could also be put in a Subroutine and called as needed.

The screenshot shows a control interface with three expandable sections:

- SEOR Parameter: Bins {Clear} {2}**
 - A dropdown menu set to "Clear" with a "Right" button next to it.
 - A dropdown menu set to "2" with a "Left" button next to it.
- SEOR Parameter: Distance {12}**
 - A dropdown menu set to "12".
- SEOR Activate Override {24}**
 - A dropdown menu set to "24".

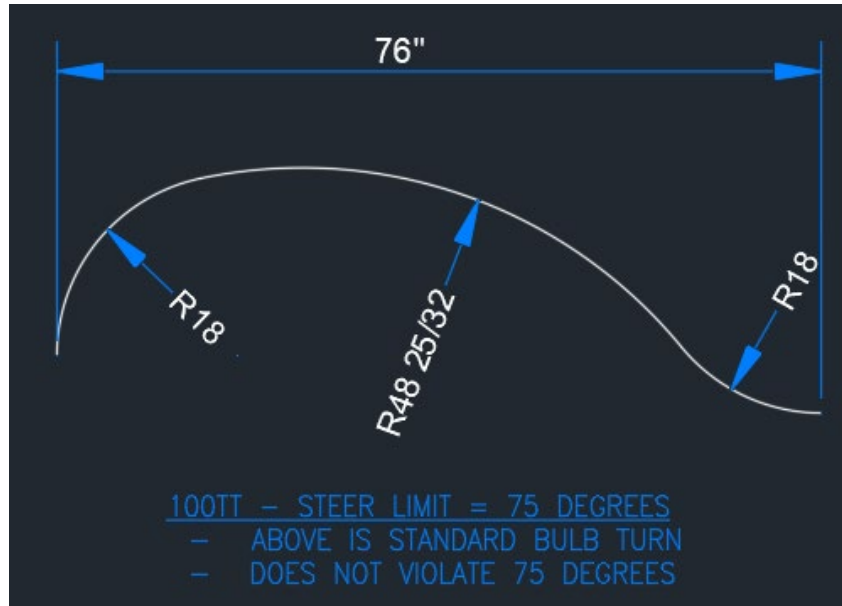
It is recommended that the Bins and Distance only be reduced as much as needed to navigate the curve

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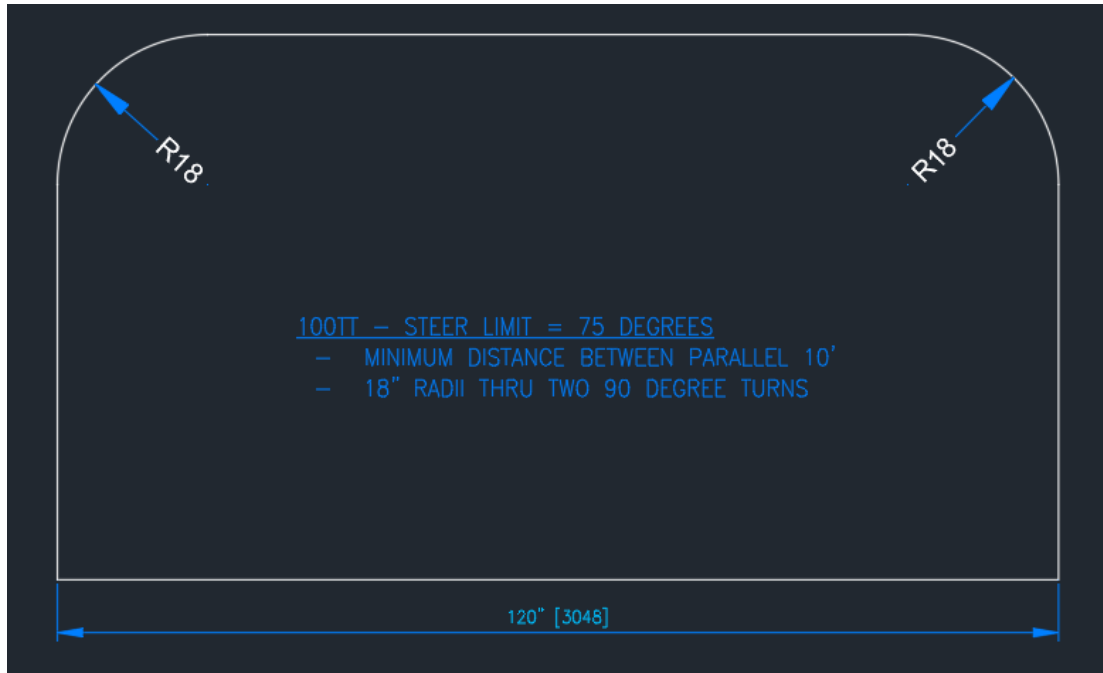
Measured Examples: 100TT



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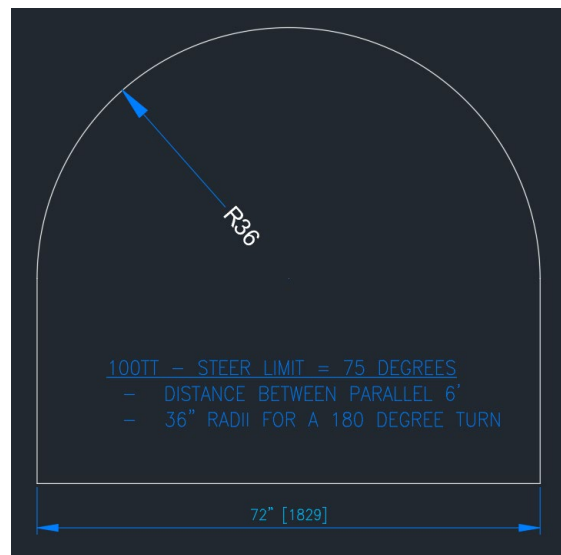
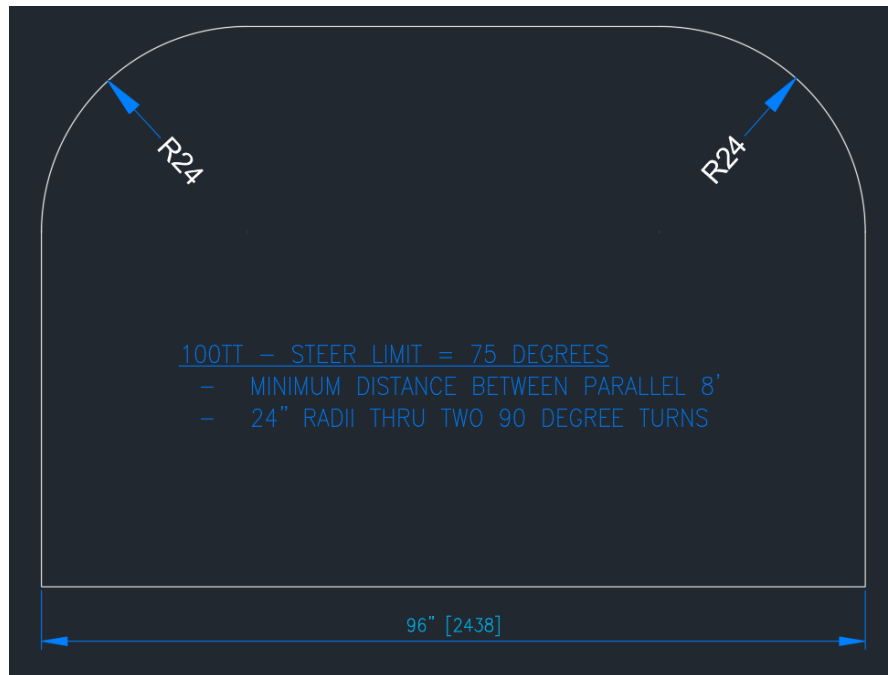
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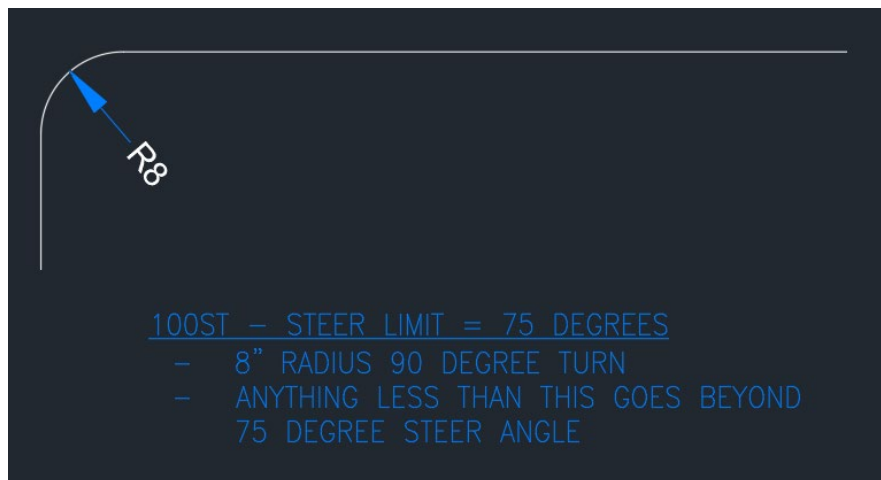
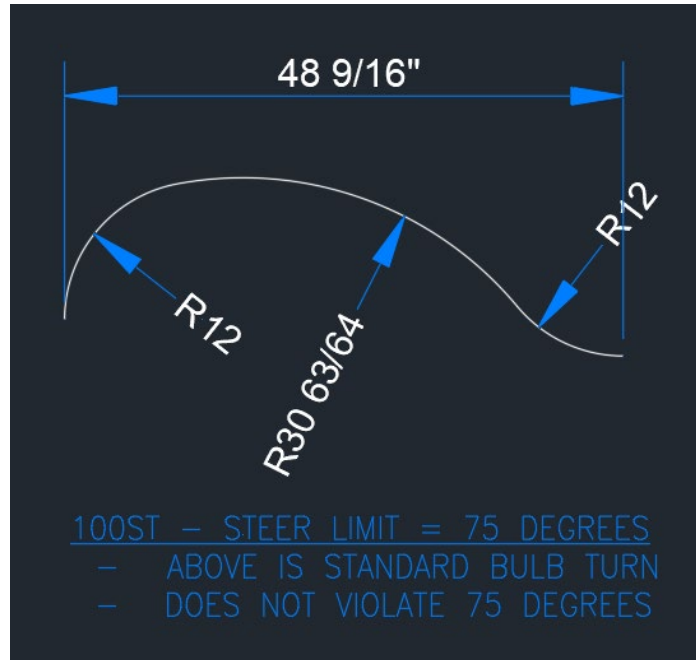
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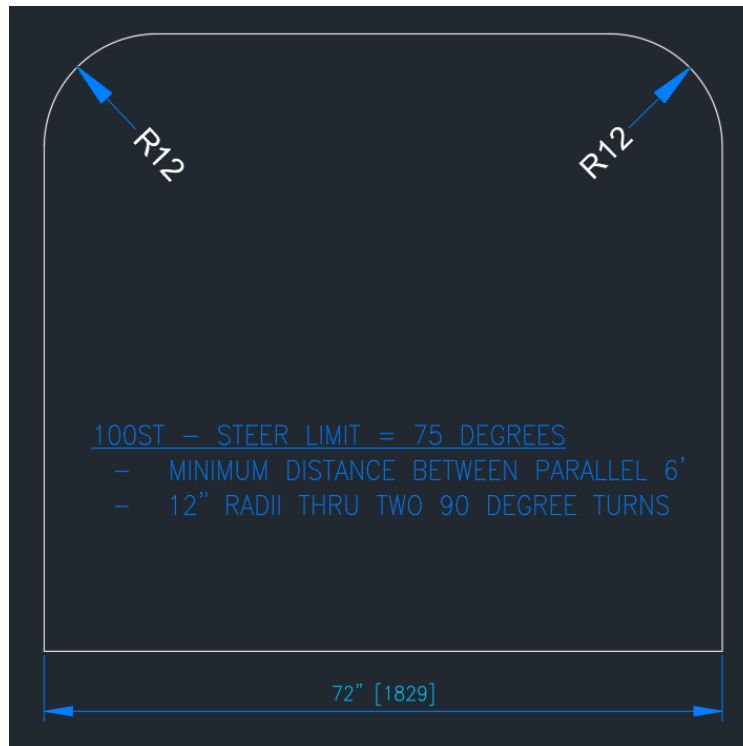
Measured Examples: 100ST



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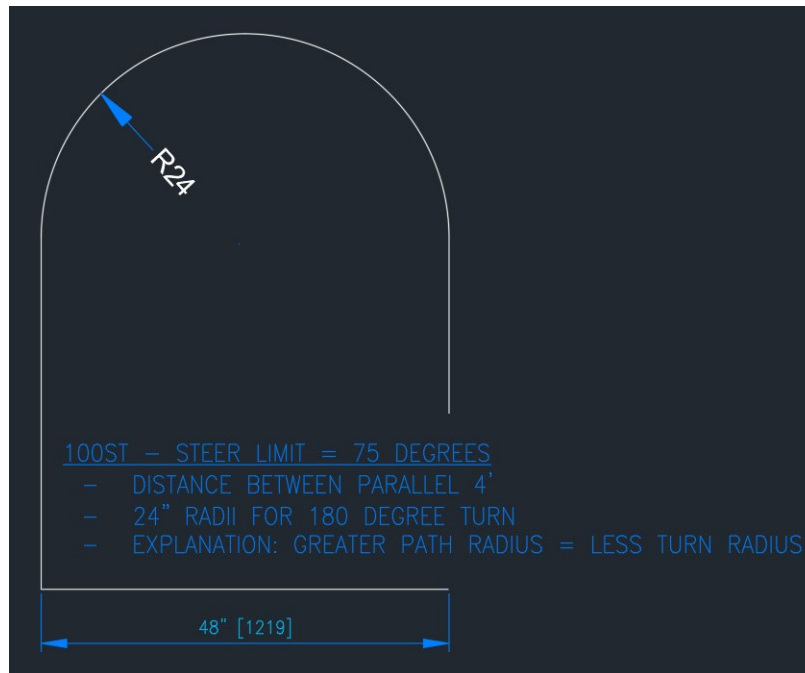
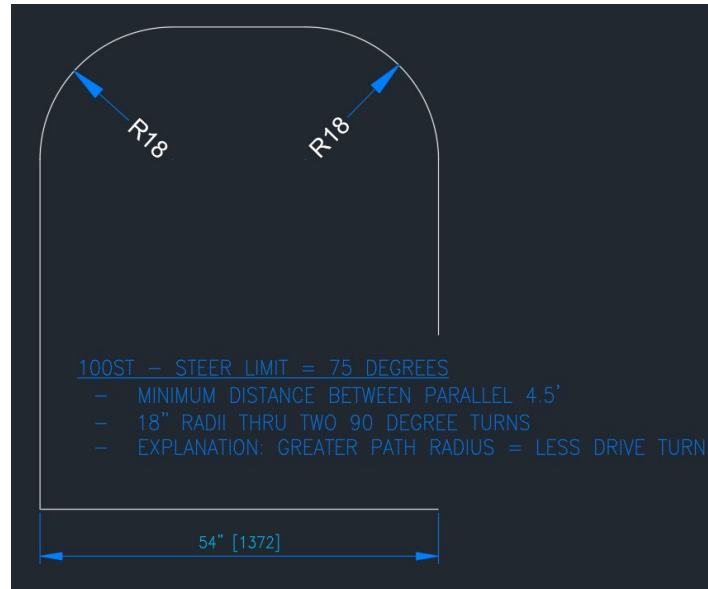
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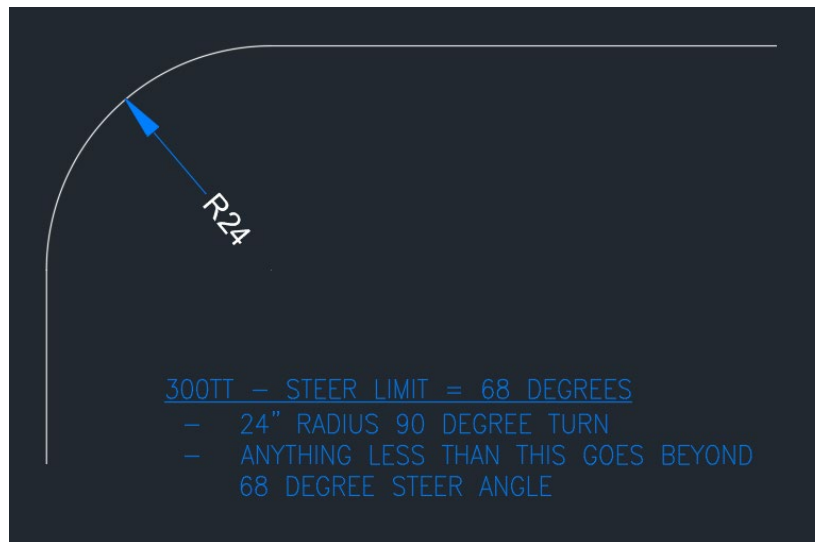
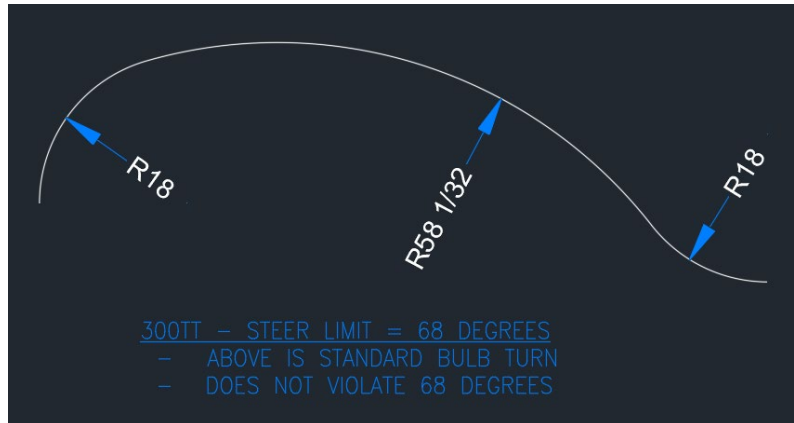
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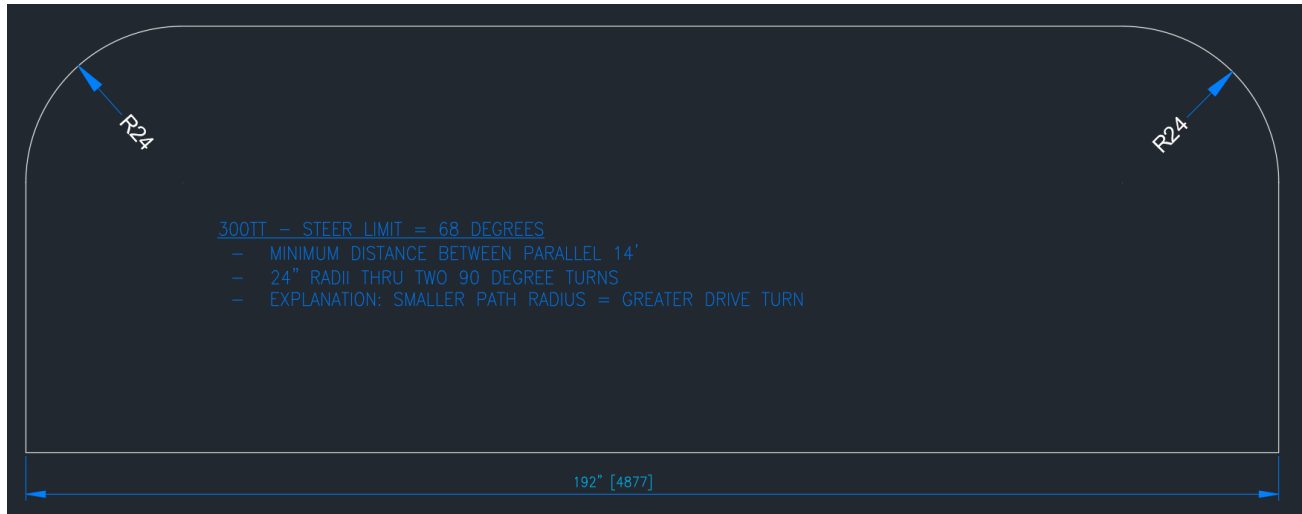
Measured Examples: 300TT



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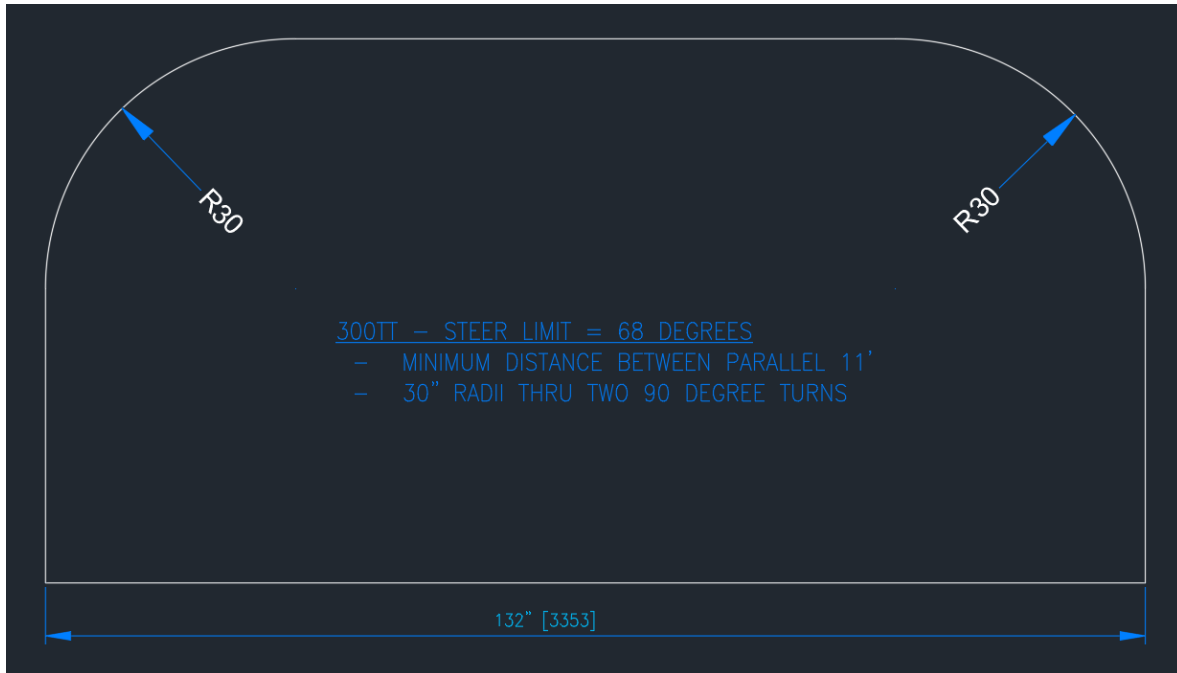
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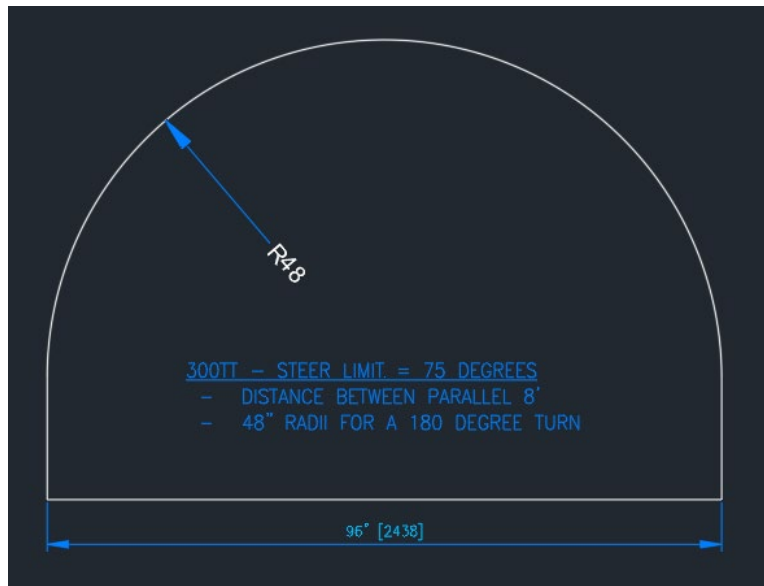
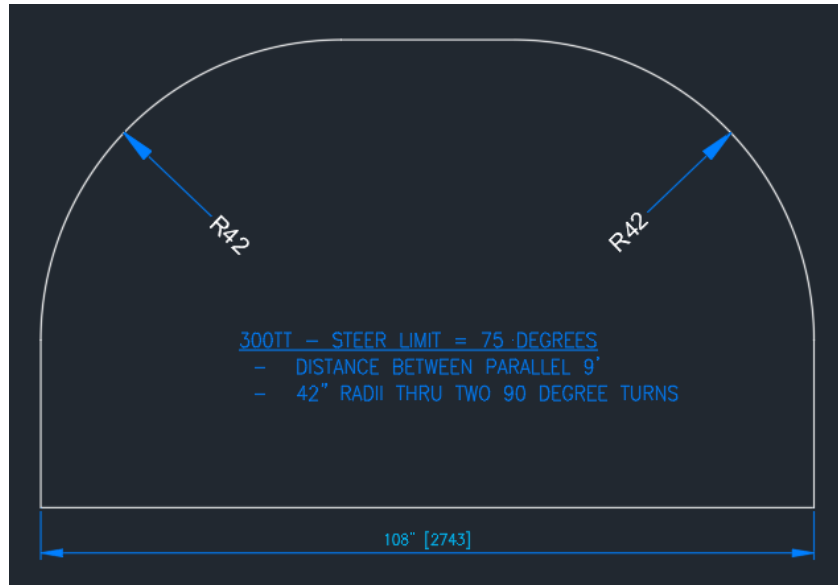
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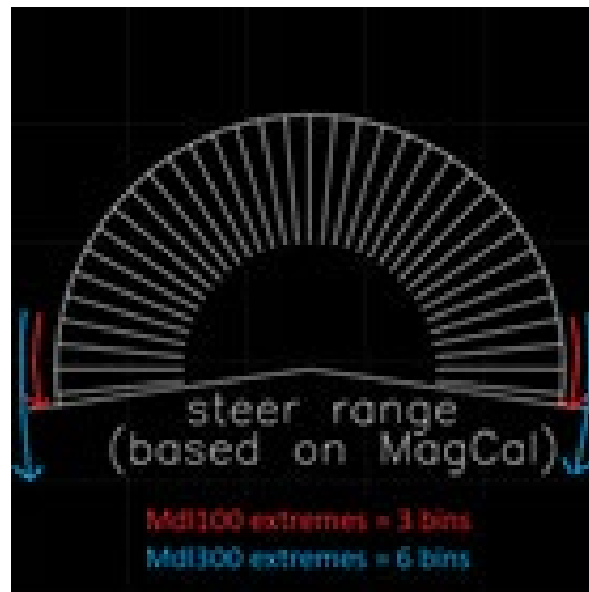


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Definition of Bins

- Each side of the left or right steering is divided into 15 Bins.
- Numbering starts at bottom of the range = 1.
- Numbering is higher toward the center of range.
- To “open up a steering limit” you decrease the bin from the Default of 3 for 100 or 6 for 300. (shown with Yellow Line at right)



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Adding SEOR Commands to CartTools V5

- Find your custom.ini file, it may be in 1 of 2 places:
 - C:\Program Files (x86)\Daifuku\CartTools
 - In the folder where you are keeping your .CCT file
- If you do not find a custom.ini file
 - Create a New Text file in your .CCT folder and rename it “custom.ini”.
 - Add the text from the following pages to your “custom.ini” file.
 - At the end of the file
- Once you have finished adding these to your custom.ini file, the next time you run CartTools, these new commands should show up in your list of commands.

1st Command (leave a blank line between commands)

[71]

Name=SEOR Parameter: Distance

AllowArrival=TRUE

AllowDest=TRUE

AllowRelease=TRUE

DefaultValue=0

SelectionList=Clear=0

MinimumValue=0

MaximumValue=127

Text=Inches:

TextHint="Steer-Extremity Inches Override Parameter (activated by SEOR Activate Override)"

Firmware=5

2nd Command (leave a blank line between commands)

[72]

Name=SEOR Parameter: Bins

AllowArrival=TRUE

AllowDest=TRUE

AllowRelease=TRUE

DefaultValue=0

SelectionList="Clear=0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15"

MinimumValue=0

MaximumValue=15

Text=Right:.,Left:

TextHint="Steer-Extremity Left/Right Bins Override Parameter (activated by SEOR Activate Override)"

Firmware=5

3rd Command (leave a blank line between commands)

[73]

Name=SEOR Activate Override

AllowArrival=TRUE

AllowDest=TRUE

AllowRelease=TRUE

DefaultValue=0

SelectionList=Cancel=0

MinimumValue=0

MaximumValue=127

Text=Override Enable Inches:

TextHint="Steer-Extremity Override Inches (Activates 'SEOR-Parameter' Bins & Distance commands) for the next Inches of travel"

Firmware=5