

How to Write Custom Metrics

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I. [Introduction](#)

The Custom Metric facility allows you to create new metrics from existing Stock Rover metrics. The metric can then be used as filters in screeners as custom equation screeners or they can be added to Table Views as individual columns.

The capabilities of custom metrics range from creating a simple ratio of two existing metrics, to comparing the same metric over different time periods, to creating a brand-new formula with whatever level of complexity is needed to achieve the desired result.

This guide will explain custom metric writing in the following five sections: Functions, Examples, Historical Time Periods, Tips and Troubleshooting.

II. Functions

Functions can be used when creating custom metrics or creating equation screeners. Below is a list of the available functions along with their descriptions.

****Note: The functions are case sensitive and must be written in lower case**

abs	Returns the absolute value of value
and	Boolean function combines tests and checks for both tests to be true
case when then else end	This function lets you evaluate conditions and return a value when the first condition is met (like an IF-THEN-ELSE statement)
greatest	Selects the greatest of a set of values
ifnull	Returns the second value if the first value is null.
is null AND is not null	Tests to see if the value is null or not null.
least	Selects the least of a set of values
nullif	Returns null if the first and second are equal otherwise it returns the first value.
or	Boolean function combines tests and checks for either test to be true
pow	Returns the value raised to the nth power

III. Examples

Listed below are a practical example for each function. It will indicate if the example is a Custom Metric example or an Equation Screener example.

Abs

Description: *This custom metric shows one-year return as a percent of the Max Drawdown over 5 years*

Formula:

$100 * \text{"1-Year Return [Now]"} / \text{abs("Max Drawdown 5-Year")}$

Add Custom Metric

Name: CustomMetric

Description: Enter an optional description...

Display Format: One Decimal

Formula

Test

100 * "1-Year Return [Now]" / abs("Max Drawdown 5-Year")

Sample Values for AAPL (Apple)

Change ticker...

Metric	Value	Period	Units
1-Year Return	81.75	Now	Percentage
Max Drawdown 5-Year	-38.52	Now	Number

Includable Metrics

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5-Day Return

10-Day Return

1-Month Return

3-Month Return

6-Month Return

YTD Return

1-Year Return

2-Year Return

3-Year Return

5-Year Return

10-Year Return

Create

Cancel

and

Description: *This equation example shows one-year return as a percent of the Max Drawdown over 5 years*

Formula:

"Altman Z-Score [Now] " > 1 and "Altman Z-Score [Now] " > "Altman Z-Score [TTM1]"

Add Criteria

Equation

Test Help Auto Search: ☒

"Altman Z-Score [Now] " > 1 and "Altman Z-Score [Now] " > "Altman Z-Score [TTM1]"

3066 out of 14967 stocks from North American Exchanges (20.5%) pass

Sample Values for AAPL (Apple)

Change ticker...

Metric	Value	Period	Units
Altman Z-Score	5.26	Now	Ratio
Altman Z-Score [TTM1]	5.26	TTM 1 Year Ago	Ratio

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Valuation Yields

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OK

Cancel

case when then else end

Description: *This custom metric shows Net Cash as % of share price and excludes negative values*

Formula:

100 * case when "Net Cash Per Share [Now]" < 0 then null else "Net Cash Per Share [Now]" / "Price [Now]" end

Add Custom Metric

Name:

Description:

Display Format:

One Decimal

Formula

Test

↺

↻

Help

Auto Search: ☒

100 * case when "Net Cash Per Share [Now]" < 0 then null else "Net Cash Per Share [Now]" / "Price [Now]" end

Valid. For ticker AAPL metric is '-'

Sample Values for AAPL (Apple)

Change ticker...

Metric	Value	Period	Units
Net Cash Per Share	-3.76	Now	Dollars
Price	320.27	Now	Dollars

Includable Metrics

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Cancel

greatest

Description: *This custom metric shows the best yearly return vs. the market in the past 3 years*

Formula:

greatest ("1-Year Return vs S&P 500 [Y1]" , "1-Year Return vs S&P 500 [Y2]" , "1-Year Return vs S&P 500 [Y3]")

Add Custom Metric

Name:

Description:

Display Format:

One Decimal

Formula

Test

↺

↻

Help

Auto Search: ☒

greatest ("1-Year Return vs S&P 500 [Y1]" , "1-Year Return vs S&P 500 [Y2]" , "1-Year Return vs S&P 500 [Y3]")

Valid. For ticker AAPL metric is '57.6'

Sample Values for AAPL (Apple)

Change ticker...

Metric	Value	Period	Units
1-Year Return vs S&P 500 [Y1]	57.63	1 Calendar Year Ago	Percentage
1-Year Return vs S&P 500 [Y2]	-0.94	2 Calendar Years Ago	Percentage
1-Year Return vs S&P 500 [Y3]	26.12	3 Calendar Years Ago	Percentage

Includable Metrics

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Valuation Yields

Create

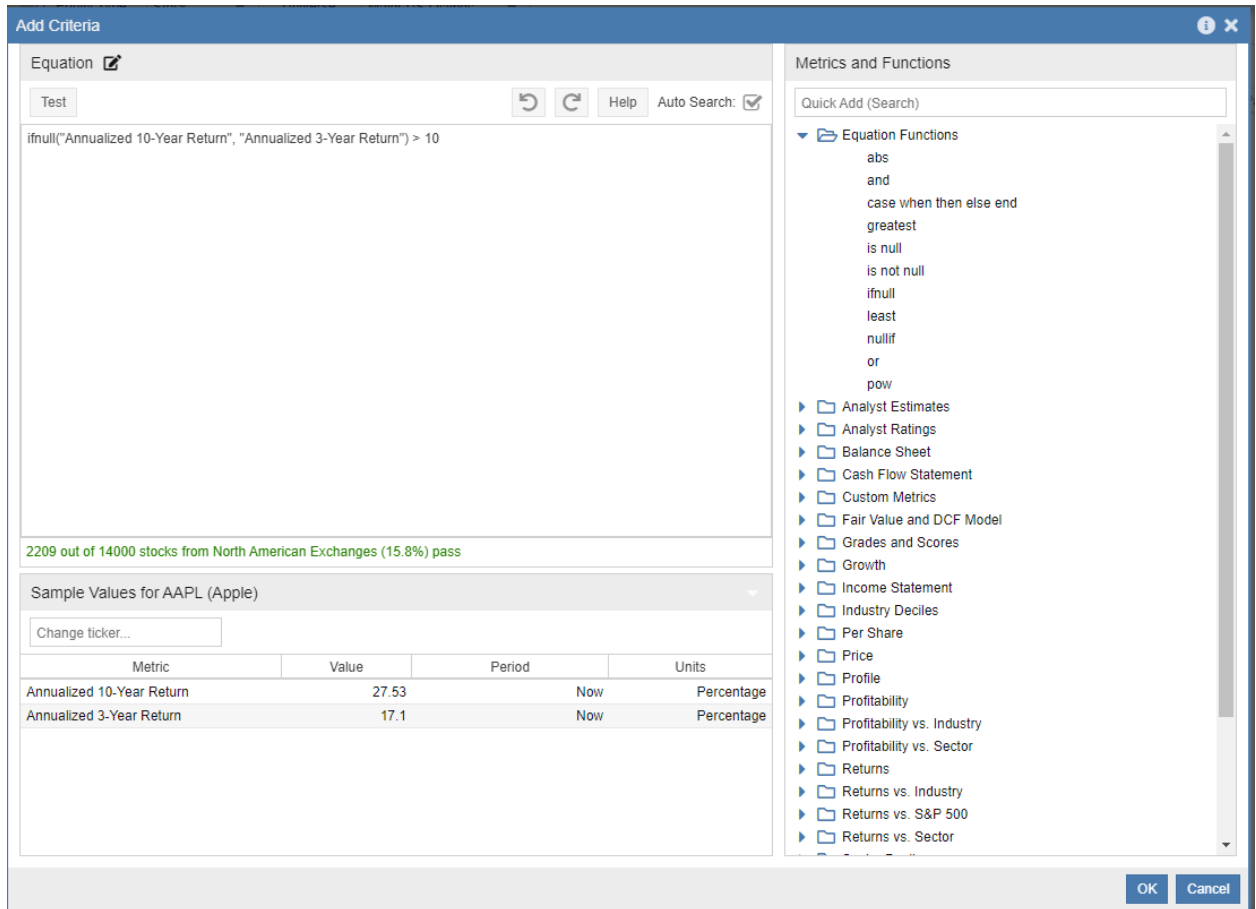
Cancel

ifnull

Description: *This example find companies that have good long-term returns but have not existed for a long time:*

Formula:

`ifnull("Annualized 10-Year Return", "Annualized 3-Year Return") > 10`



is null AND is not null

Description: *This equation example finds stocks that recently stopped paying dividends entirely*

Formula:

`"Dividend Per Share [Now]" is null and "Dividend Per Share [TTM1]" is not null`

Add Criteria

Equation

Test

Help

Auto Search: ☒

"Dividend Per Share [Now]" is null and "Dividend Per Share [TTM1]" is not null

1620 out of 14967 stocks from North American Exchanges (10.8%) pass

Sample Values for AAPL (Apple)

Change ticker...

Metric	Value	Period	Units
Dividend Per Share	3.28	Now	Dollars
Dividend Per Share [TTM1]	3.08	TTM 1 Year Ago	Dollars

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OK

Cancel

least

Description: *This equation example finds stocks that underperformed the market by at least 35% during a recent calendar year*

Formula:

least ("1-Year Return vs S&P 500 [Y1]" , "1-Year Return vs S&P 500 [Y2]" ,
"1-Year Return vs S&P 500 [Y3]") < 35

Add Criteria

Equation

Test Help Auto Search: ☒

least ("1-Year Return vs S&P 500 [Y1]" , "1-Year Return vs S&P 500 [Y2]" , "1-Year Return vs S&P 500 [Y3]") < 35

9702 out of 14967 stocks from North American Exchanges (64.8%) pass

Sample Values for AAPL (Apple)

Change ticker...

Metric	Value	Period	Units
1-Year Return vs S&P 500 [Y1]	57.63	1 Calendar Year Ago	Percentage
1-Year Return vs S&P 500 [Y2]	-0.94	2 Calendar Years Ago	Percentage
1-Year Return vs S&P 500 [Y3]	26.12	3 Calendar Years Ago	Percentage

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 - Last Quarter Expected EPS
 - Net Cash Per Share
 - Next Dividend Payment Per Share
 - Operating Income Per Share
 - Sales Per Share
 - Tangible Equity Per Share
 - Total Asset Per Share

OK Cancel

nullif

Description: This equation uses nullif within a custom metric that computes an effective interest rate on the company's debt, where the nullif ensures we are looking only at companies with debt

Formula:

$100 * \text{"Interest Expense [Now]"} / \text{nullif("Total Debt [Now]", 0)}$

Add Custom Metric

Name:

Description:

Display Format:

Formula

Test

☐ Auto Search

100 * Interest Expense [Now] / nullif("Total Debt [Now]", 0)

Valid. For ticker AAPL metric is '2.9'

Sample Values for AAPL (Apple)

Metric	Value	Period	Units
Interest Expense	3217.32	Now	Millions of Dollars
Total Debt	109507	Now	Millions of Dollars

Includable Metrics

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 - Net Income From Continuing And Discontinued Operat...
 - Operating Income
 - Other Income and Expenses
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 - Sales
 - Sales Per Employee
 - Selling General and Administrative

Create

Cancel

or

Description: *This equation finds stocks with extremely low valuation ratios based on either Price to Earnings or Price to Book*

Formula:

("Price / Earnings [Now]" < 4 and "Price / Earnings [Now]" > 0) or ("Price / Book [Now]" < .5 and "Price / Book [Now]" > 0)

Add Criteria

Equation

Test Price / Earnings [Now]

Help Auto Search: ☒

("Price / Earnings [Now]" < 4 and "Price / Earnings [Now]" > 0) or ("Price / Book [Now]" < .5 and "Price / Book [Now]" > 0)

Sample Values for AAPL (Apple)

Change ticker...

Metric	Value	Period	Units
Price / Earnings	25.07	Now	Ratio
Price / Book	17.71	Now	Ratio

Metrics and Functions

Quick Add (Search)

Technical Indicators

Valuation

Buyback Yield ★

Capital Expenditure to EBITDA ★

Cash Return

Chowder Rule 1-Year Percent ★

Chowder Rule 3-Year Percent ★

Chowder Rule 5-Year Percent ★

Dividend Yield

Earnings Power Value ★

EBITDA / Enterprise Value

EV / EBITDA

EV / EBIT ★

EV / FCF ★

EV / Sales ★

EV to EBIT

EV to FCF

EV to Forward EBIT

EV to Forward EBITDA

EV to Forward Sales

EV to Pre-Tax Income

EV to Sales

EV to Total Assets

Forward P/E

Greenblatt Earnings Yield ★

Margin of Safety (EPV) ★

P/E Differential ★

PEG Forward

PEG Trailing

Price / Book

Price / Cash Flow

Price / Earnings

OK

Cancel

pow

Description: *This custom metric computes a 5-year growth rate of Sales Per Employee*

Formula:

$100 * (\text{pow}(\text{case when "Sales Per Employee USD [Now]" / "Sales Per Employee USD [TTM5]" } \leq 0 \text{ then null else "Sales Per Employee USD [Now]" / "Sales Per Employee USD [TTM5]" end}, 1/5) - 1)$

Add Custom Metric

Name:

Enter a name...

Description:

Enter an optional description...

Display Format:

One Decimal

Formula

Test

↶

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Help

Auto Search: ☒

100 * (pow(case when "Sales Per Employee USD [Now]" / "Sales Per Employee USD [TTM5]" <= 0 then null else "Sales Per Employee USD [Now]" / "Sales Per Employee USD [TTM5]" end , 1/5) - 1)

Valid. For ticker AAPL metric is '6.7'

Sample Values for AAPL (Apple)

Change ticker...

Metric	Value	Period	Units
Sales Per Employee USD	2516506	Now	Dollars
Sales Per Employee USD [TTM5]	1817130	TTM 5 Years Ago	Dollars

Includable Metrics

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Returns vs. S&P 500

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Create

Cancel

IV. Historical Time Periods

In both Custom Metrics and Equations screeners you can access historical data for the metrics that support historical data.

In the screenshot below you can see the highlighted box on how to access the historical time periods.

The screenshot shows the 'Add Custom Metric' dialog box. At the top, there are fields for 'Name' (with placeholder 'Enter a name...'), 'Description' (with placeholder 'Enter an optional description...'), and 'Display Format' (set to 'One Decimal'). Below these is the 'Formula' section, which contains a 'Test' button and a dropdown menu currently showing 'Cash Per Share [Y1]'. A red box highlights this dropdown menu. To the right of the dropdown are buttons for 'Help' and 'Auto Search' (checked). Below the dropdown is a large text area containing the formula '"Cash Per Share [Y1]"'. On the right side of the dialog is the 'Includable Metrics' section, which has a search bar and a list of metrics. The 'Per Share' category is expanded, showing various metrics like 'Basic EPS Plus Discontinued Operations', 'Cash Per Share', 'Cash Flow Per Share', etc. At the bottom right are 'Create' and 'Cancel' buttons.

Below is a screenshot of the window that appears when you click on the box highlighted from the above screenshot.

Select Time Period for Cash Per Share

Type: ☐ Quarters ☒ Trailing Twelve Months (TTM) ☐ Calendar Years

Value: ☒ Most Recent TTM ☐ TTM 1 Year Ago ☐ TTM 2 Years Ago ☐ TTM 3 Years Ago ☐ TTM 4 Years Ago ☐ TTM 5 Years Ago ☐ TTM 6 Years Ago ☐ TTM 7 Years Ago ☐ TTM 8 Years Ago ☐ TTM 9 Years Ago ☐ TTM 10 Years Ago

Metric Description: Cash per share is the sum of cash and short-term investments divided by the total number of shares.

Units: Dollars

Explanation: Selects the value that would show in the main table. For Income and Cash Flow metrics this is typically a trailing 12 month value while for Balance Sheet metrics such as Cash per Share it would be the most recent quarterly value.

OK Cancel

Here is what each time period represents:

- Now:** The value that would show in the main table, this is normally the trailing 12-month value
- Most Recent Quarter (MRQ):** Uses the most recent quarterly result
- TTM X Years Ago:** Uses the trailing twelve months of data, but for prior years rather than the current trailing twelve months
- X Calendar Years Ago:** Looks at results for individual calendar years
- X Quarters Ago:** Looks back X quarters

For example, EPS is shown in the main table as a trailing 12 month value so "EPS [Now]" is equal to "EPS [MRQ]" + "EPS [Q1]" + "EPS [Q2]" + "EPS [Q3]"

V. Tips

Tip: Make sure to always test the metric or equation to see if the formula is valid

Add Custom Metric

Name:

Description:

Display Format:

One Decimal

Formula

Test

Sales Per Employee [TTM5]

↺

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Help

Auto Search: ☒

100 * (pow(case when "Sales Per Employee [Now]" / "Sales Per Employee [TTM5]" < 0 then null else "Sales Per Employee [Now]" / "Sales Per Employee [TTM5]" end , 1/5) -1)

Valid. For ticker AAPL metric is '-1.5'

Sample Values for AAPL (Apple)

Change ticker...

Metric	Value	Period	Units
Sales Per Employee	1971880.88	Now	Dollars
Sales Per Employee [TTM5]	2129170	TTM 5 Years Ago	Dollars

Includable Metrics

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Income After Tax

Income Before Tax

Interest Expense

Net Income

Net Income Common Stockholders

Net Income From Continuing And Discontinued Operat...

Operating Income

Other Income and Expenses

Research and Development

Sales

Sales Per Employee

Selling General and Administrative

Create

Cancel

Tip: *It is very important to use parentheses in the equations or custom metrics to make sure the order of operations is done correctly*

Example:

"FFO per Share [Now]" * "Diluted Shares [Now]" / "Equity [Now]" + "Accumulated Depreciation [Now]"

Returns -284.2 for a particular ticker, but if you add parentheses...

("FFO per Share [Now]" * "Diluted Shares [Now]") / ("Equity [Now]" + "Accumulated Depreciation [Now]")

Returns 0.5 for the same ticker

Add Custom Metric

Name:

Description:

Display Format:

One Decimal

Formula

Test

↺

↻

Help

Auto Search: ☒

"FFO per Share [Now]" * "Diluted Shares [Now]" / "Equity [Now]" + "Accumulated Depreciation [Now]"

Valid. For ticker CSH.UN.TO metric is '-284.2'

Sample Values for CSH.UN.TO (Chartwell Retirement)

Change ticker...

Metric	Value	Period	Units
FFO per Share	0.79	Now	Dollars
Diluted Shares	213.65	Now	Number
Equity	591.78	Now	Millions of Dollars
Accumulated Depreciation	-284.46	Now	Millions of Dollars

Includable Metrics

Quick Add (Search)

▶

Equation Functions

▶

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▶

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▼

Balance Sheet

- Accumulated Depreciation
- Cash
- Cash Ratio ★
- Cash & Short-term %
- Cash as a % of Market Cap ★
- Cash to Total Assets ★
- Current Assets
- Current Liabilities
- Current Ratio
- Days Inventory
- Days Sales Outstanding
- Debt / Assets ★
- Debt / Equity
- Debt / Net Current Assets ★
- Equity
- Gross PP&E
- Intangibles
- Intangibles %
- Interest Coverage
- Inventory
- Inventory %
- Long Term Debt
- Long Term Debt / Total Capital

Create

Cancel

Add Custom Metric

Name:

Enter a name...

Description:

Enter an optional description...

Display Format:

One Decimal

Formula

Test

Accumulated Depreciation [Now]

↶

↷

Help

Auto Search: ☒

("FFO per Share [Now]" * "Diluted Shares [Now]") / ("Equity [Now]" + "Accumulated Depreciation [Now])

Valid. For ticker CSH.UN.TO metric is '0.5'

Sample Values for CSH.UN.TO (Chartwell Retirement)

Change ticker...

Metric	Value	Period	Units
FFO per Share	0.79	Now	Dollars
Diluted Shares	213.65	Now	Number
Equity	591.78	Now	Millions of Dollars
Accumulated Depreciation	-284.46	Now	Millions of Dollars

Includable Metrics

Quick Add (Search)

▶

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▶

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▶

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▼

Balance Sheet

▶

Accumulated Depreciation

▶

Cash

▶

Cash Ratio ★

▶

Cash & Short-term %

▶

Cash as a % of Market Cap ★

▶

Cash to Total Assets ★

▶

Current Assets

▶

Current Liabilities

▶

Current Ratio

▶

Days Inventory

▶

Days Sales Outstanding

▶

Debt / Assets ★

▶

Debt / Equity

▶

Debt / Net Current Assets ★

▶

Equity

▶

Gross PP&E

▶

Intangibles

▶

Intangibles %

▶

Interest Coverage

▶

Inventory

▶

Inventory %

▶

Long Term Debt

▶

Long Term Debt / Total Capital

Create

Cancel

VI. Troubleshooting

- a. If you copy a formula from a document or email to the formula window and then the test fails, make sure to retype the quotes. Sometimes the quotes get copied in the wrong format.
- b. If you are using the **pow** function for a custom metric and you add it to a view, and then you start getting an error *Server not responding*, then you need to edit the function and add the case statement because the pow function only accepts positive numbers.

The **pow** function should have the **case** when statement around it like this:

```
100 * (pow(case when "EPS [Now]" / "EPS [Y5]" <= 0 then null else "EPS [Now]" / "EPS [Y5]" end, 1/5) - 1)
```

- c. If you test a custom metric that is looking at historical values and the data doesn't return, this could be because of the following:
 - i. The ticker is a foreign company, they don't typically have quarterly data
 - ii. Companies with a Market Cap of less than \$10 million won't have quarterly data