In [1]:

```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
%matplotlib inline
```

Preparing the dataframes

In [2]:

```
df_all = pd.read_csv('data/dataport-export_gas_oct2015-mar2016.csv')
len(df_all)
```

Out[2]:

1584823

In [3]:

```
df_all = df_all.set_index(pd.to_datetime(df_all['localminute']))
```

In [4]:

```
display(df_all.head(), df_all.tail())
```

	localminute	dataid	meter_value
localminute			
2015-10-01 05:00:10	2015-10-01 00:00:10-05	739	88858
2015-10-01 05:00:13	2015-10-01 00:00:13-05	8890	197164
2015-10-01 05:00:20	2015-10-01 00:00:20-05	6910	179118
2015-10-01 05:00:22	2015-10-01 00:00:22-05	3635	151318
2015-10-01 05:00:22	2015-10-01 00:00:22-05	1507	390354

	localminute	dataid	meter_value
localminute			
2016-04-01 04:59:14.336743	2016-03-31 23:59:14.336743-05	2129	201726
2016-04-01 04:59:17.427165	2016-03-31 23:59:17.427165-05	2945	161232
2016-04-01 04:59:35.370782	2016-03-31 23:59:35.370782-05	9729	138146
2016-04-01 04:59:47.816286	2016-03-31 23:59:47.816286-05	5129	166488
2016-04-01 04:59:58.923080	2016-03-31 23:59:58.92308-05	484	114174

In [5]:

```
df_all = df_all.drop(columns='localminute')
display(df_all.head())
```

	dataid	meter_value
localminute		
2015-10-01 05:00:10	739	88858
2015-10-01 05:00:13	8890	197164
2015-10-01 05:00:20	6910	179118
2015-10-01 05:00:22	3635	151318
2015-10-01 05:00:22	1507	390354

In [6]:

```
groups = df_all.groupby('dataid')
keys = groups.groups.keys()  # keys: an iterable of dataids or meter ids

# check if each group (grouped by meter id) is sorted in ascending order by datetime.
for key in keys:
    df_i = groups.get_group(key)
    print(df_i.index.is_monotonic_increasing)
```

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```

Check meterids

In [7]:

```
keys_list = list(keys)
print(keys_list)
```

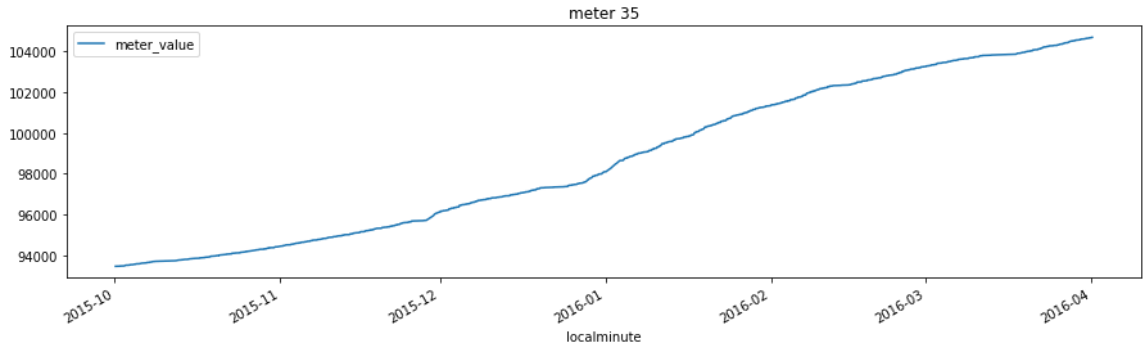
```
[35, 44, 77, 94, 114, 187, 222, 252, 370, 483, 484, 661, 739, 744, 871, 10
42, 1086, 1103, 1185, 1283, 1403, 1415, 1507, 1556, 1589, 1619, 1697, 171
4, 1718, 1790, 1791, 1792, 1800, 1801, 2018, 2034, 2072, 2094, 2129, 2233,
2335, 2378, 2449, 2461, 2470, 2575, 2638, 2645, 2755, 2814, 2818, 2945, 29
46, 2965, 2980, 3036, 3039, 3134, 3310, 3367, 3527, 3544, 3577, 3635, 372
3, 3778, 3849, 3893, 3918, 4029, 4031, 4193, 4228, 4296, 4352, 4356, 4373,
4421, 4447, 4514, 4671, 4732, 4767, 4874, 4998, 5129, 5131, 5193, 5275, 53
17, 5395, 5403, 5439, 5484, 5545, 5636, 5658, 5785, 5810, 5814, 5892, 597
2, 6101, 6412, 6505, 6578, 6673, 6685, 6830, 6836, 6863, 6910, 7016, 7017,
7030, 7117, 7287, 7429, 7460, 7566, 7674, 7682, 7739, 7741, 7794, 7900, 79
19, 7965, 7989, 8059, 8084, 8086, 8155, 8156, 8244, 8386, 8467, 8703, 882
9, 8890, 8967, 9052, 9121, 9134, 9160, 9278, 9295, 9474, 9600, 9620, 9631,
9639, 9729, 9766, 9849, 9956, 9982]
```

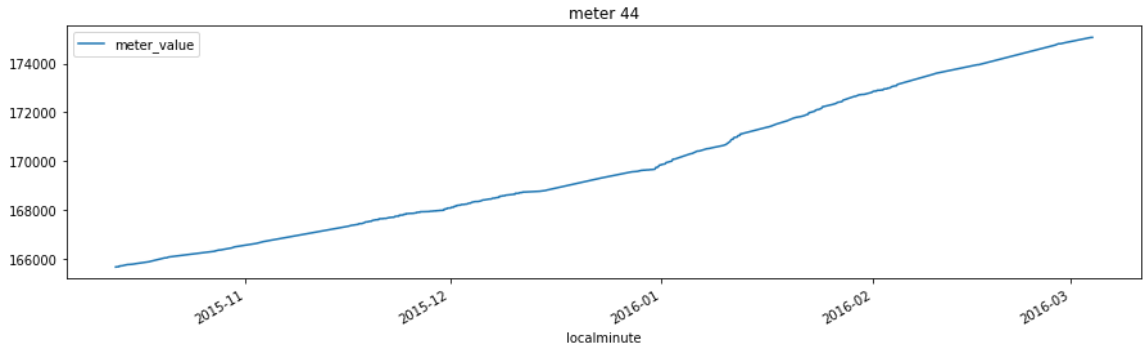
Print full-length (6 mth) plot by meterid.

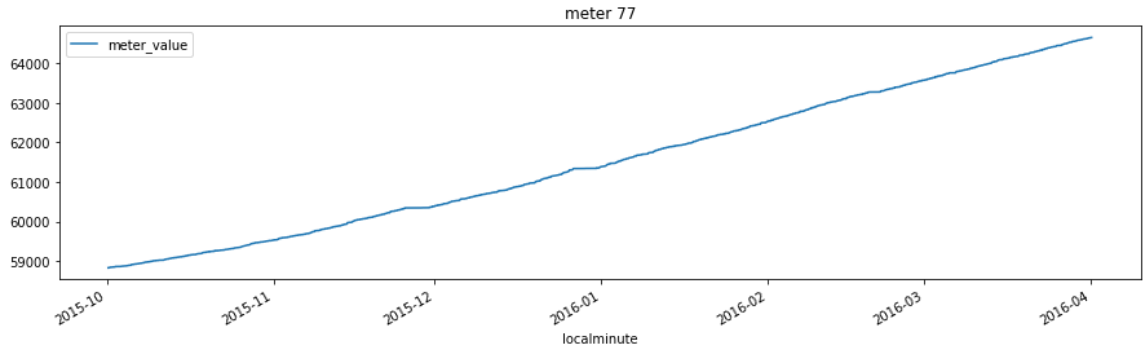
In [8]:

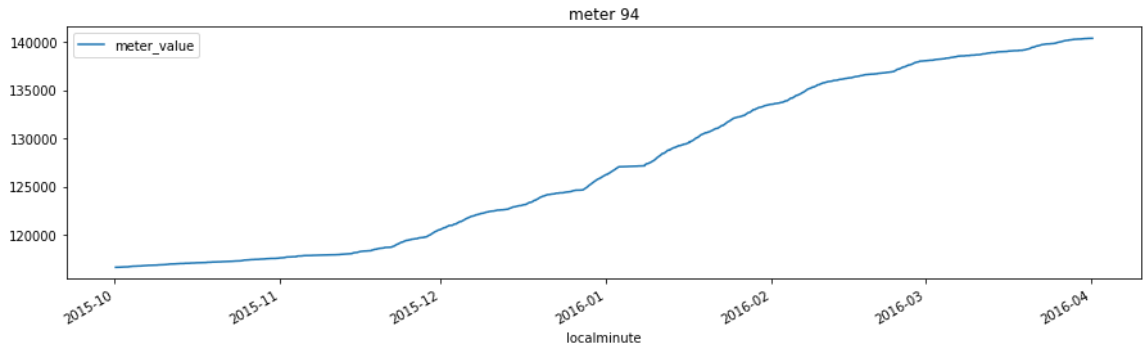
```
for key in keys_list:
    df_i = groups.get_group(key)
    df_i.drop(columns='dataid').plot(figsize=(15,4), title=str(f'meter {key}'))
```

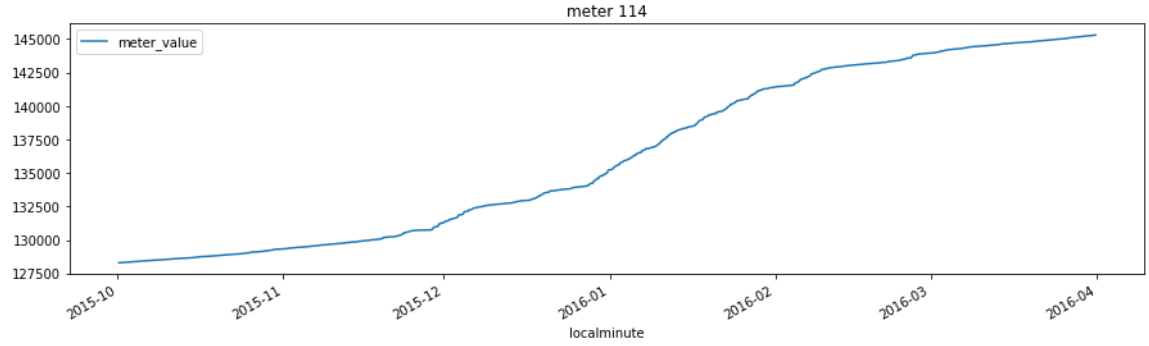
```
C:\Users\Melvin\Anaconda3\lib\site-packages\matplotlib\pyplot.py:537: Runt
imeWarning: More than 20 figures have been opened. Figures created through
the pyplot interface (`matplotlib.pyplot.figure`) are retained until expli
citly closed and may consume too much memory. (To control this warning, se
e the rcParam `figure.max_open_warning`).
  max_open_warning, RuntimeWarning)
```







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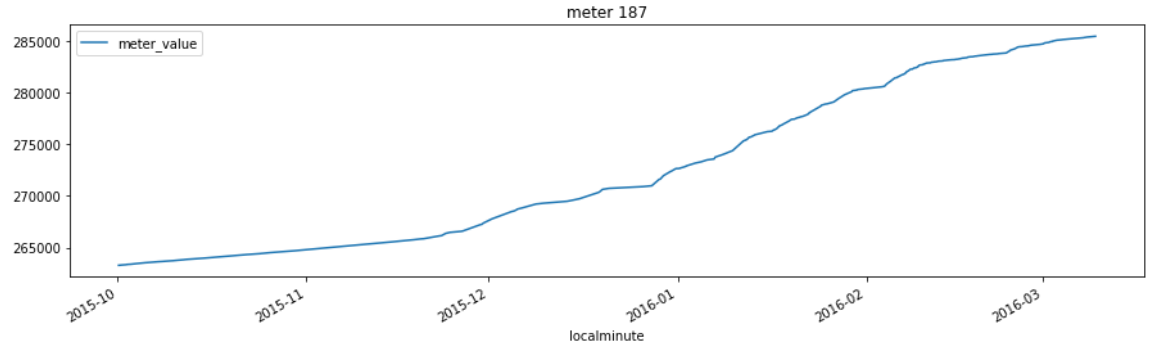
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
localminute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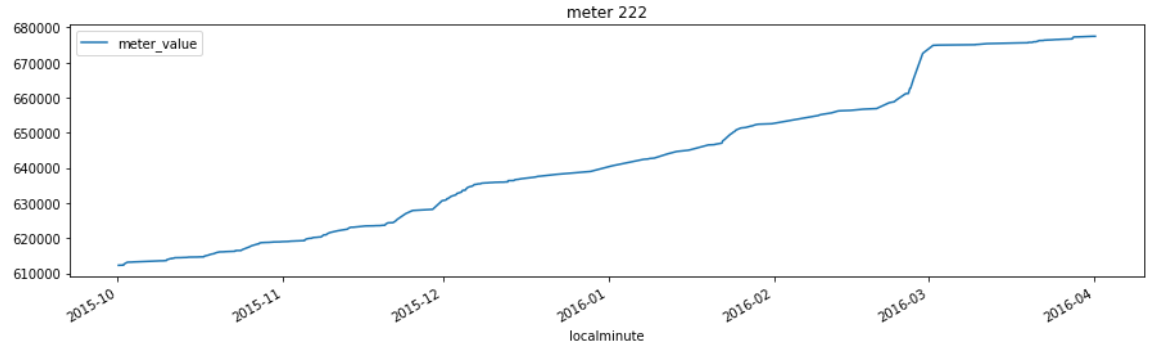
2015-12
2016-01
2016-02
2016-03
localminute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630000
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610000
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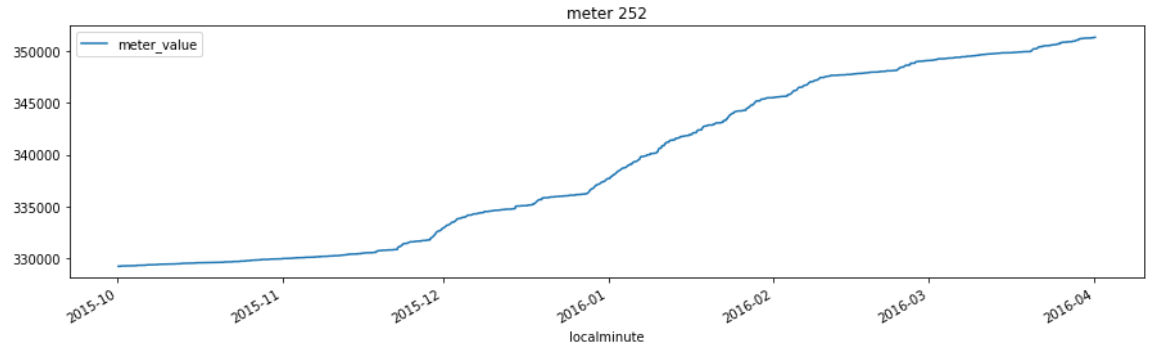
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
localminute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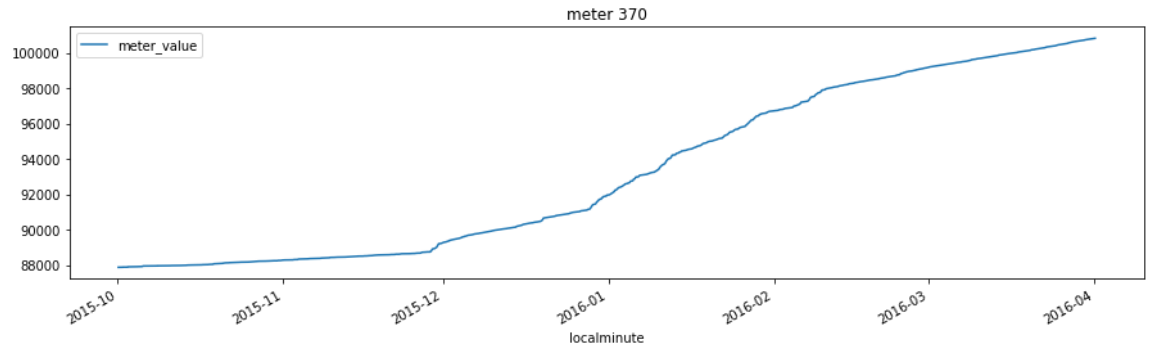
localminute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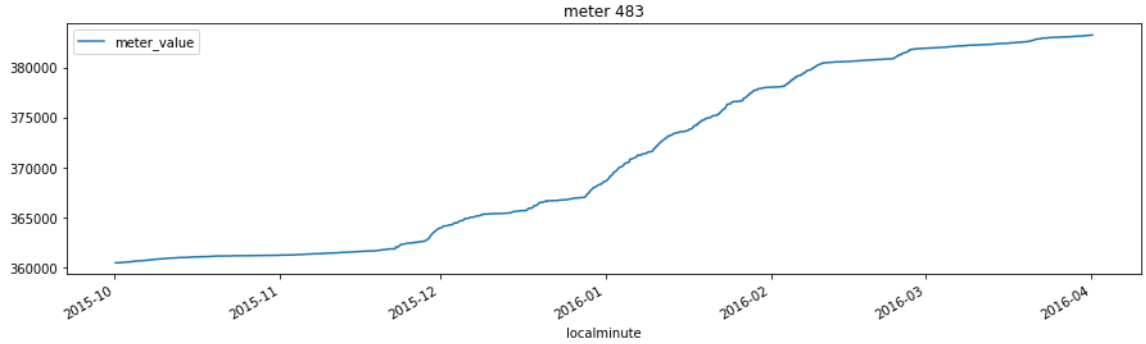
localminute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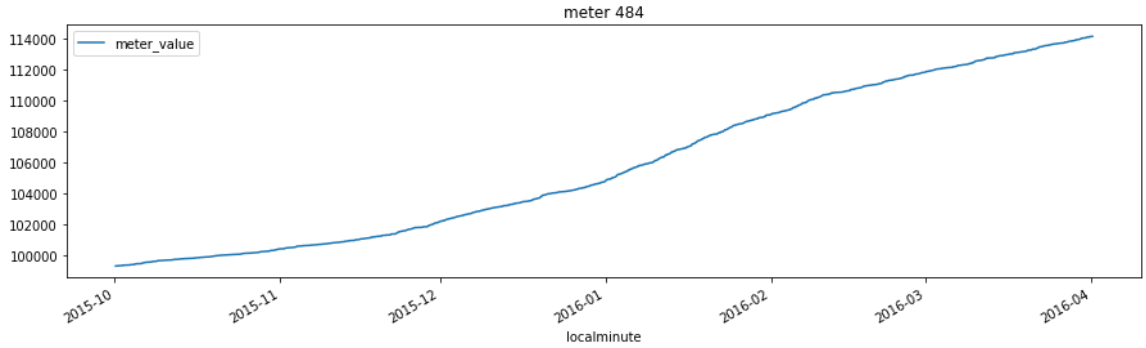
localminute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110000
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104000
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100000
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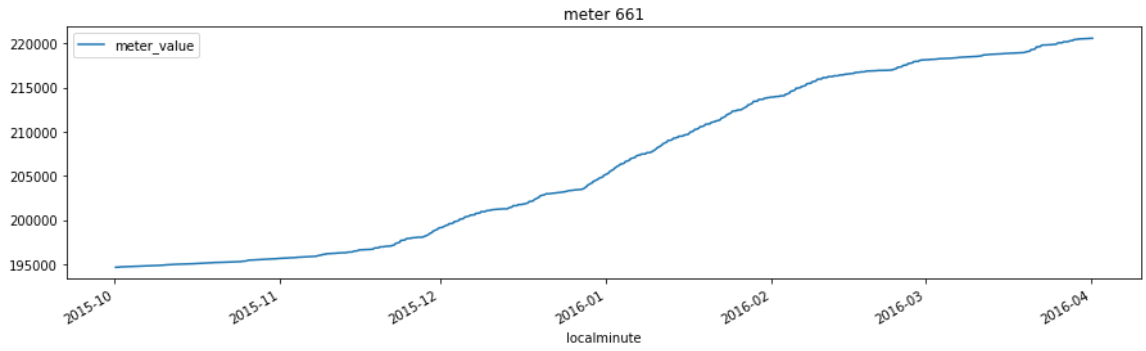
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
localminute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200000
195000
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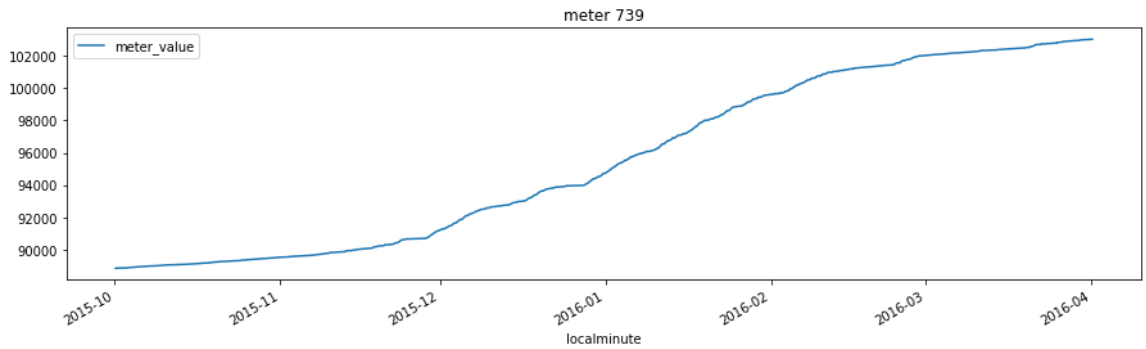
2015-12
2016-01
2016-02
2016-03
2016-04
localminute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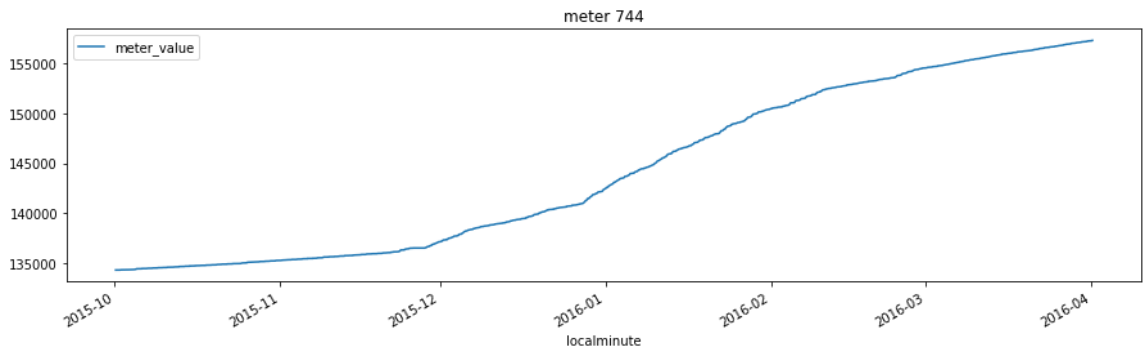
2016-02
2016-03
2016-04
localminute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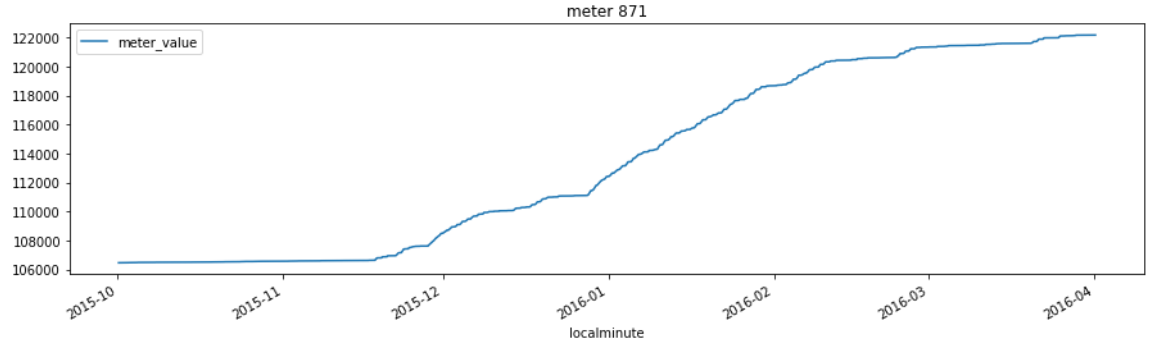
2016-04
localminute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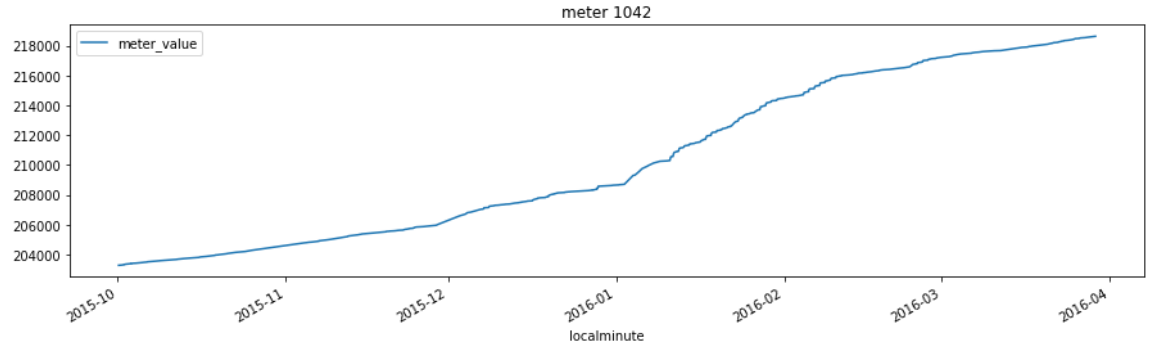
2016-01
2016-02
2016-03
2016-04
localminute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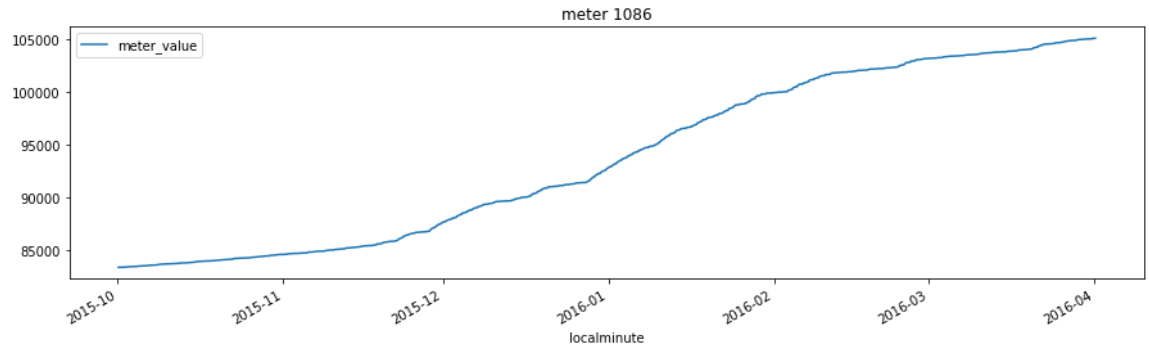
2016-02
2016-03
2016-04
localminute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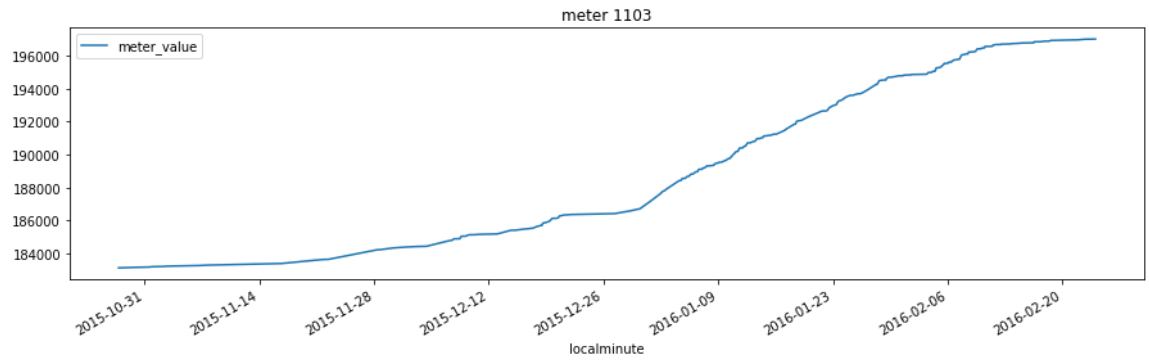
2016-01
2016-02
2016-03
2016-04
localminute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194000
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190000
188000
186000
184000
2015-10-31
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2015-12-12
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2016-01-23
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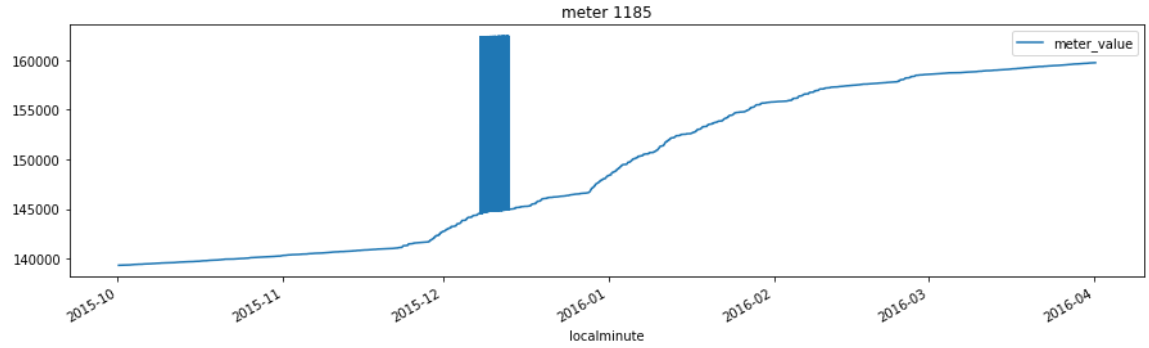
2016-02-20
localminute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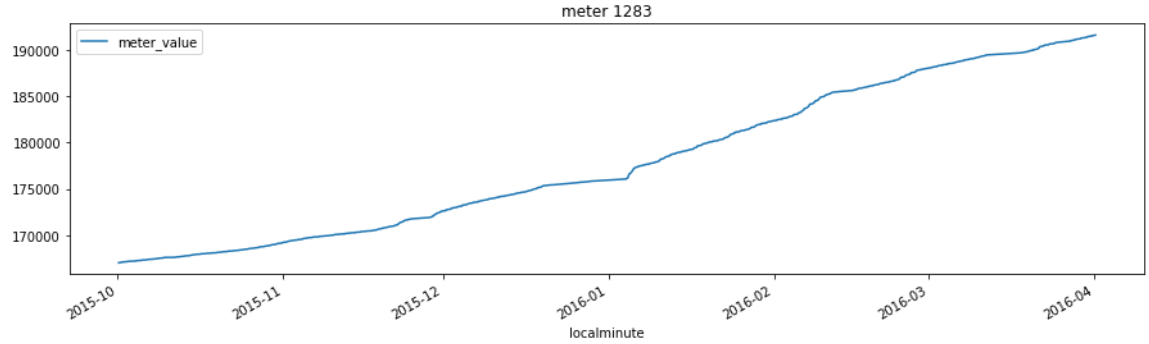
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2016-03
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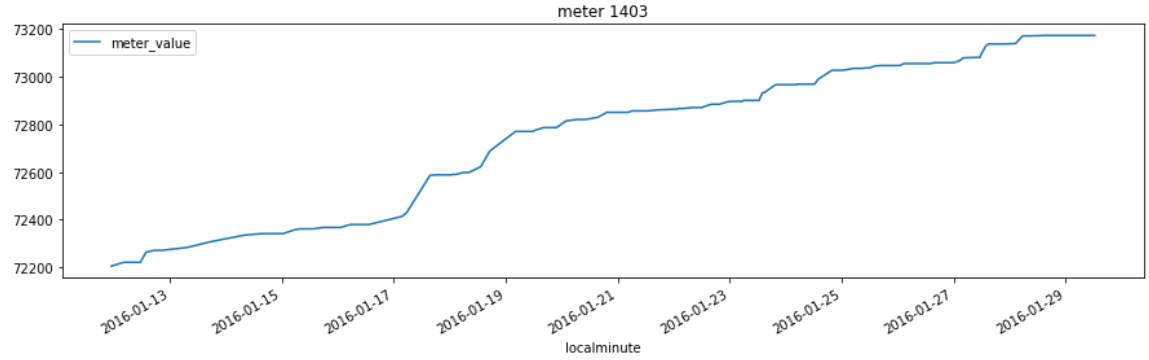
localminute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2016-01-15
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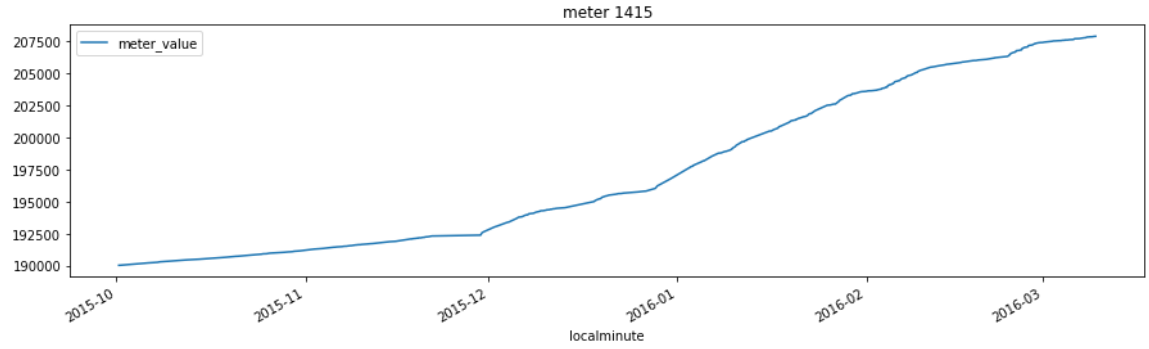
2016-01-23
2016-01-25
2016-01-27
2016-01-29
localminute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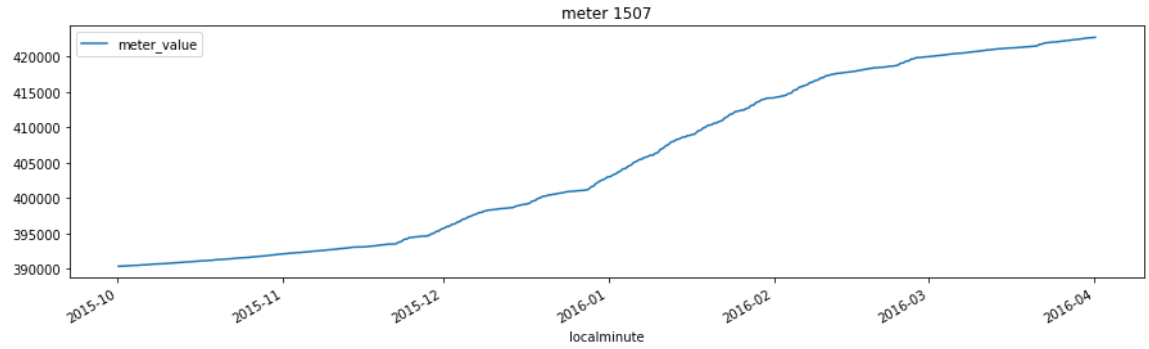
2016-02
2016-03
localminute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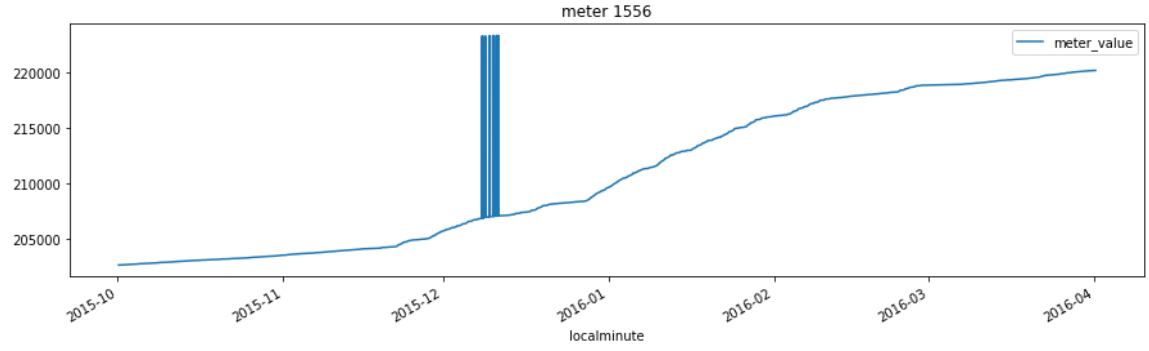
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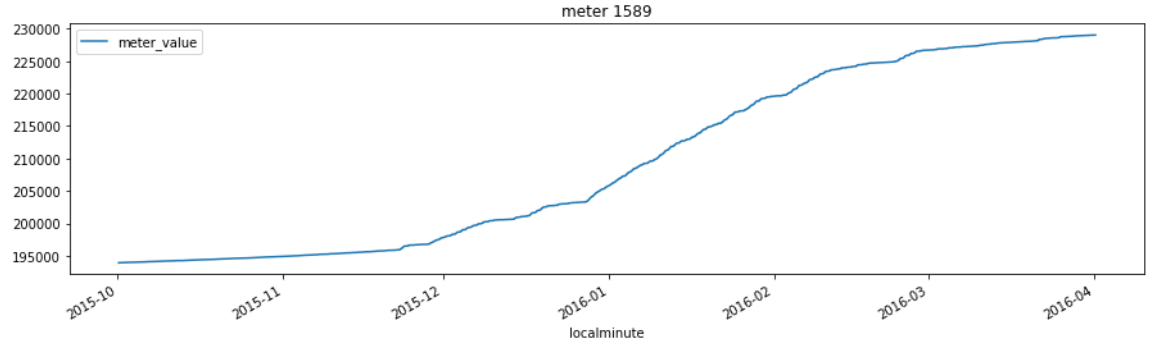
2016-03
2016-04
localminute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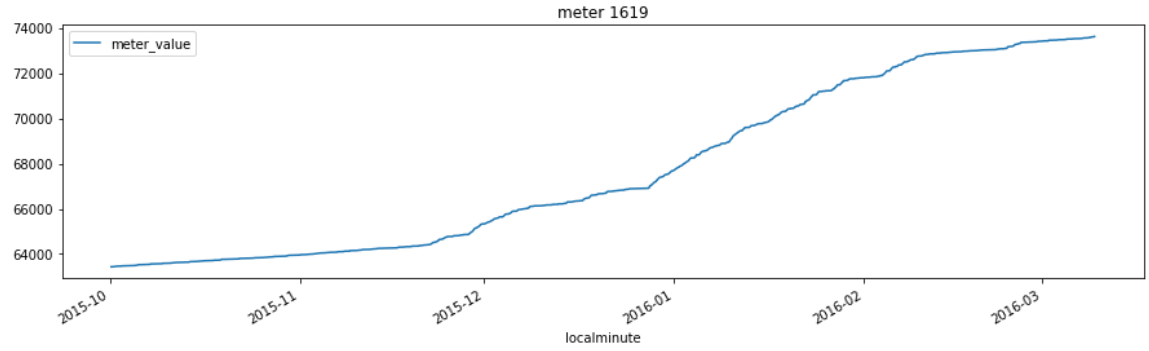
2016-01
2016-02
2016-03
2016-04
localminute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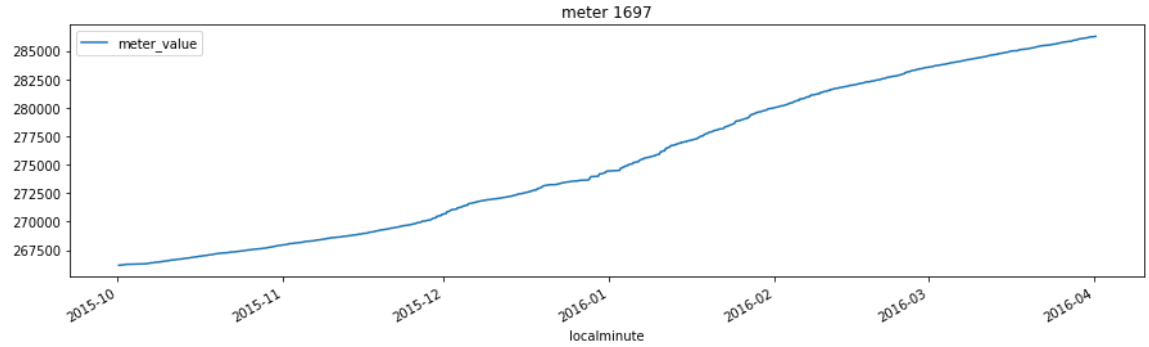
2015-11
2015-12
2016-01
2016-02
2016-03
localminute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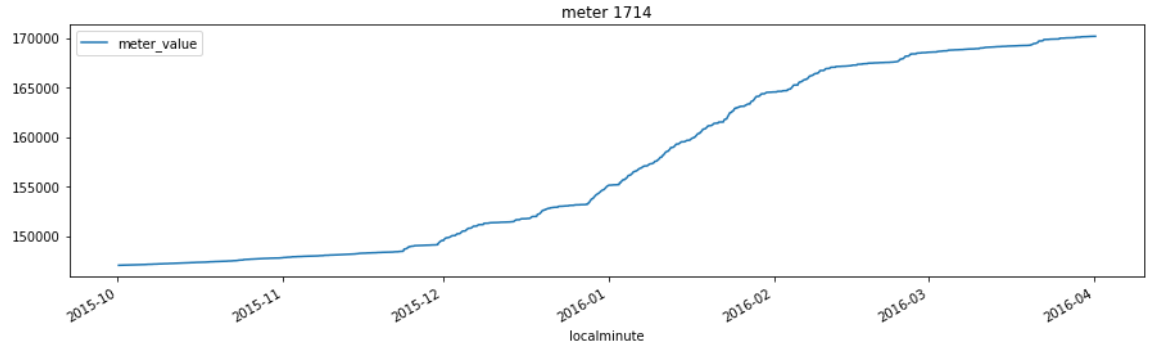
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
localminute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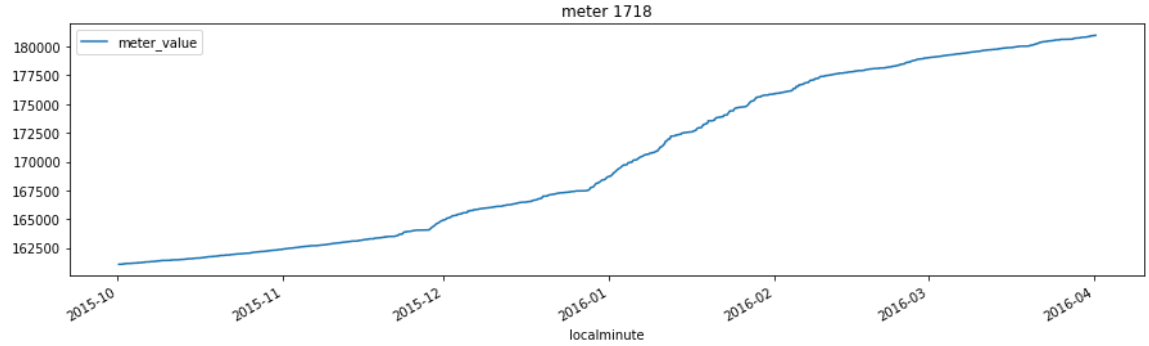
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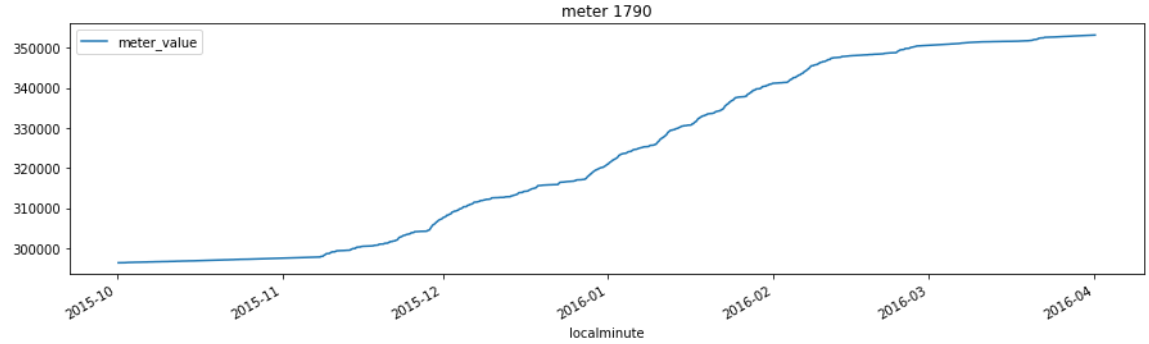
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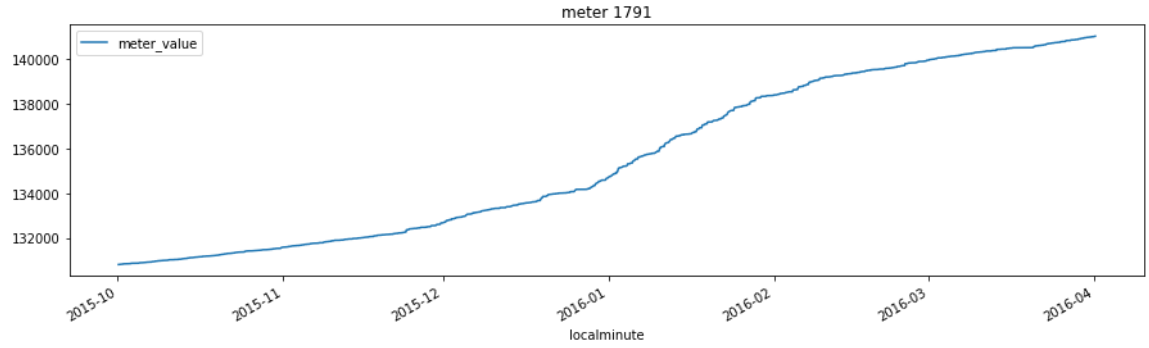
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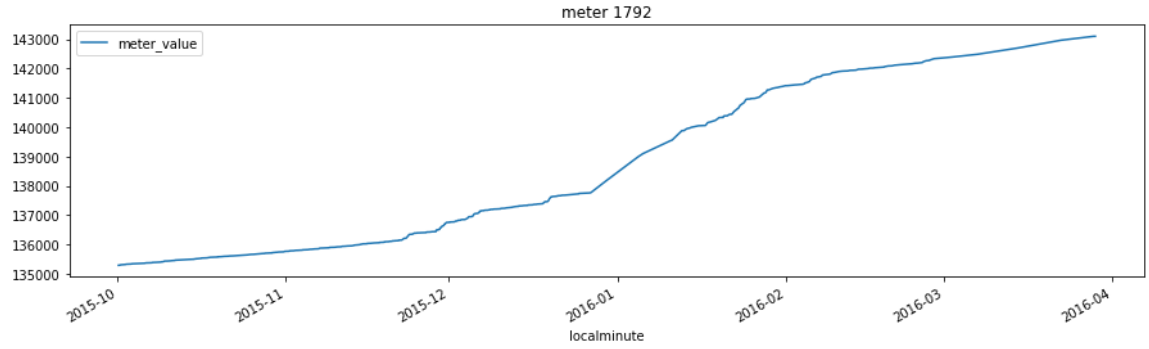
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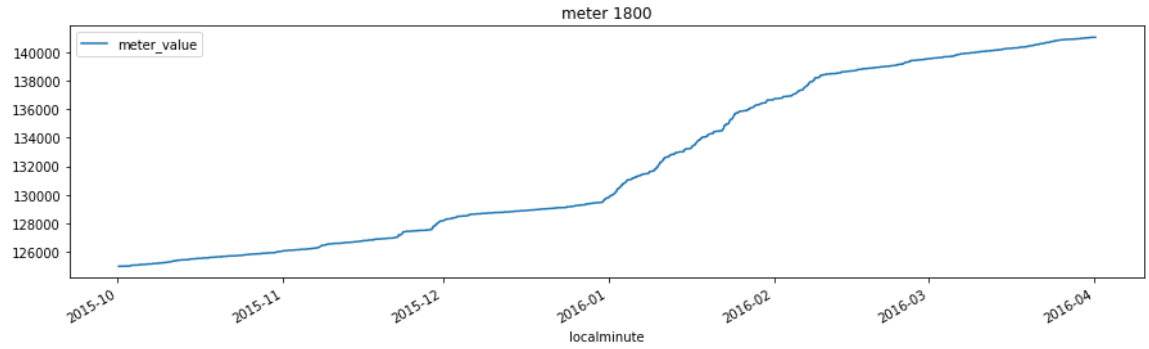
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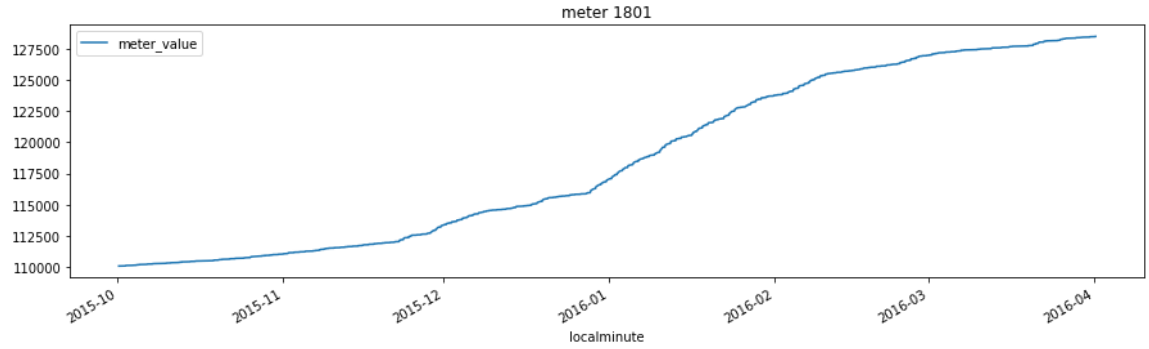
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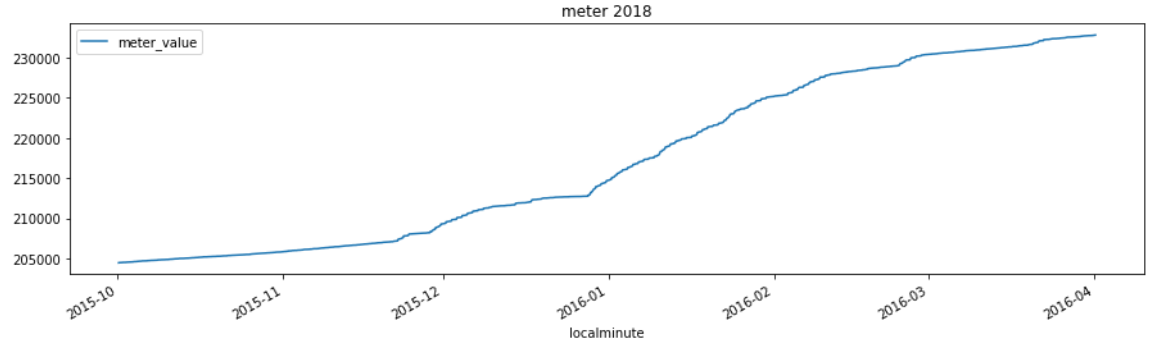
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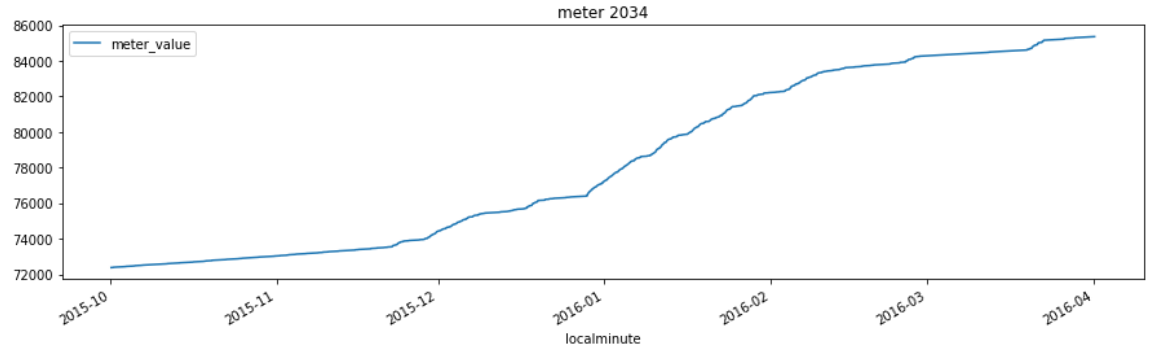
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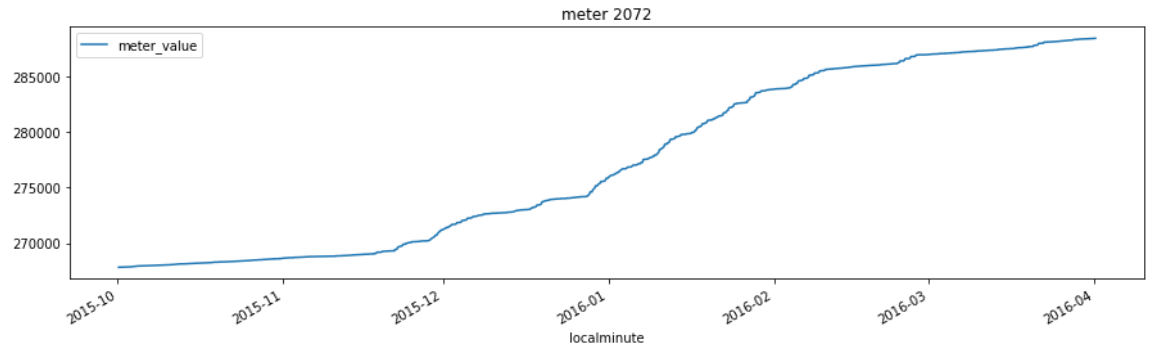
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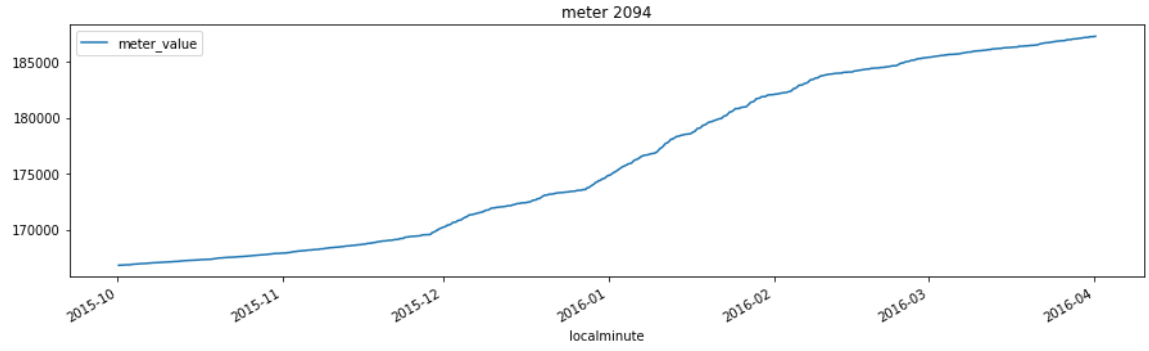
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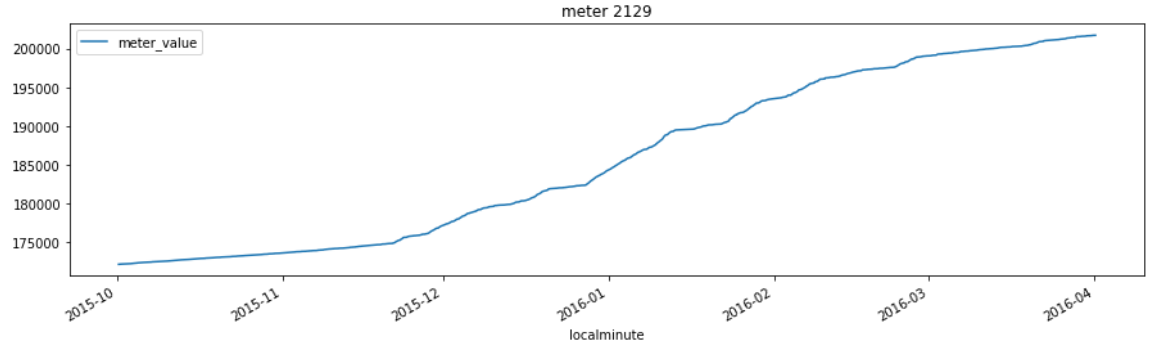
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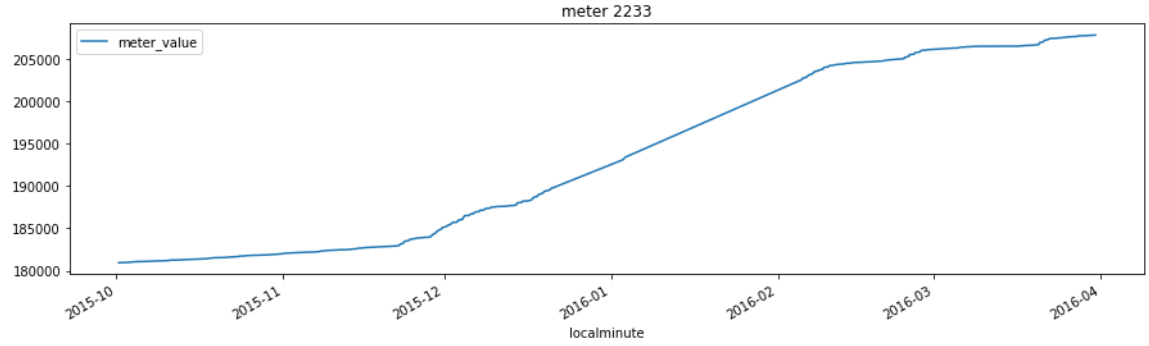
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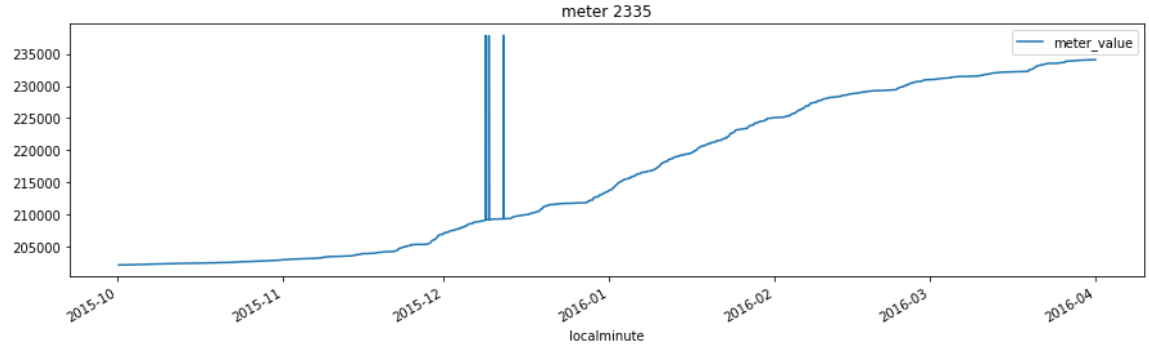
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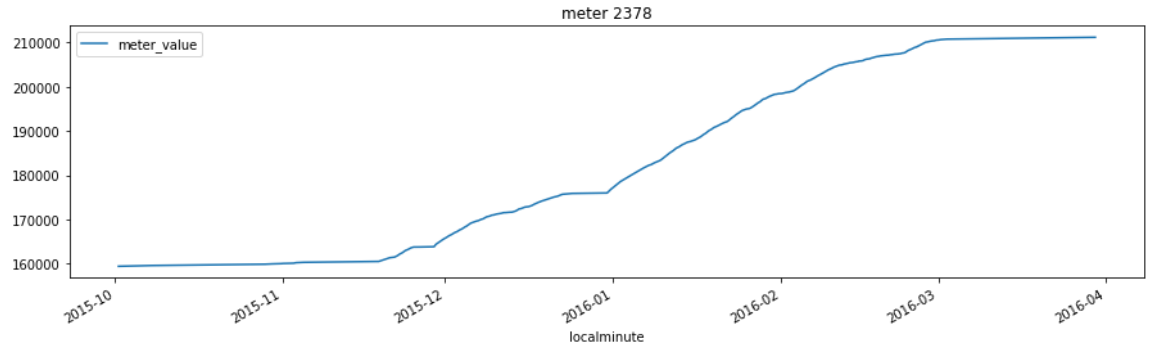
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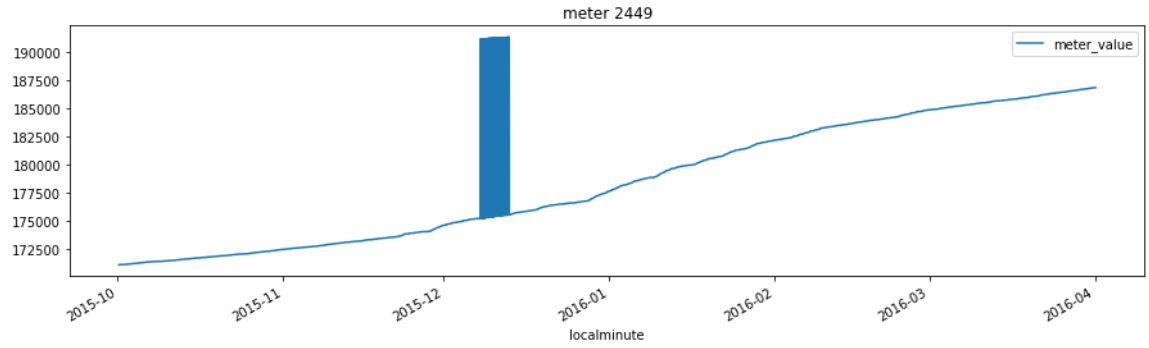
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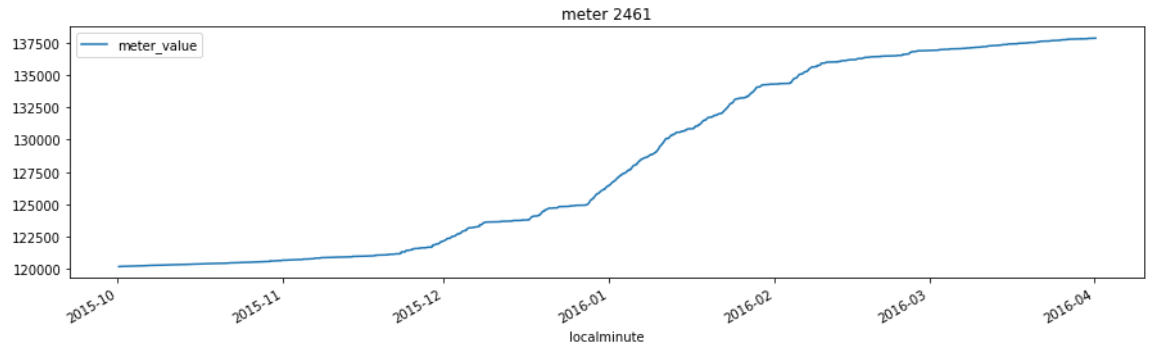
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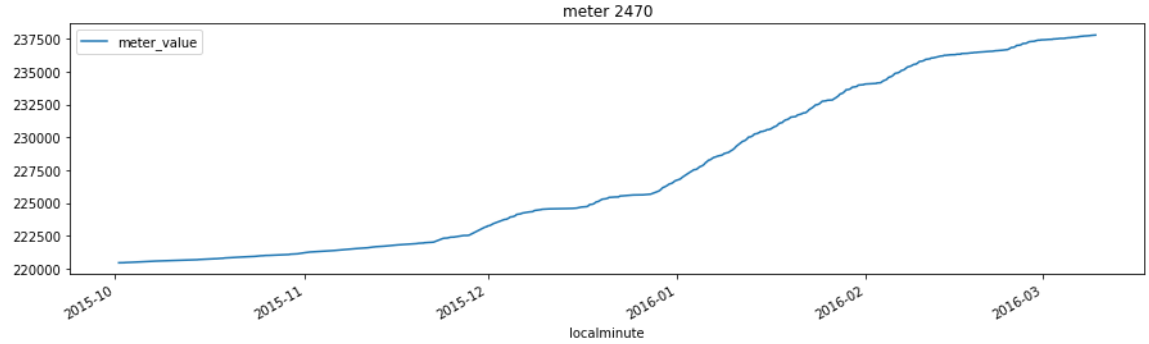
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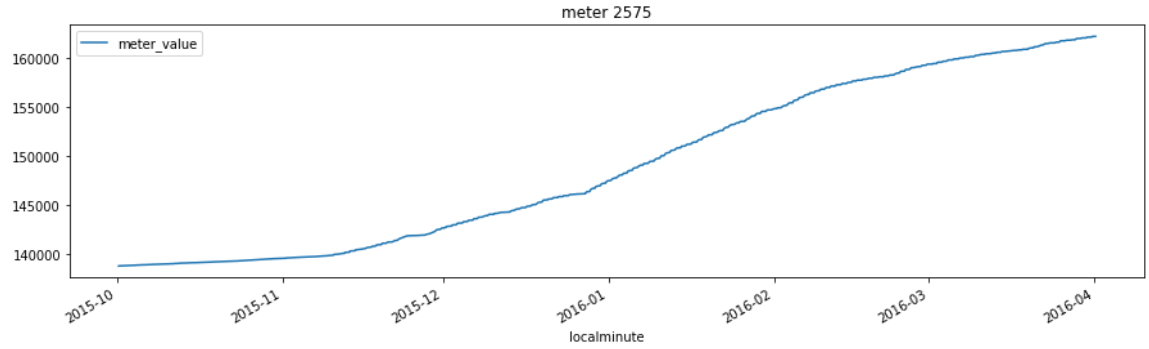
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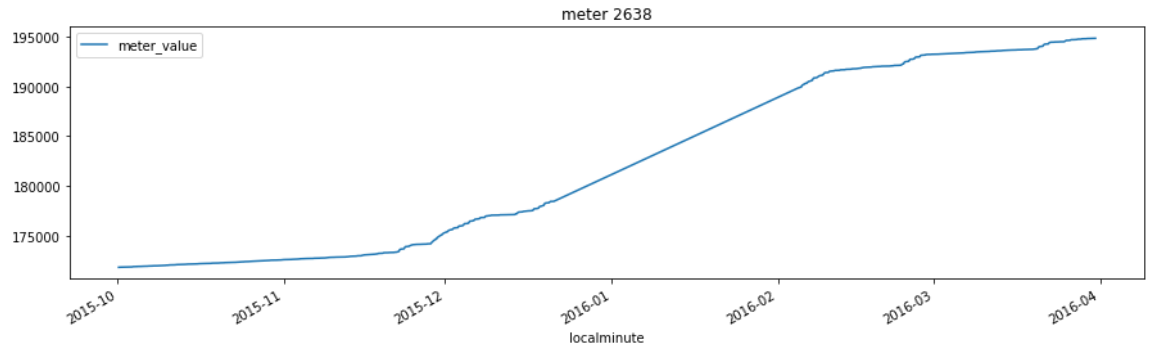
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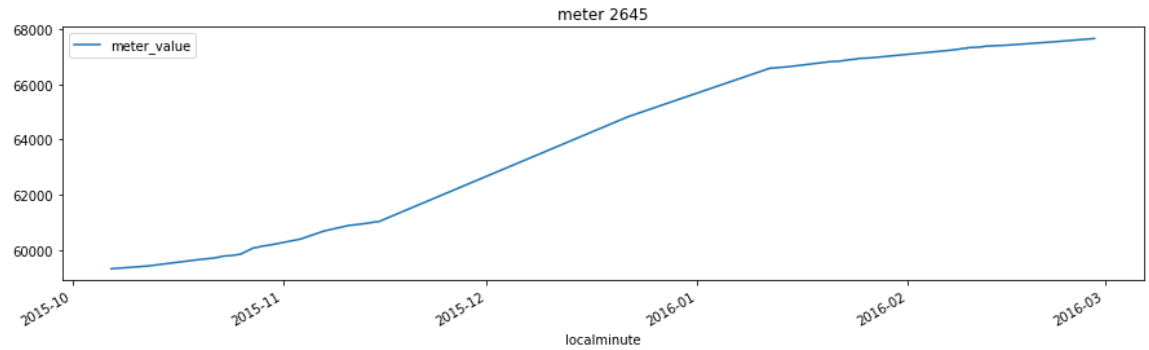
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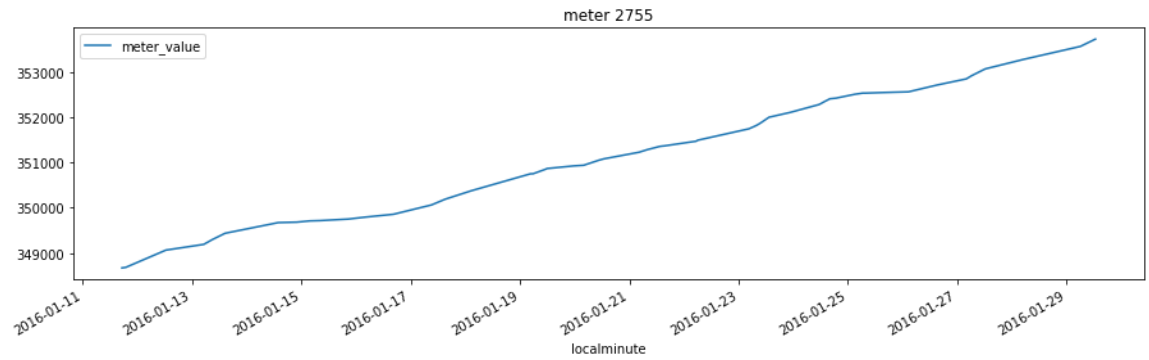
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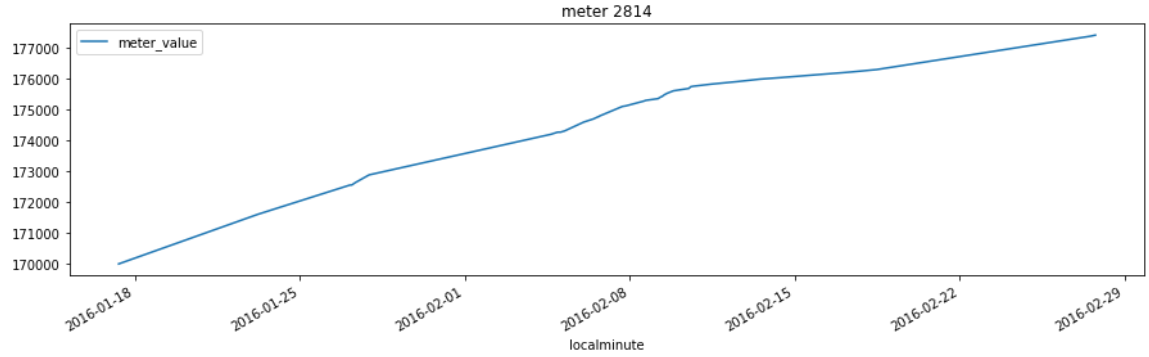
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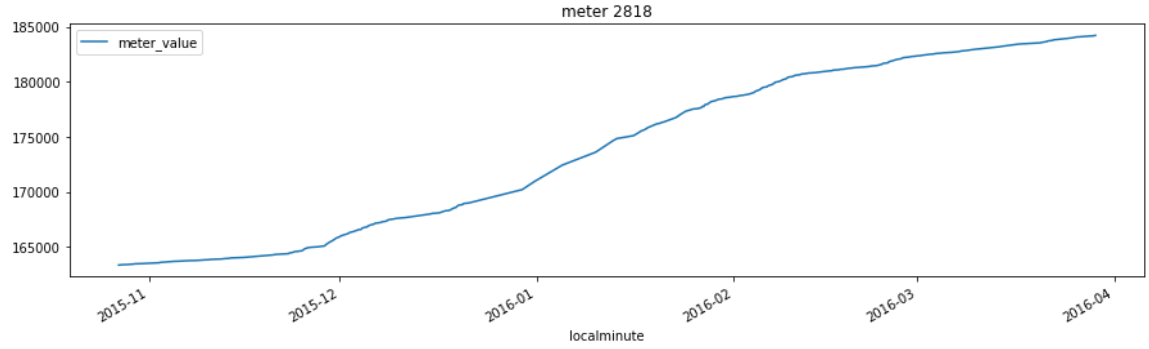
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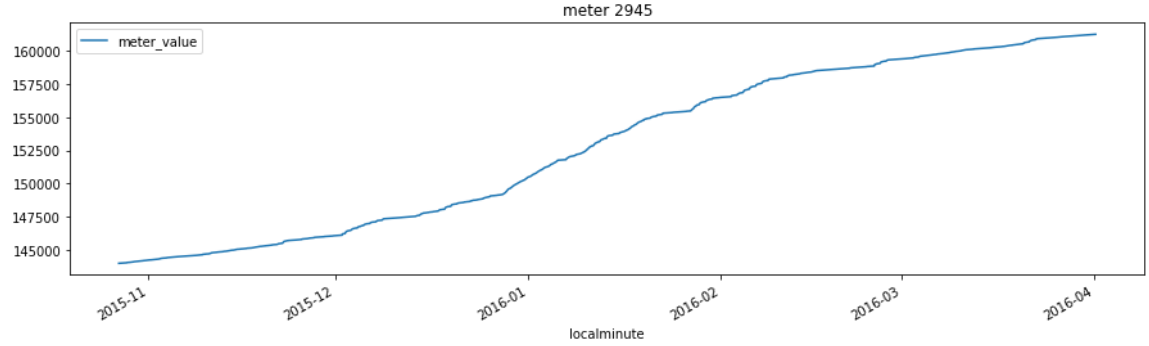
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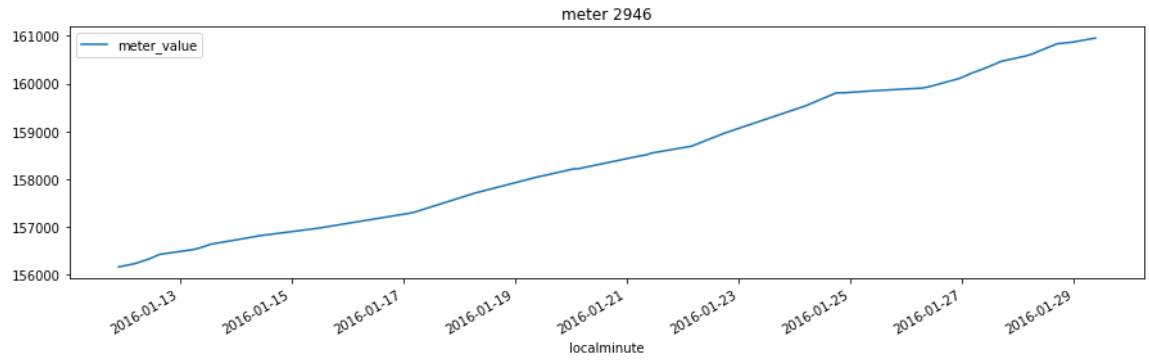
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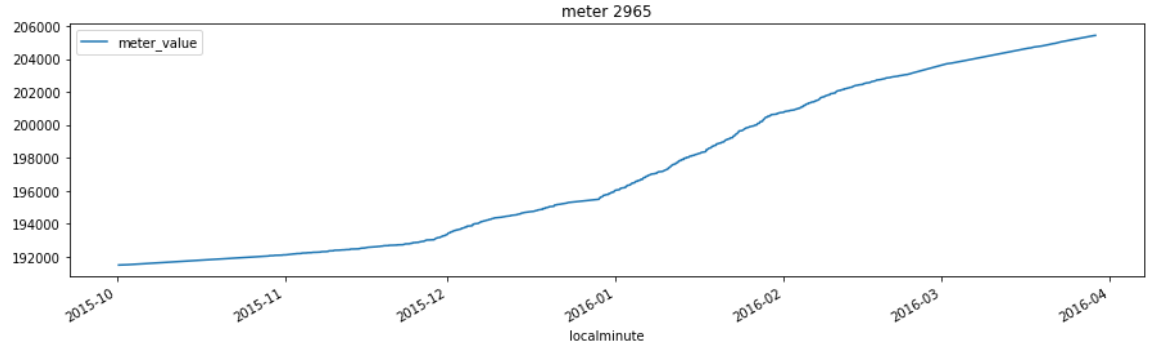
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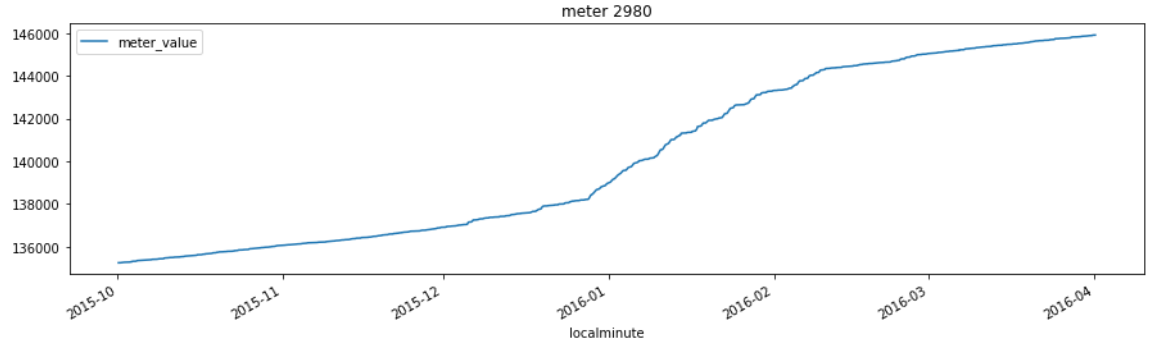
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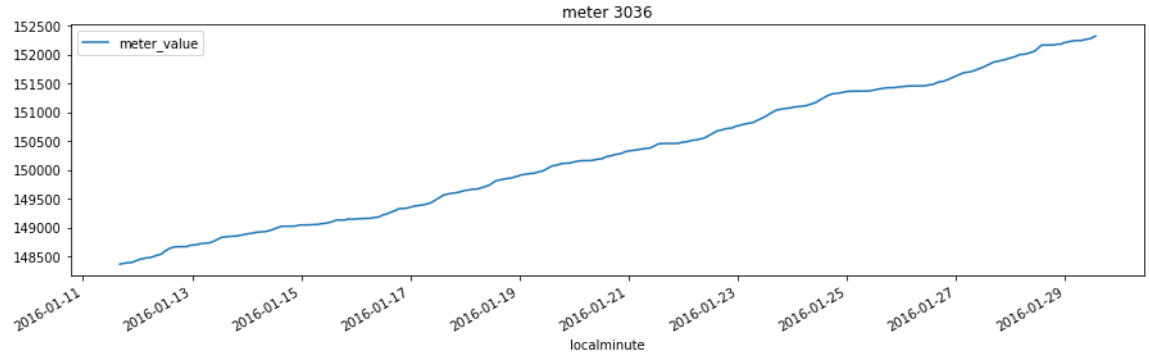
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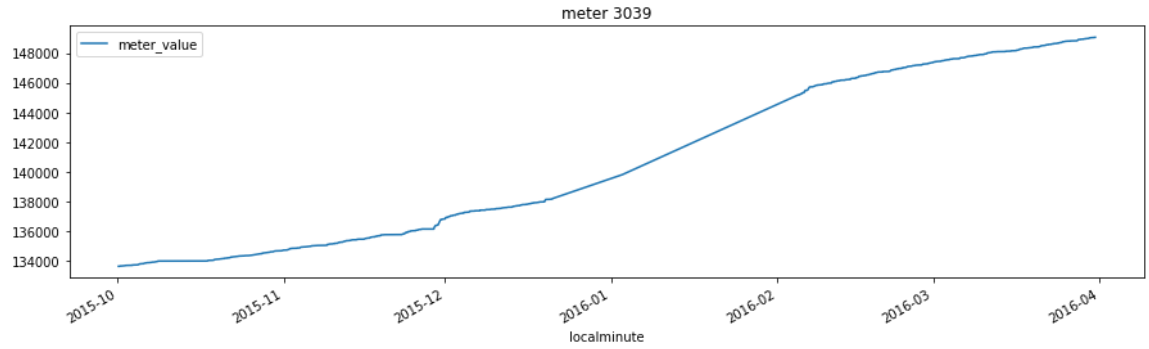
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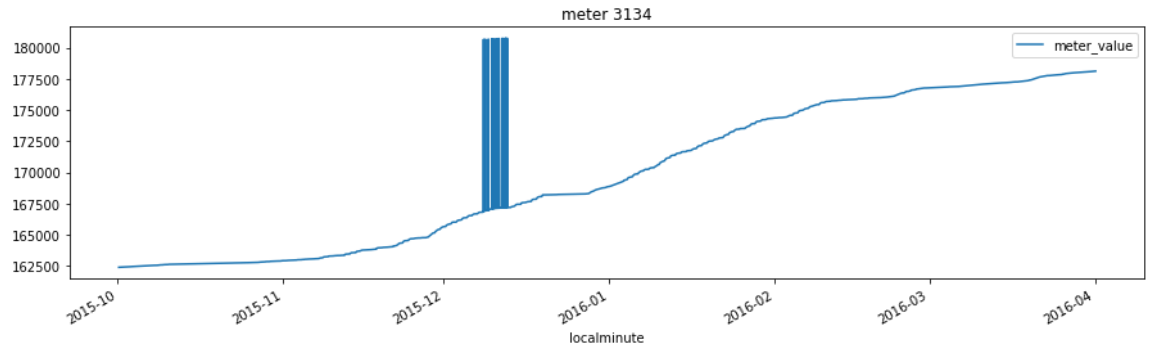
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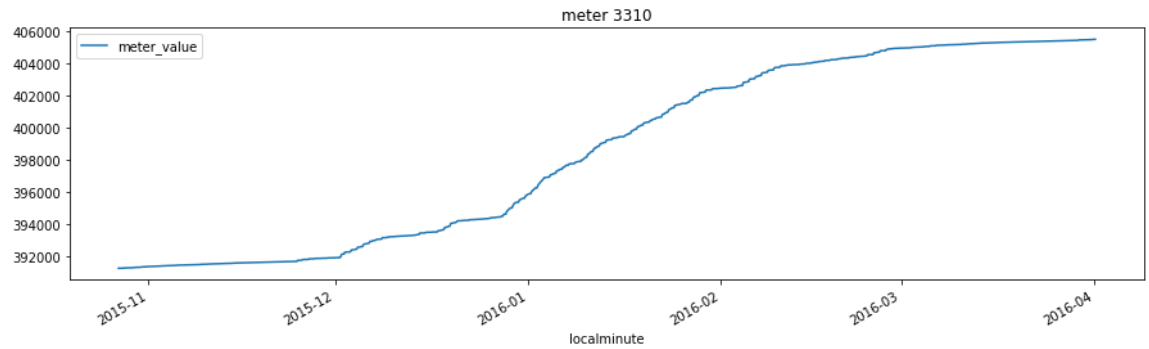
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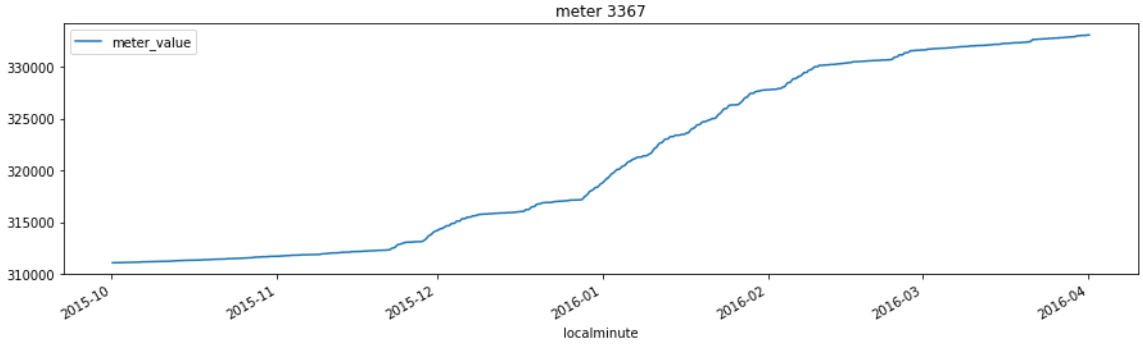
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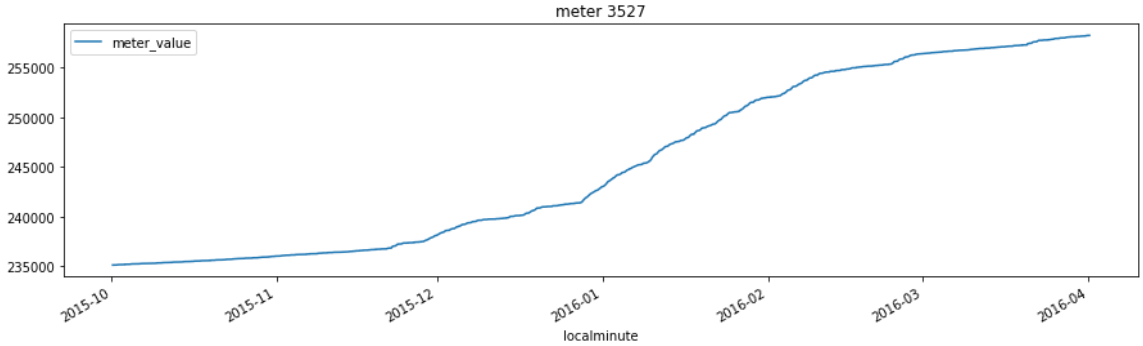
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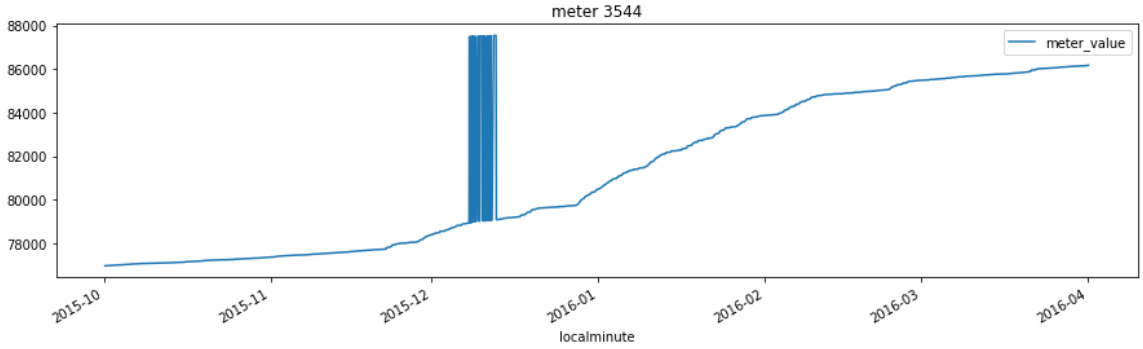
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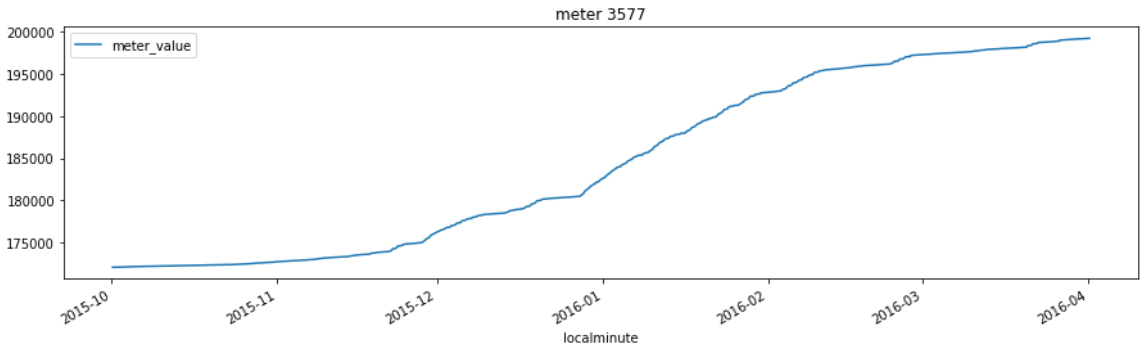
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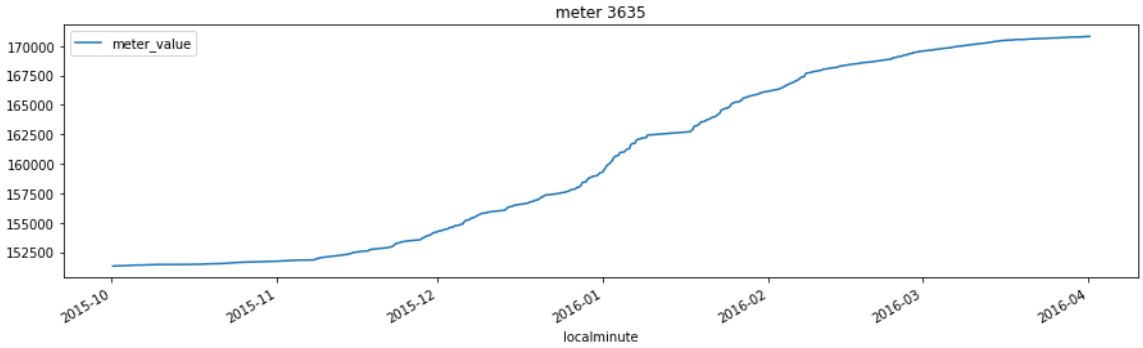
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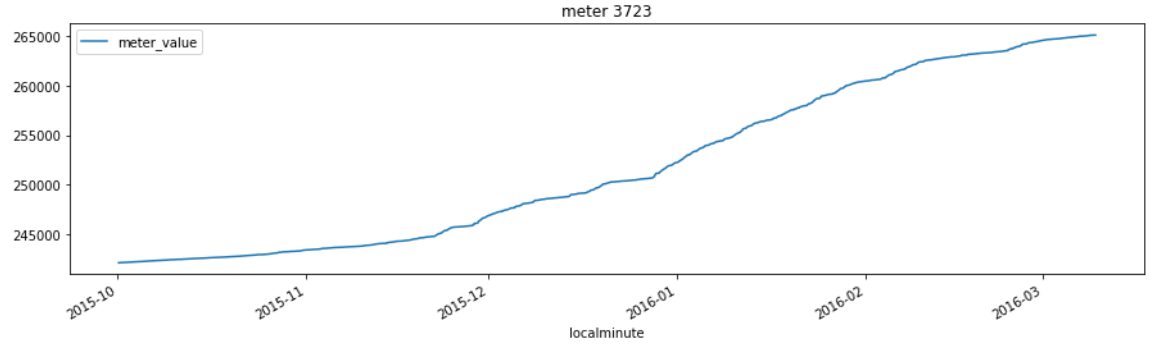
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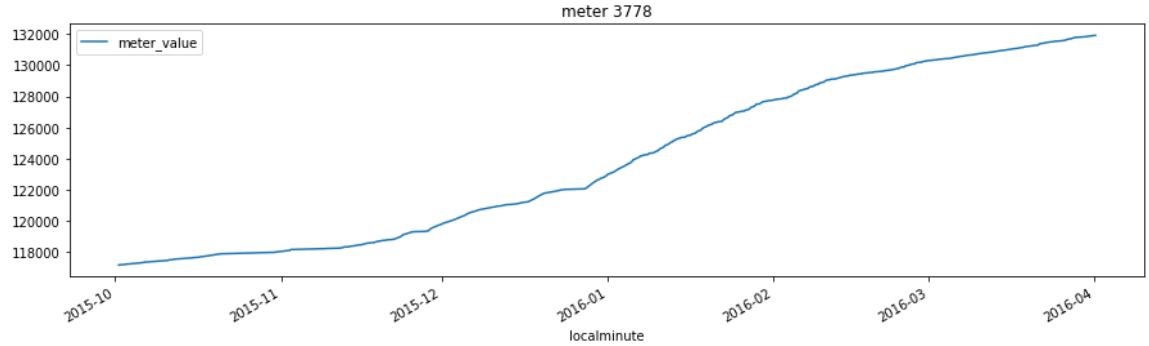
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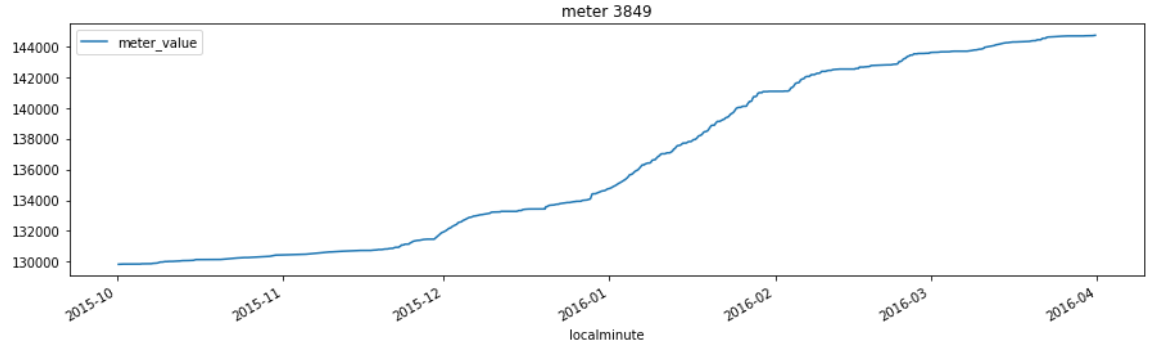
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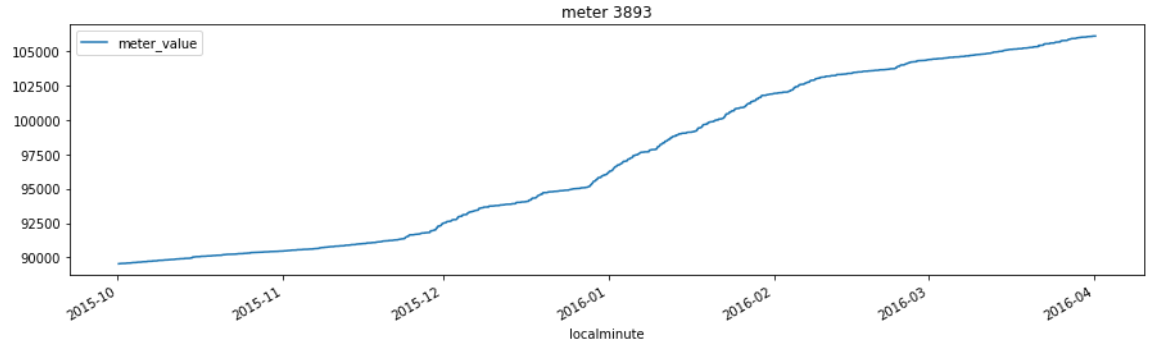
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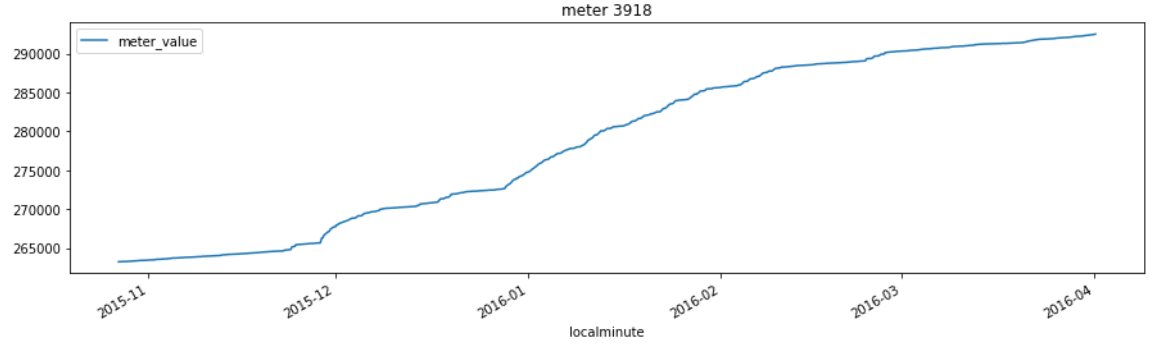
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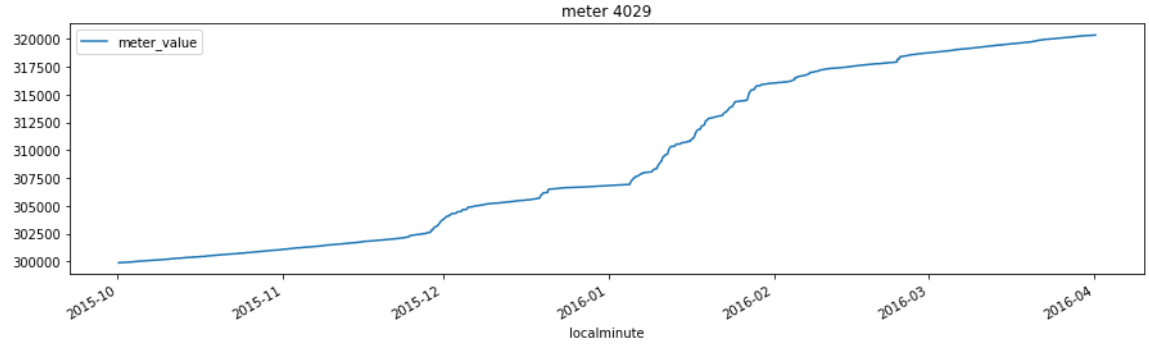
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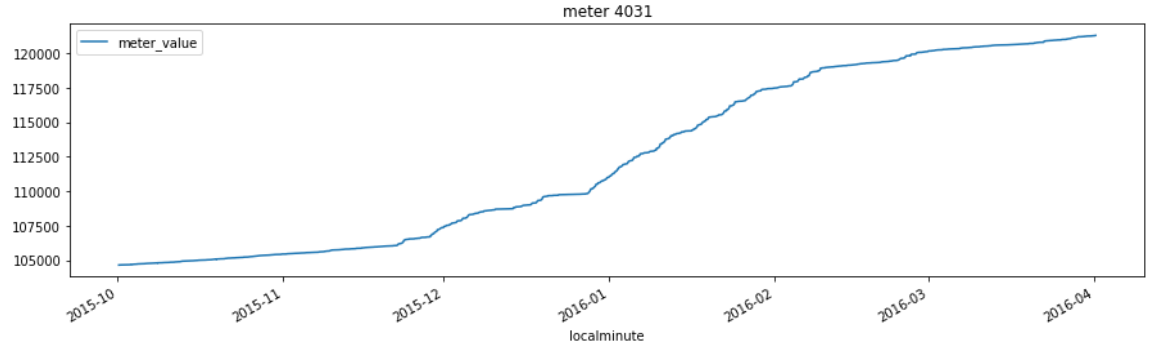
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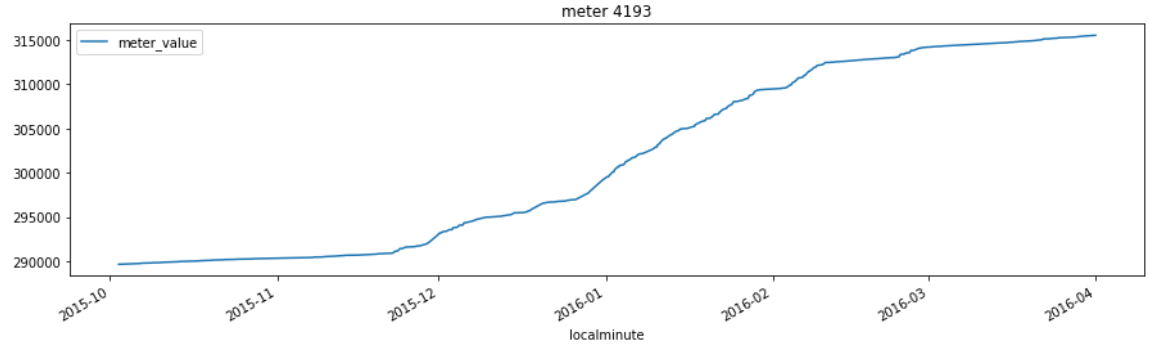
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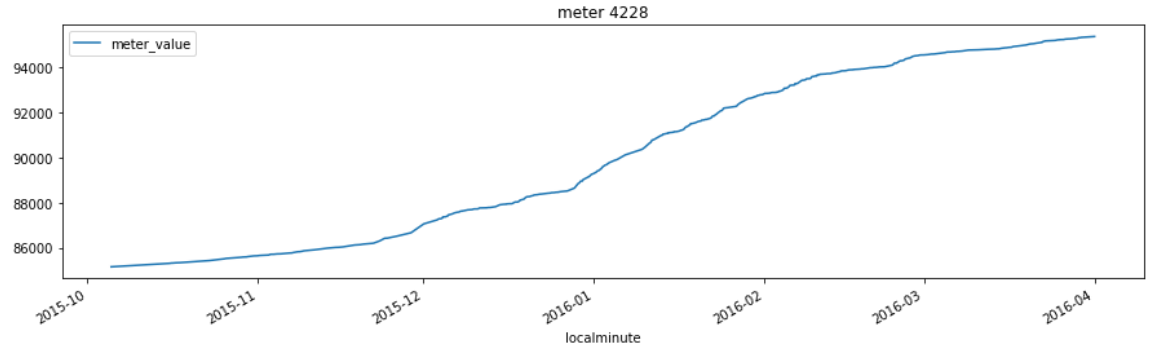
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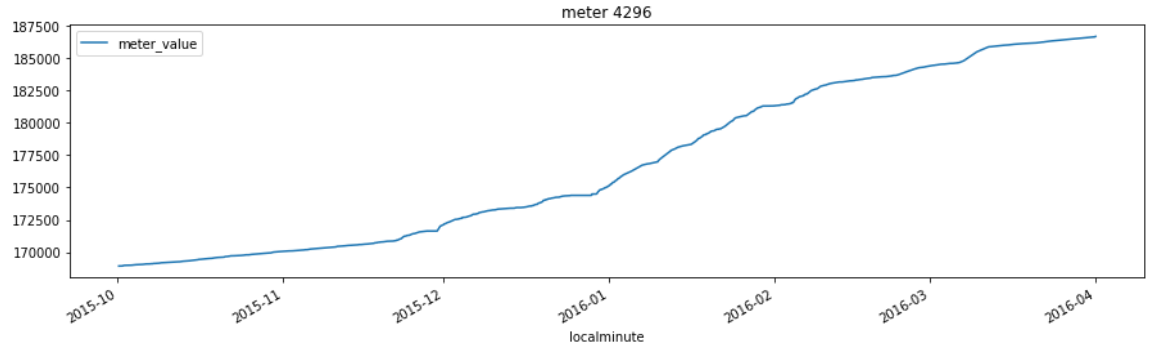
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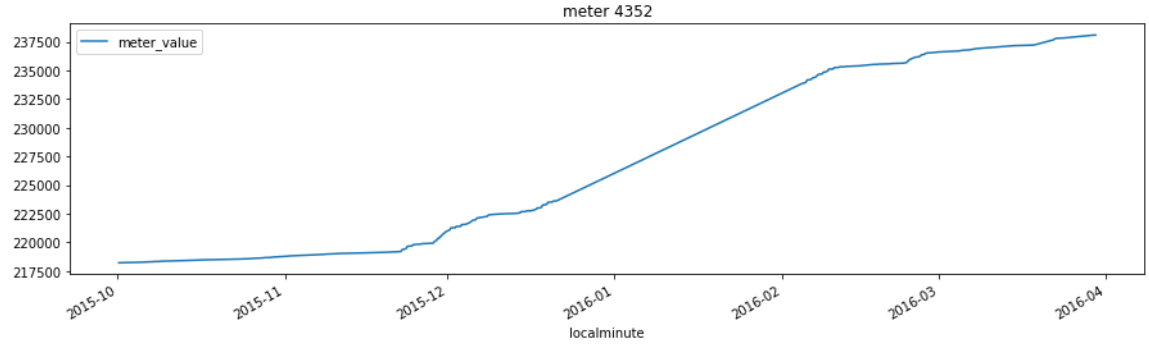
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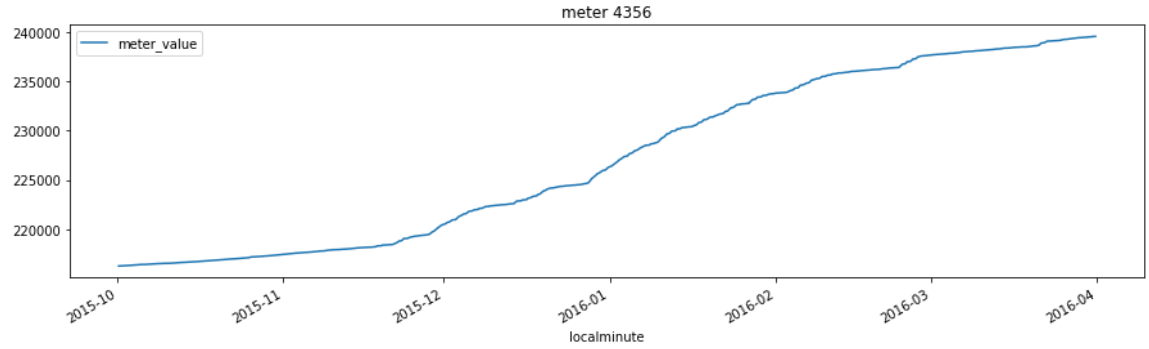
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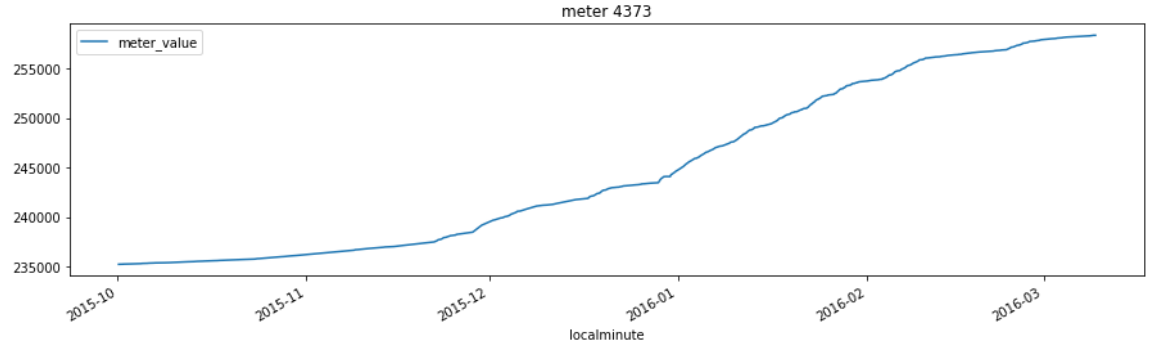
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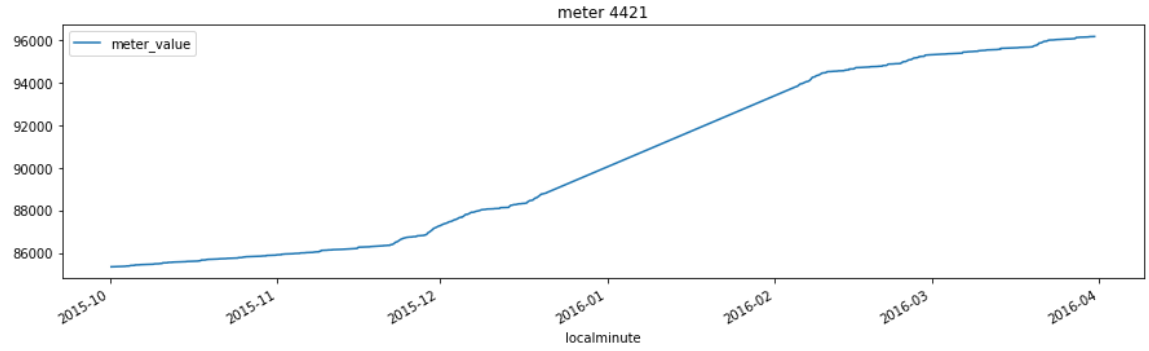
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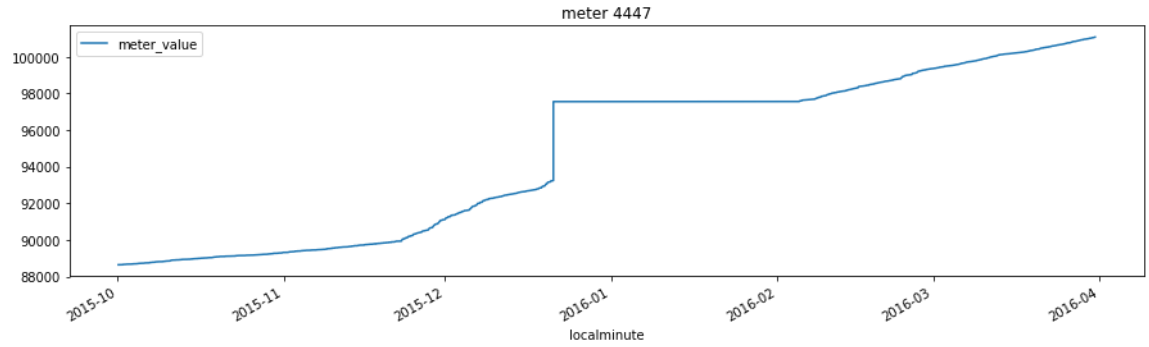
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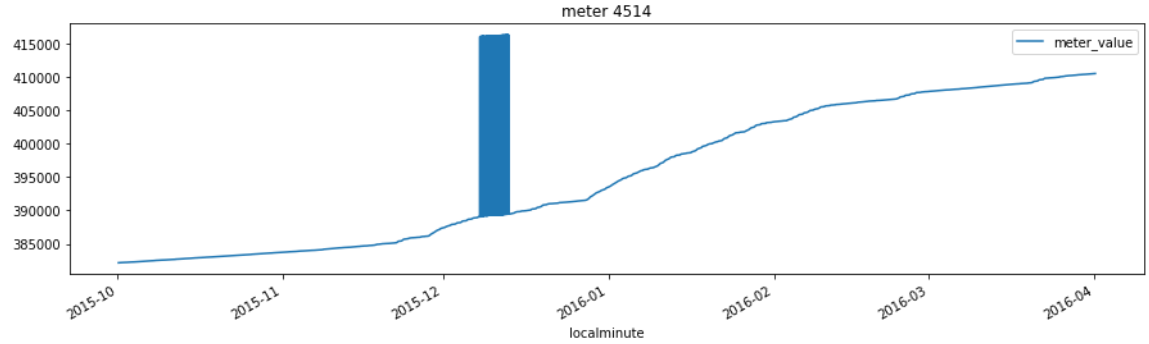
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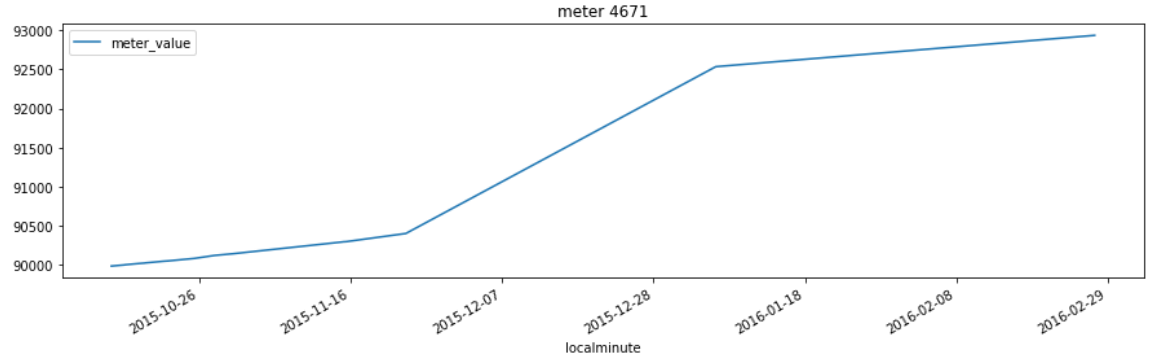
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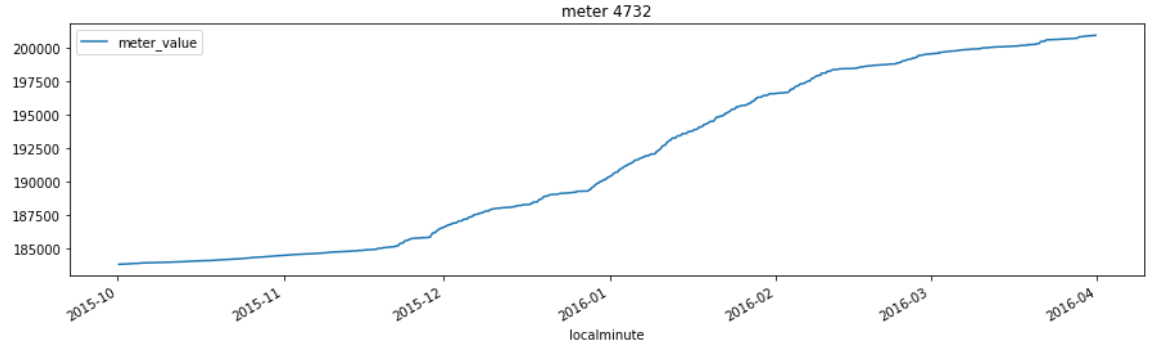
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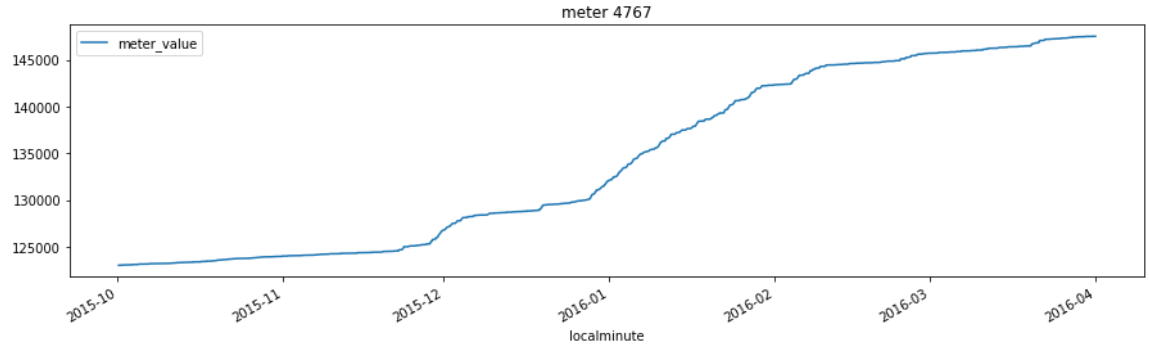
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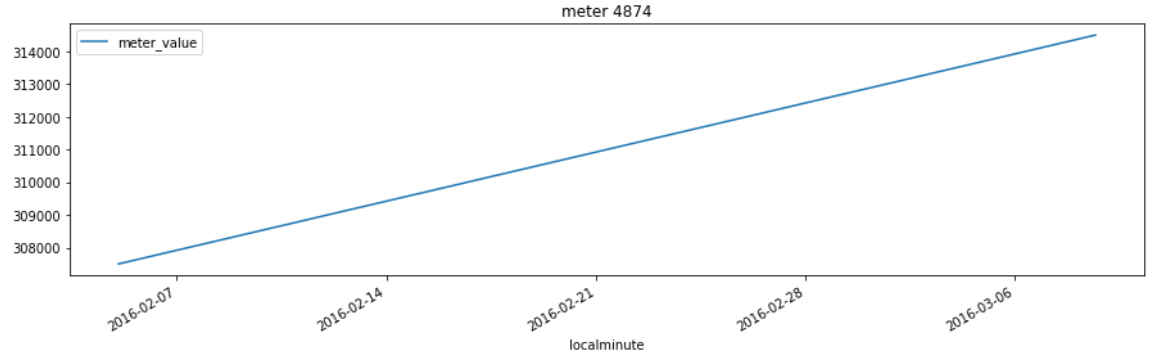
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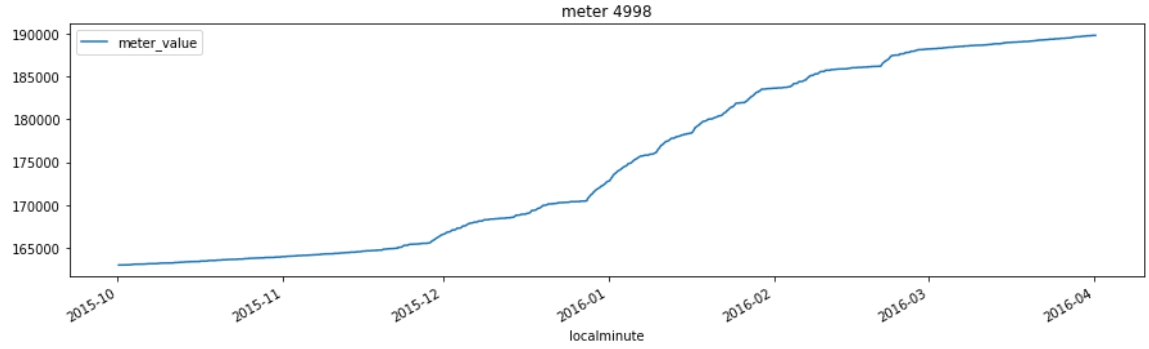
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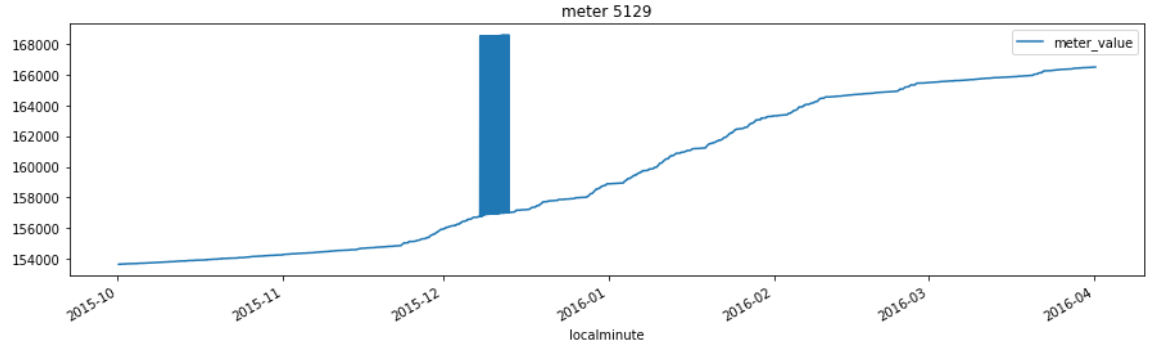
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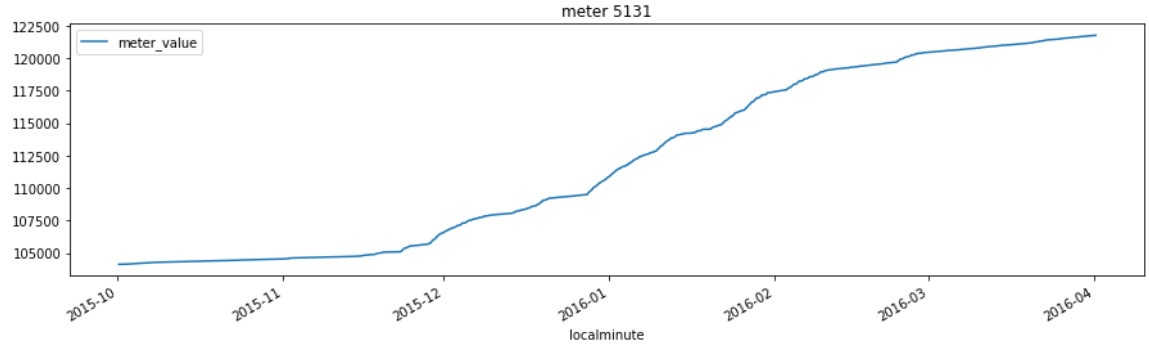
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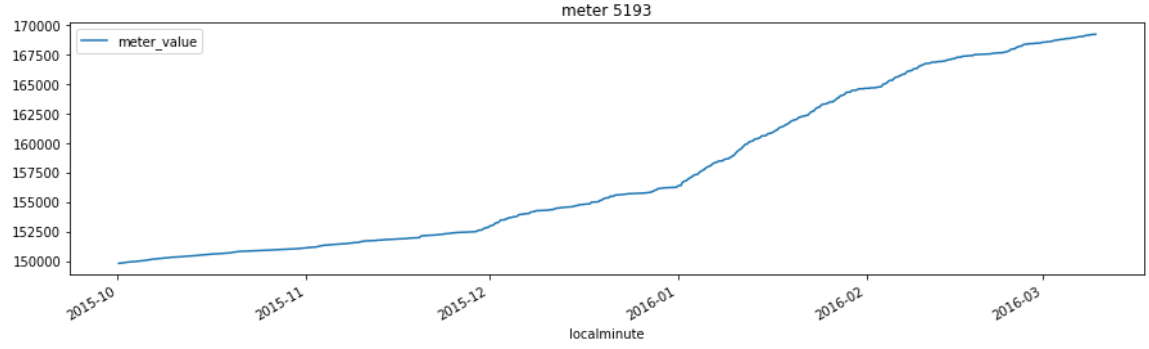
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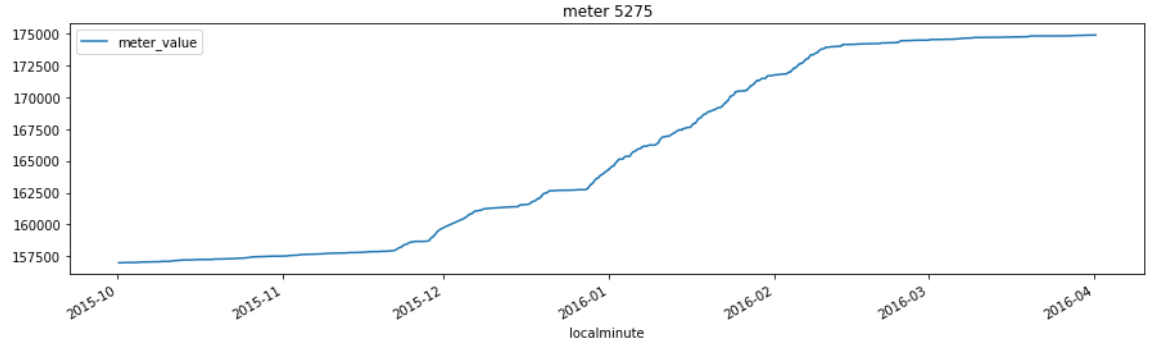
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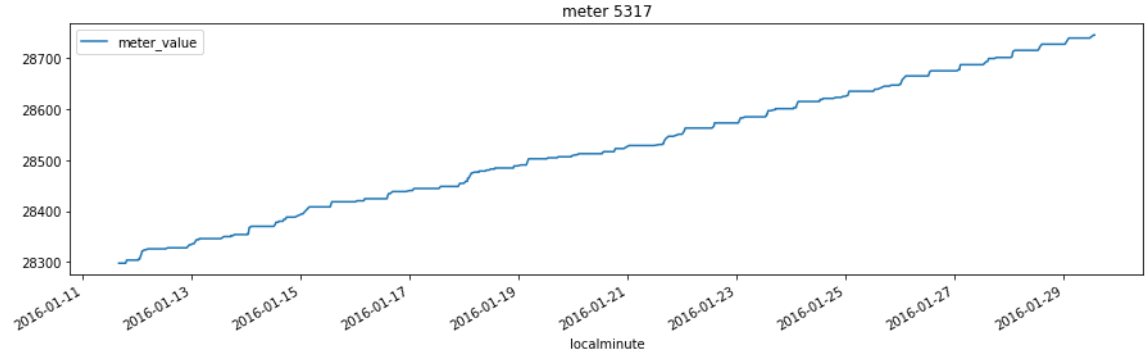
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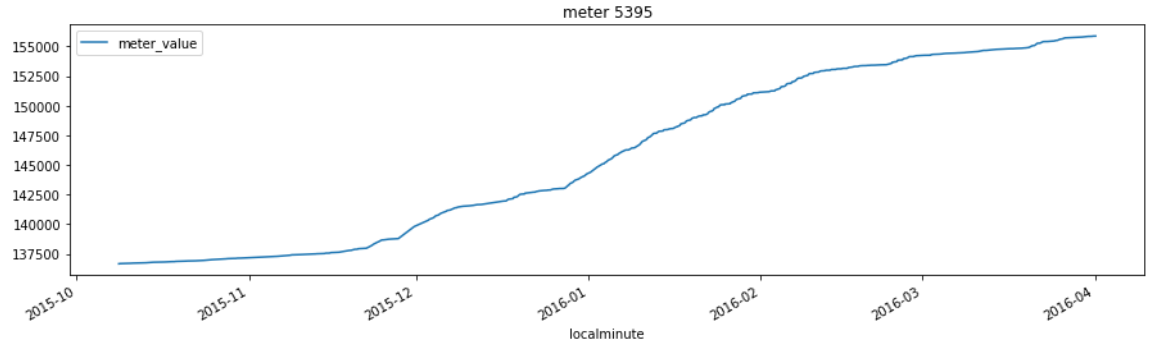
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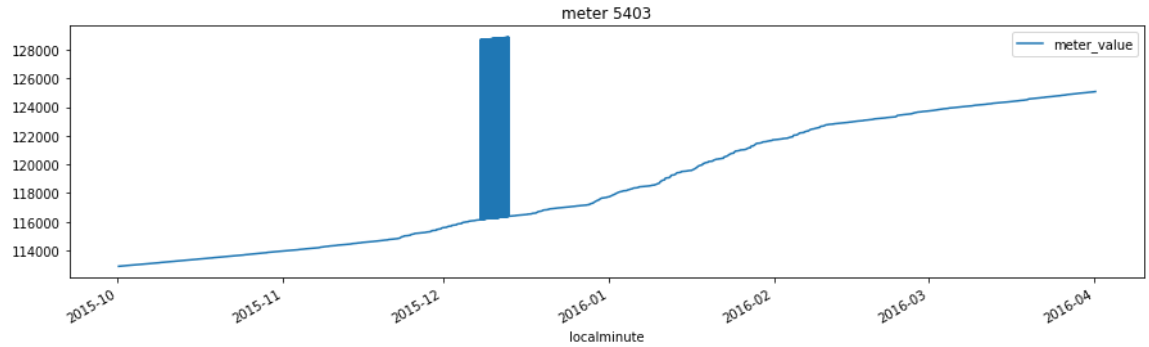
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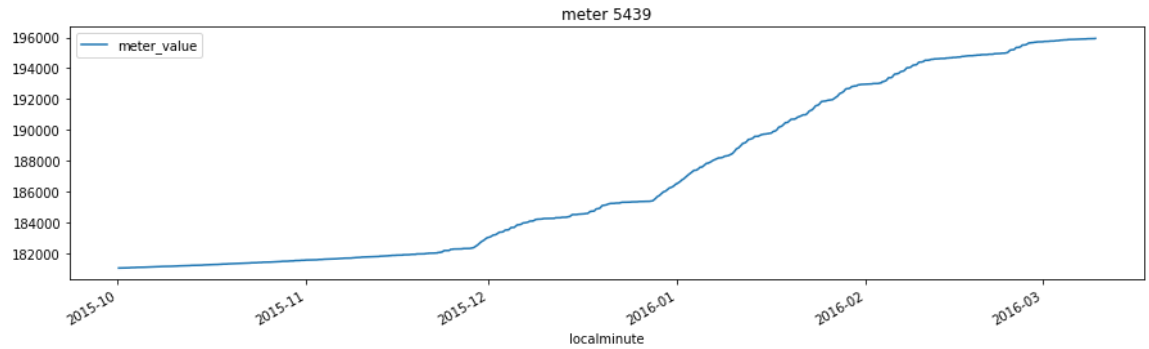
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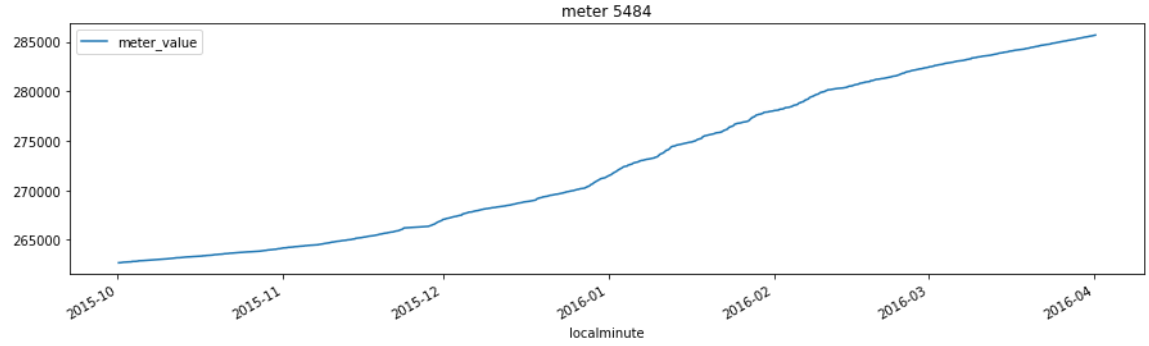
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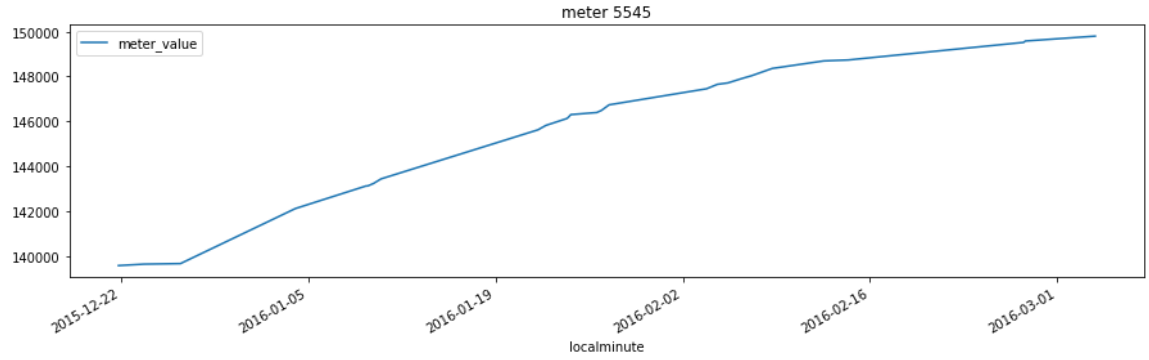
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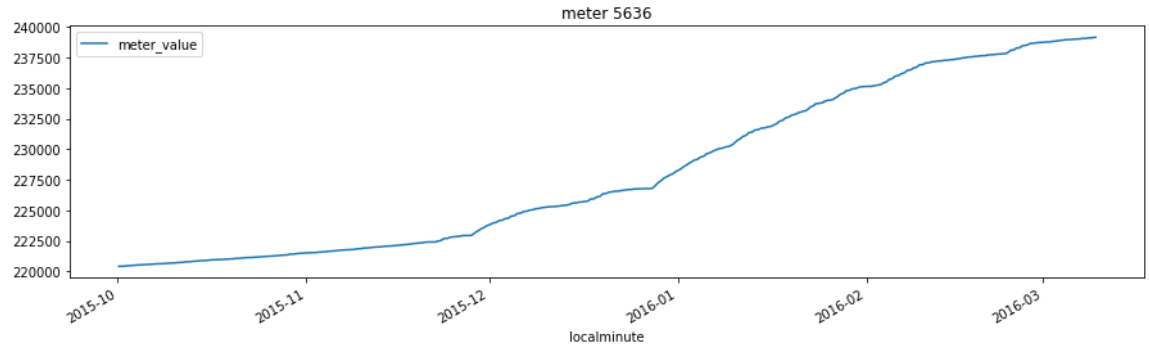
2016-03-01
localminute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2016-03
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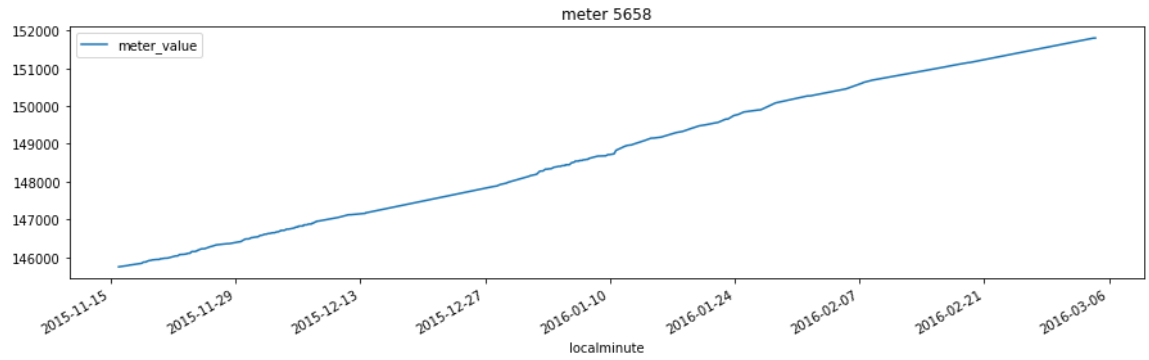
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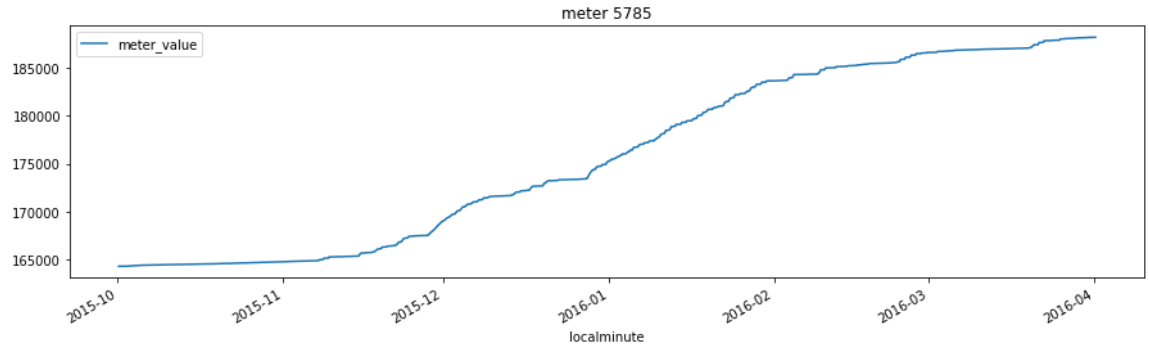
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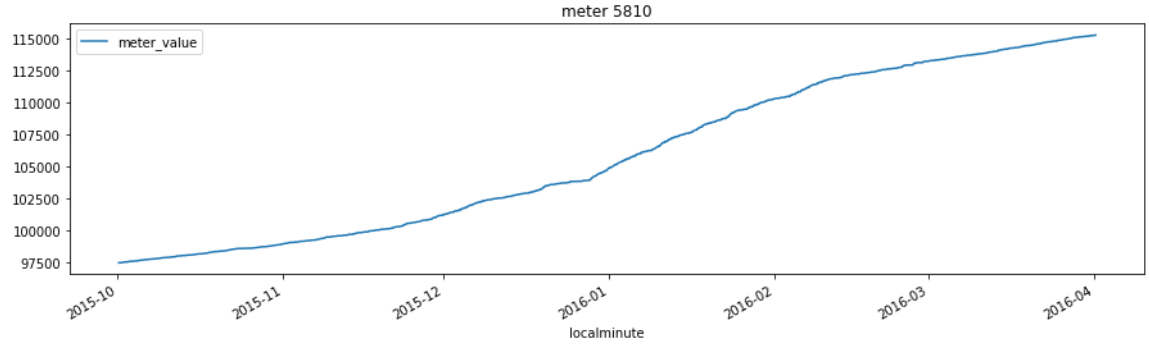
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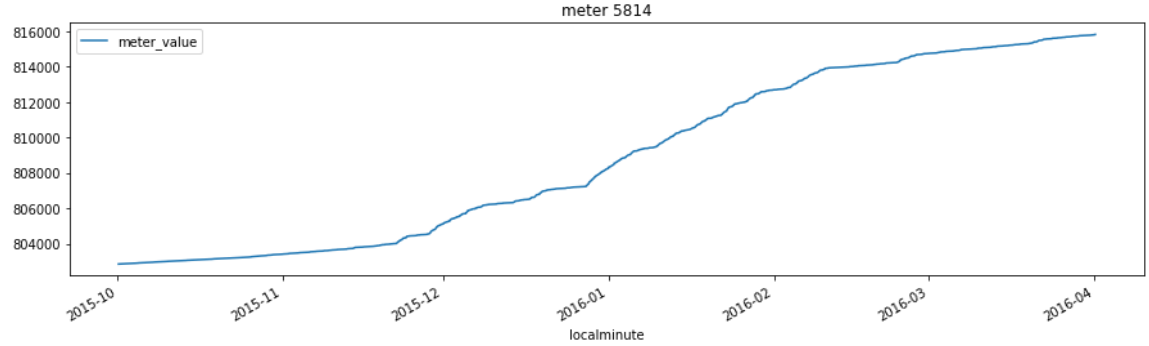
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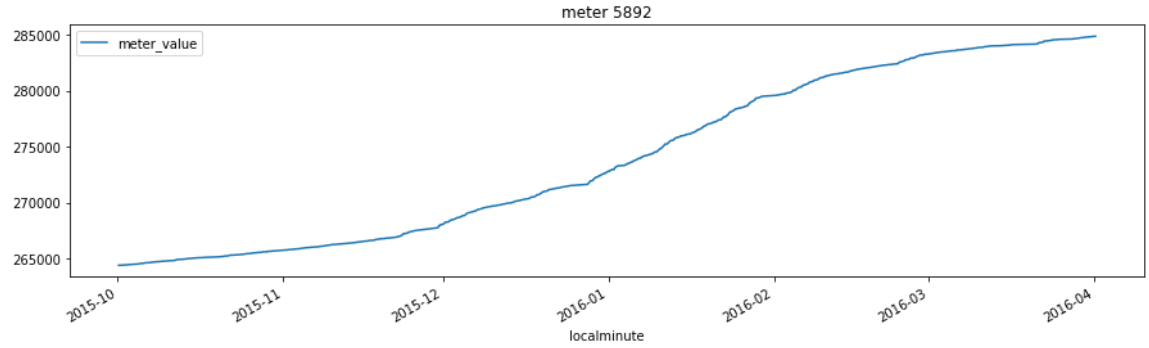
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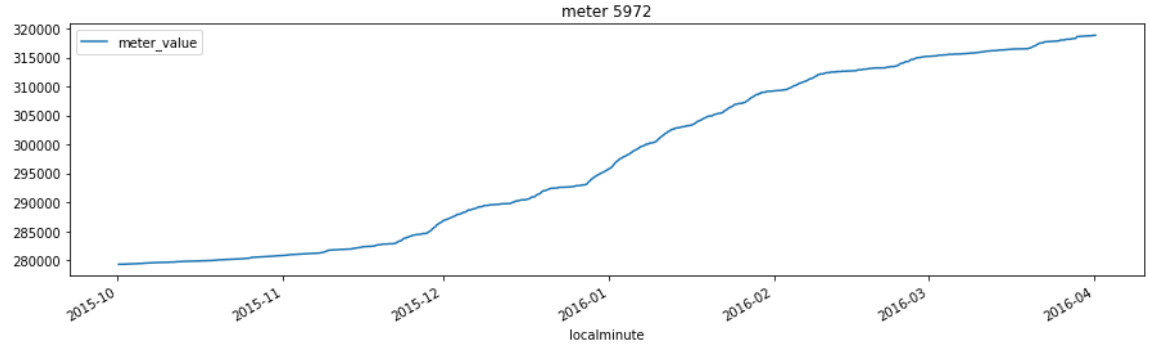
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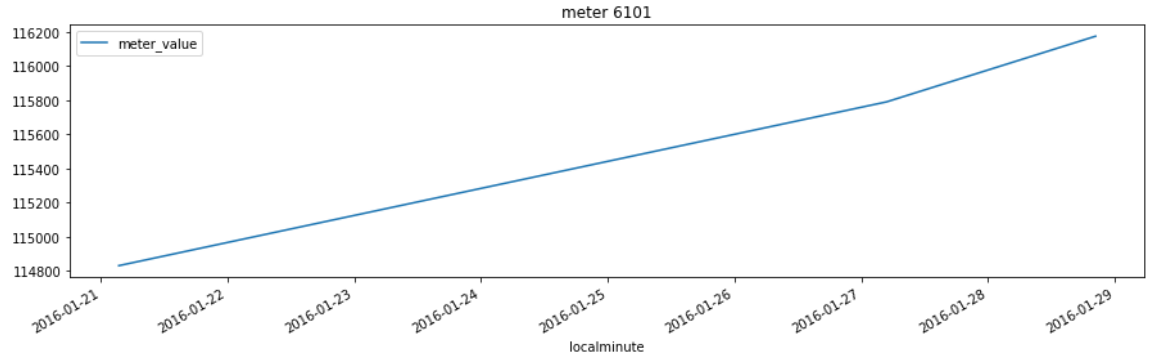
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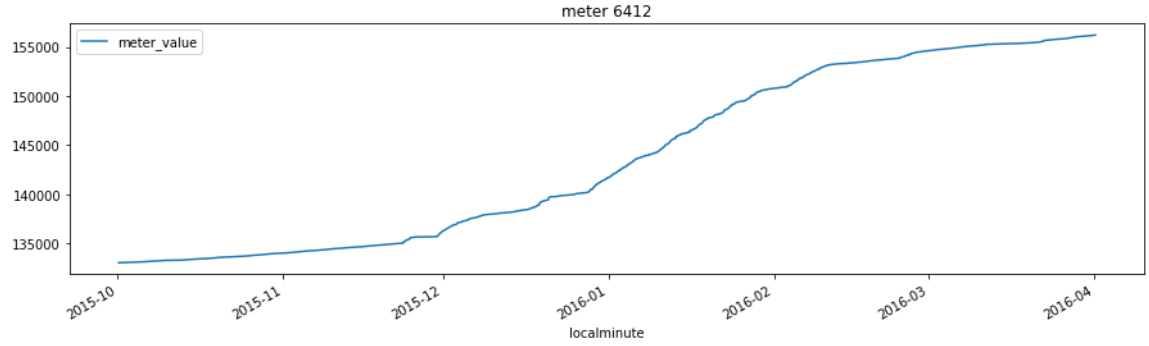
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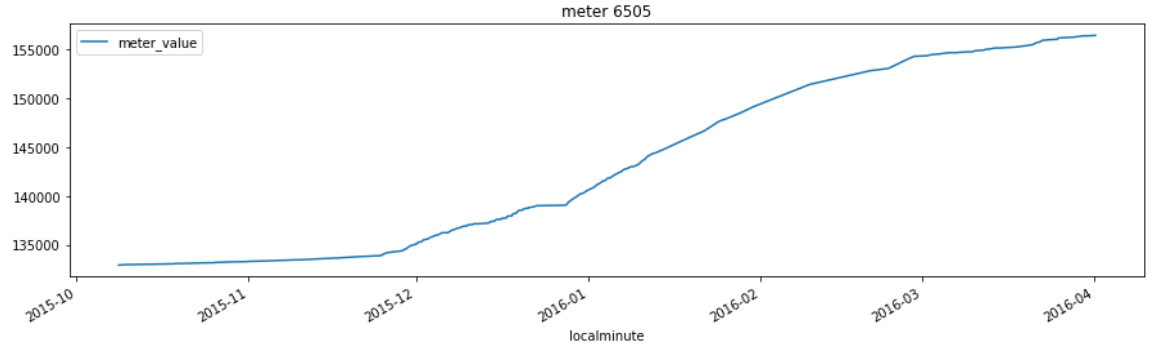
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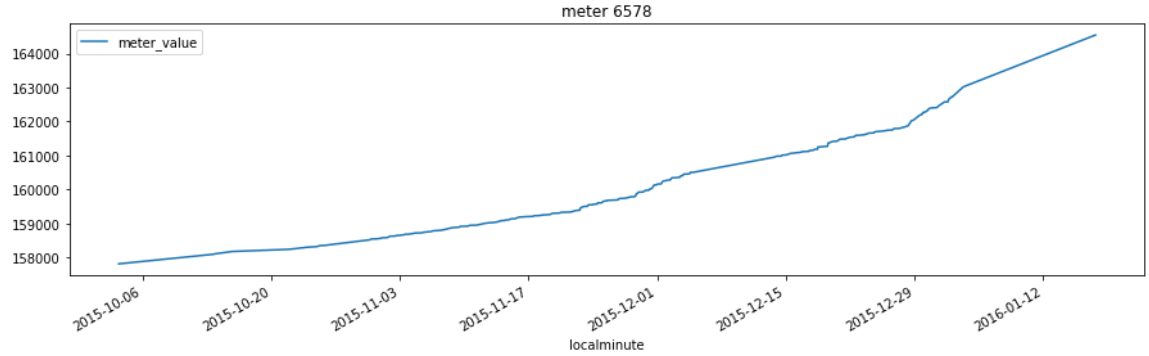
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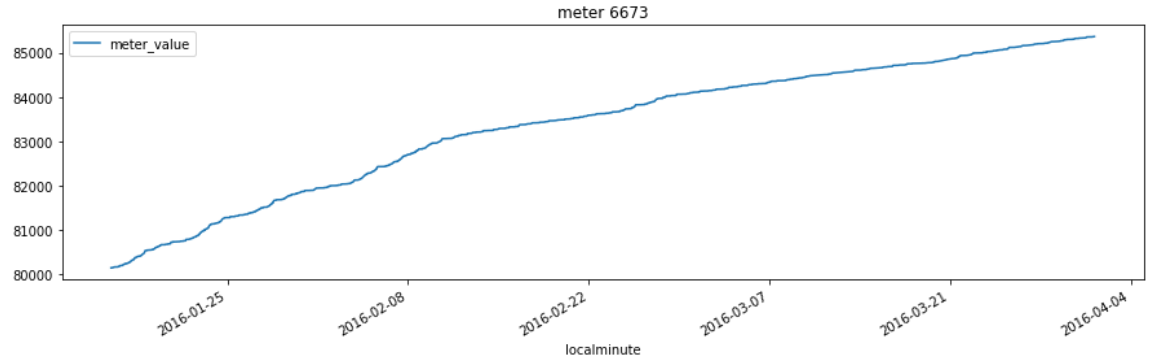
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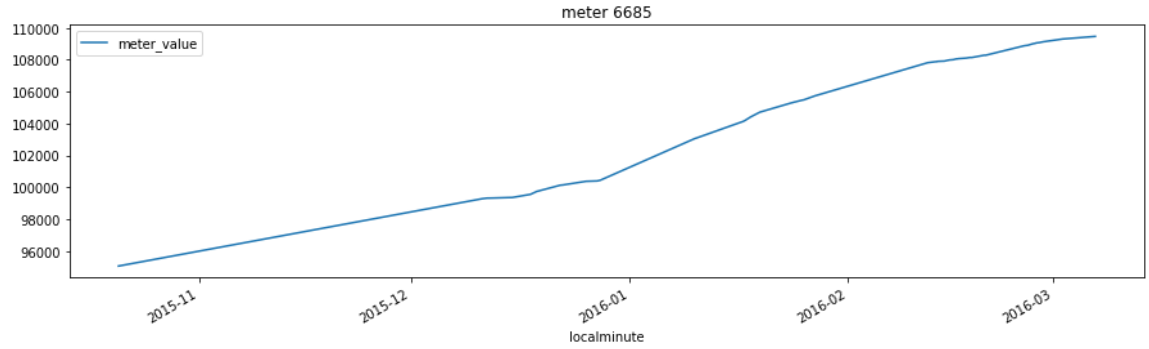
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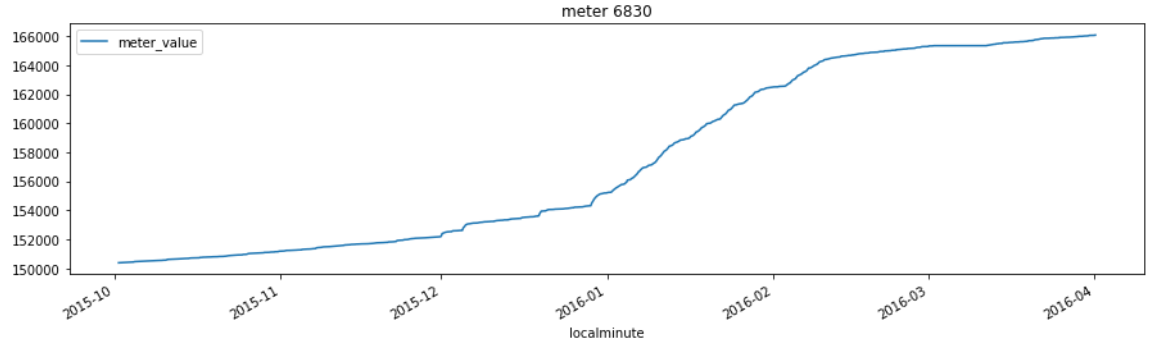
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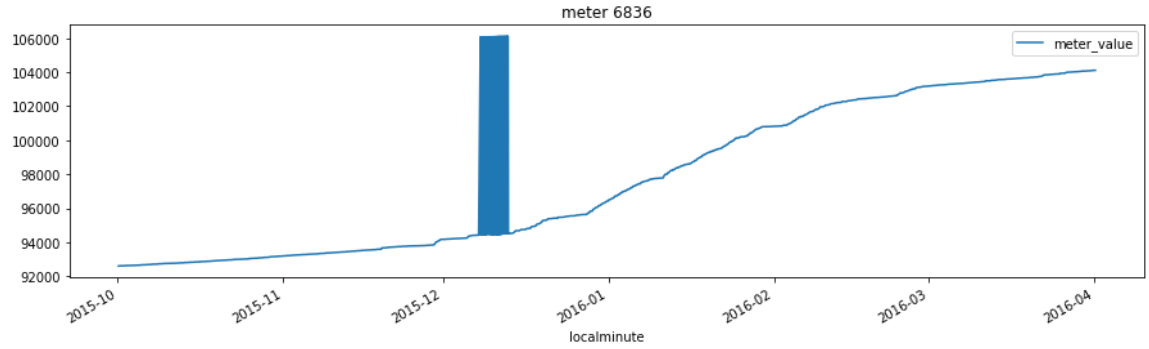
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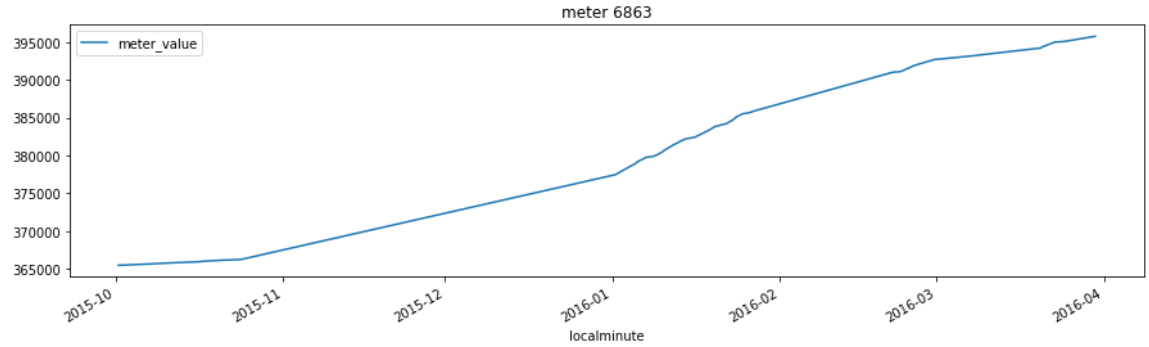
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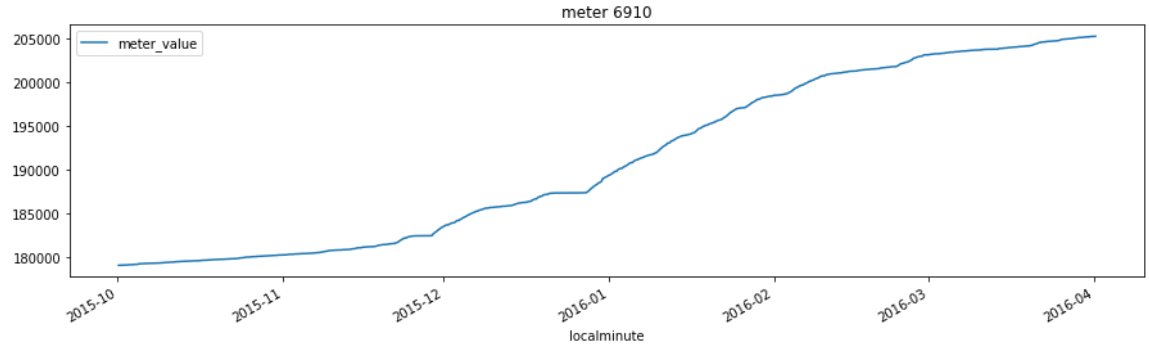
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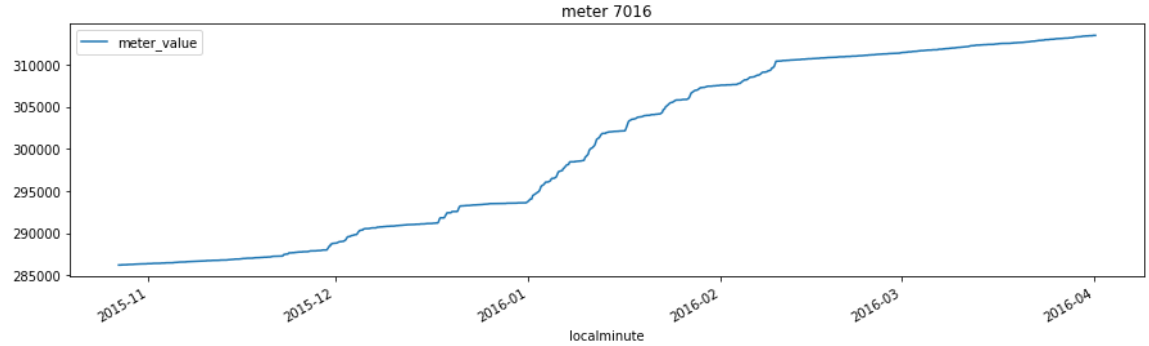
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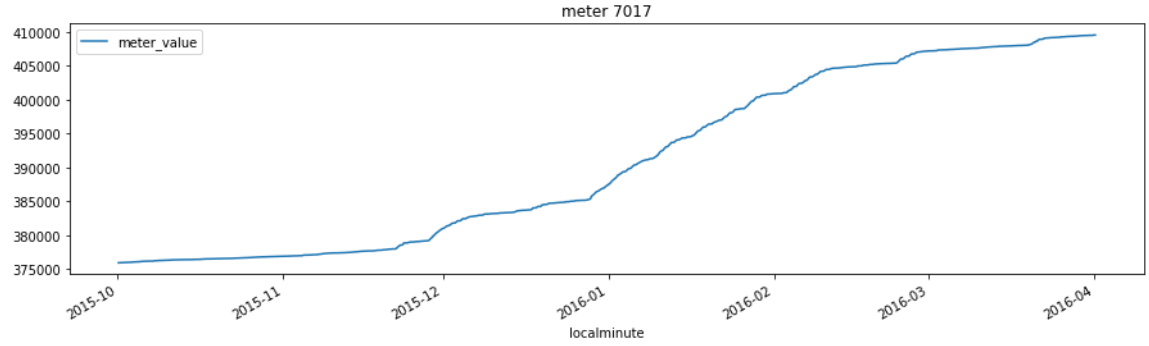
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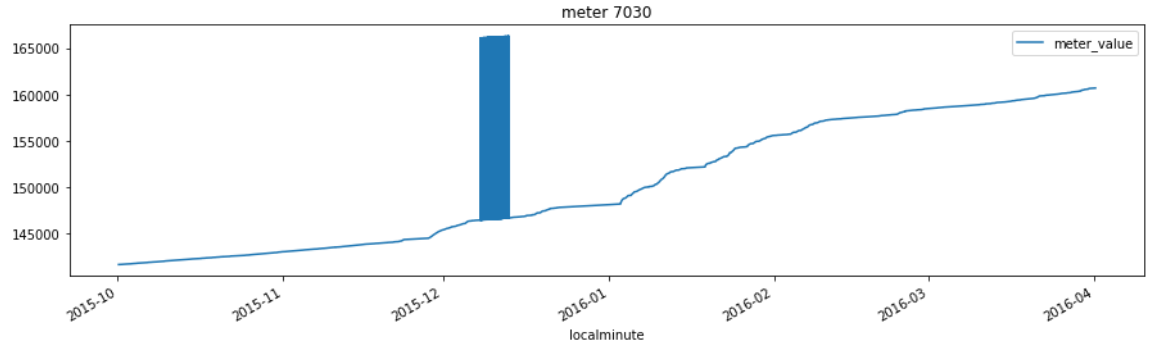
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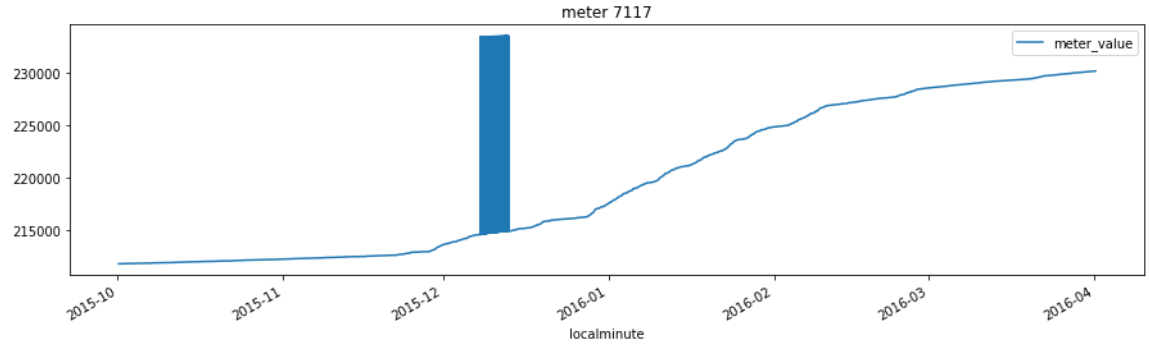
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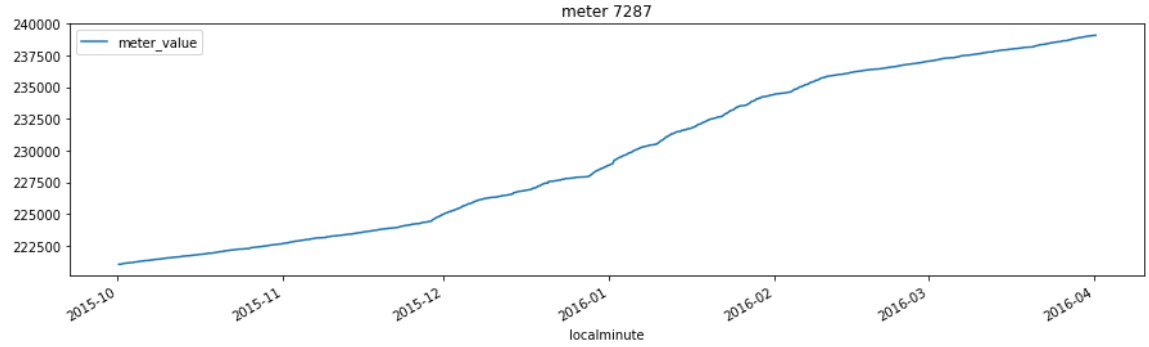
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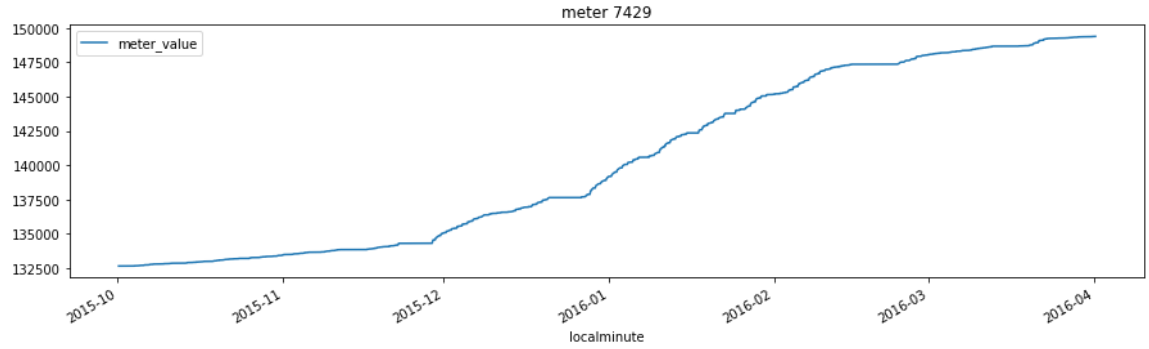
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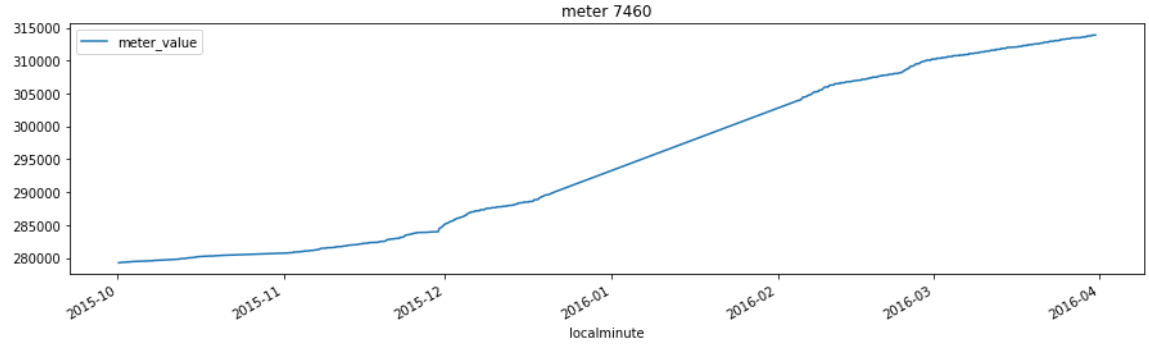
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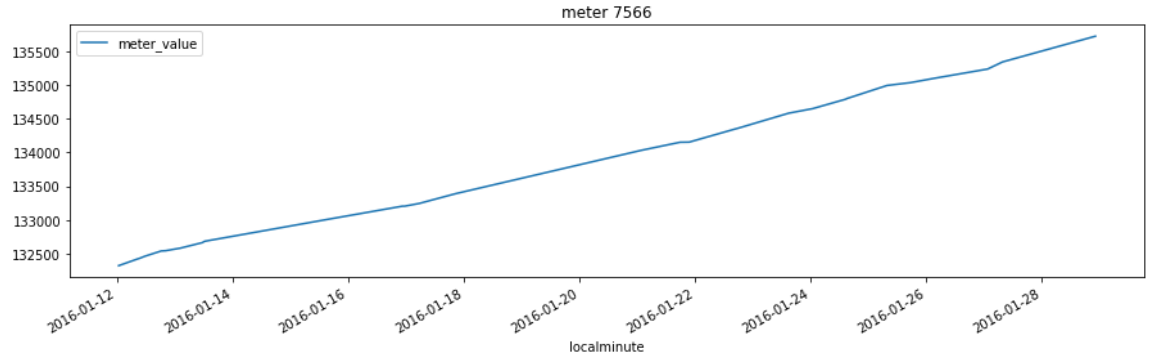
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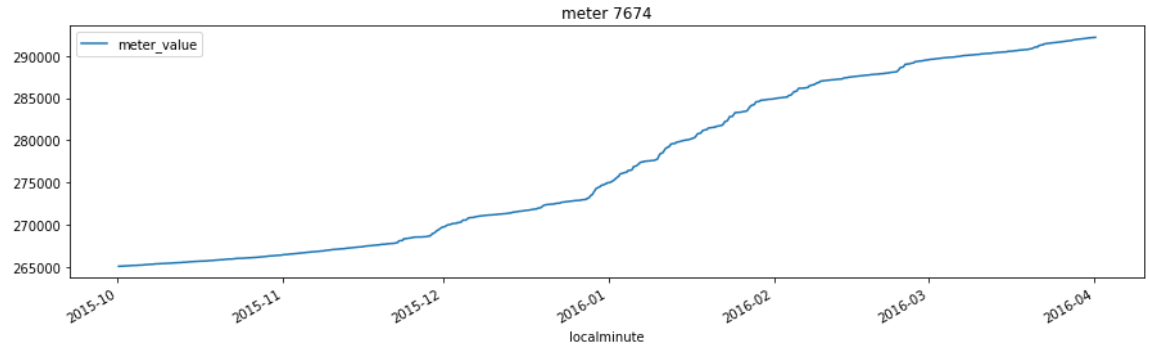
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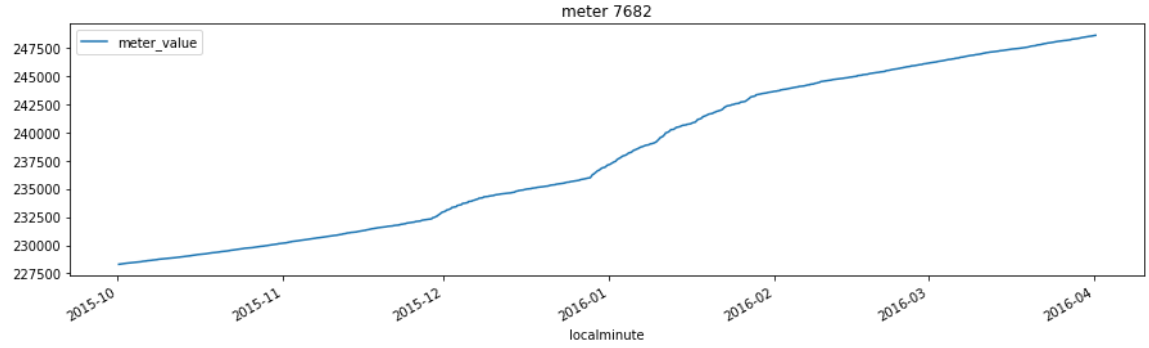
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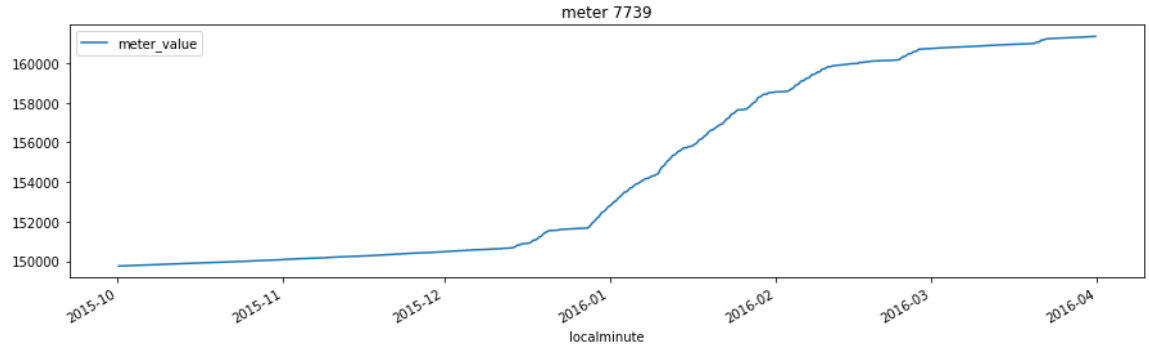
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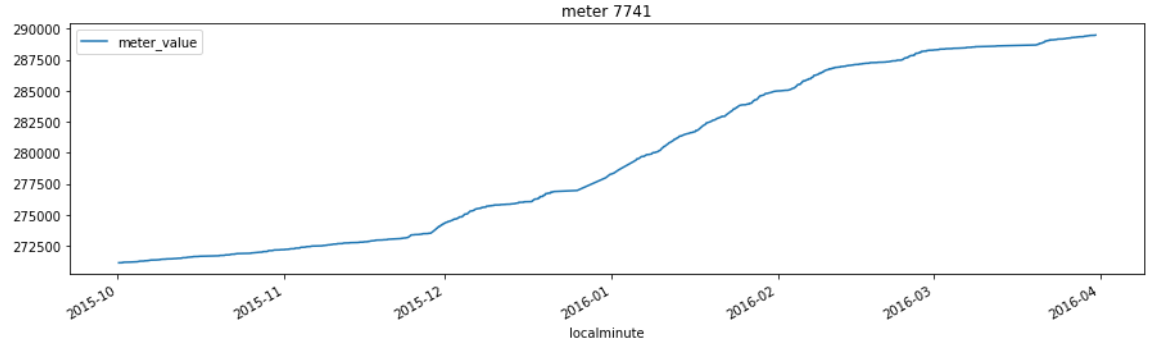
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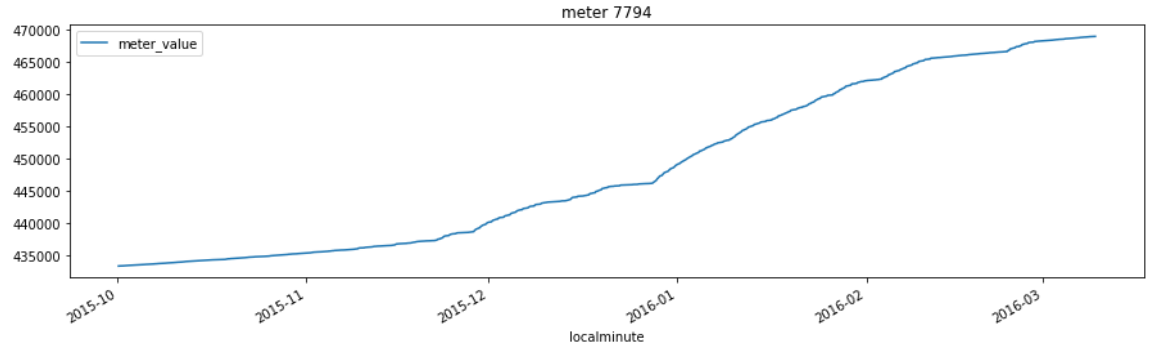
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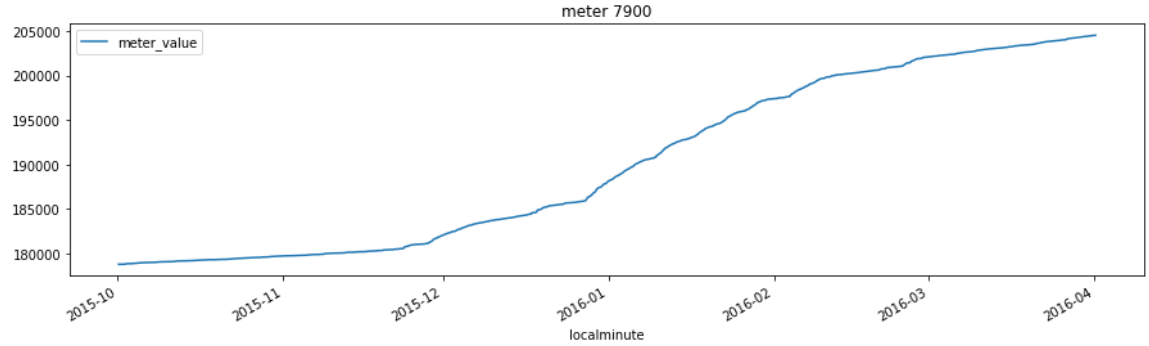
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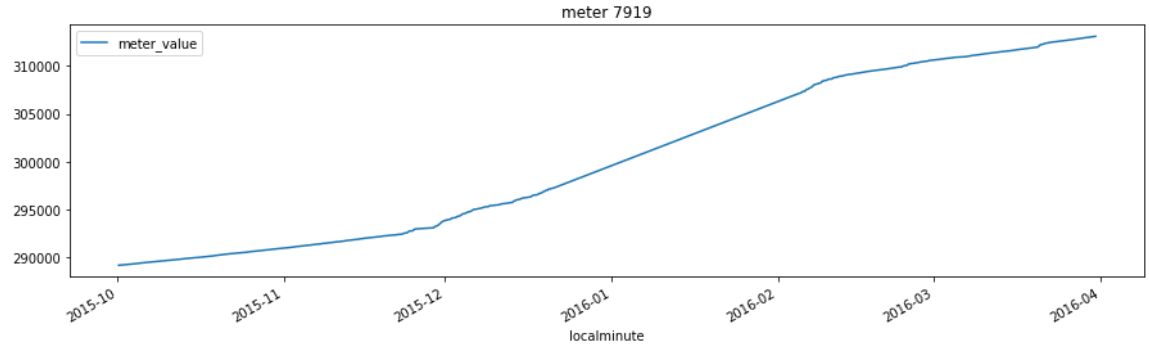
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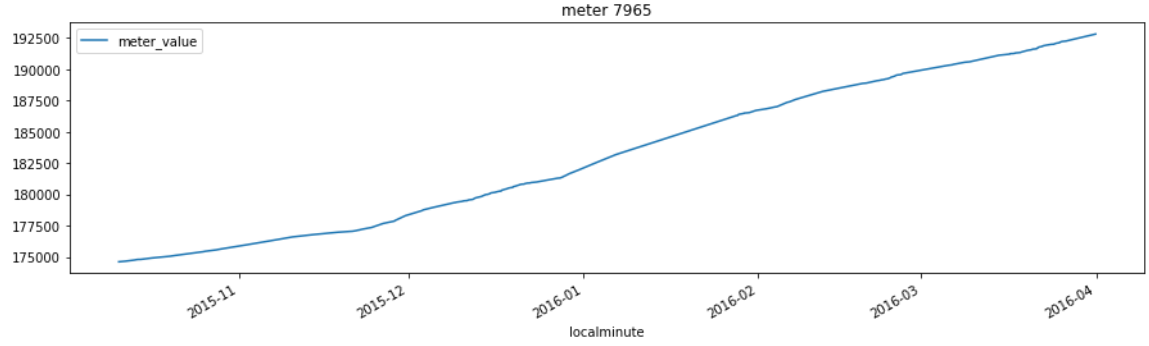
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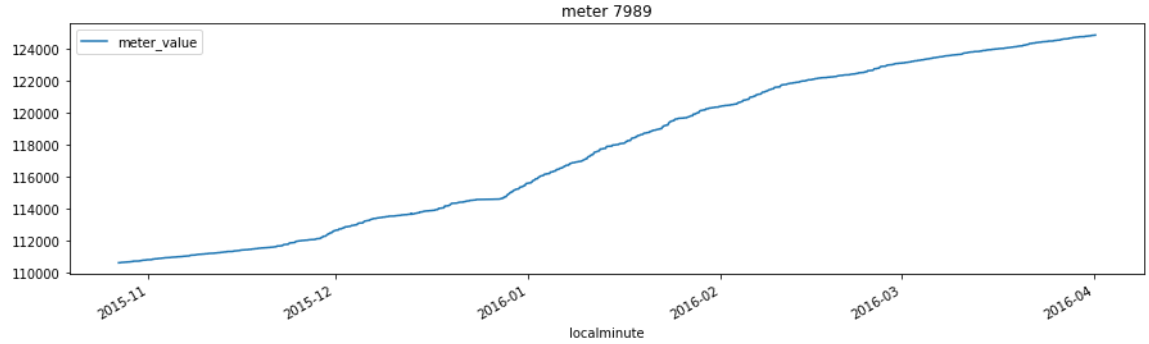
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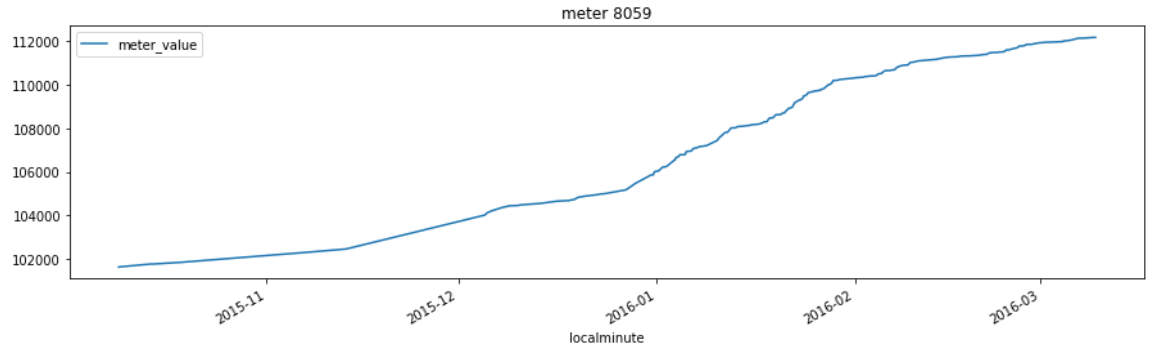
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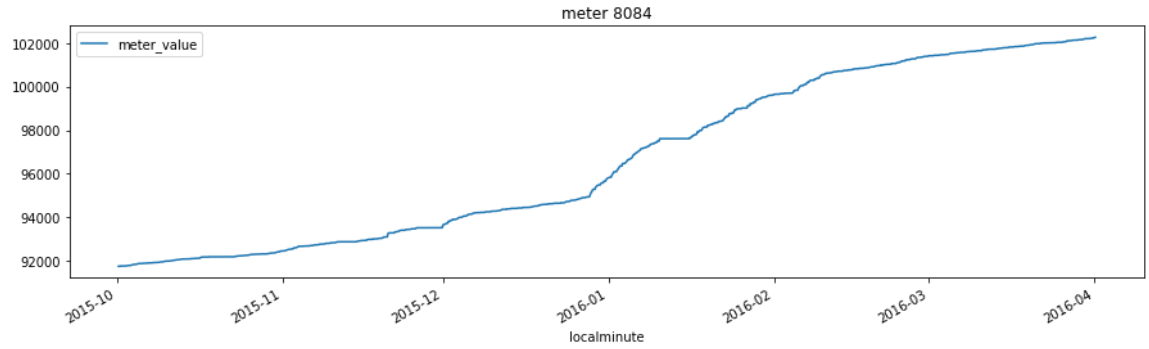
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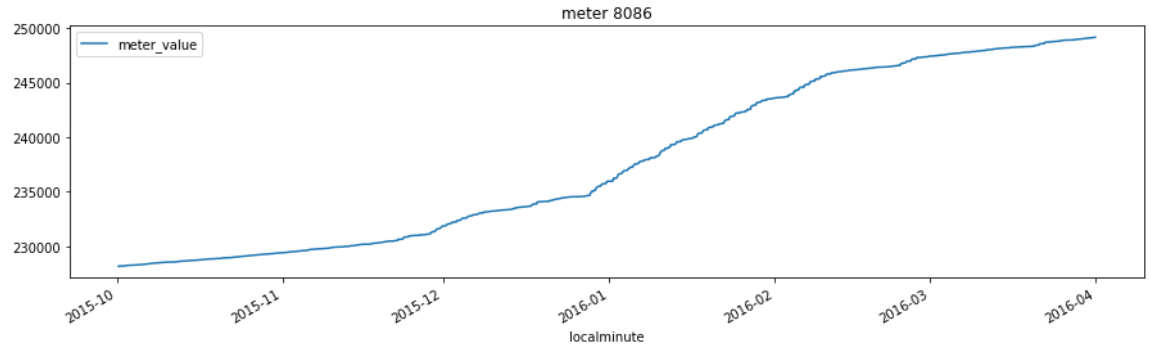
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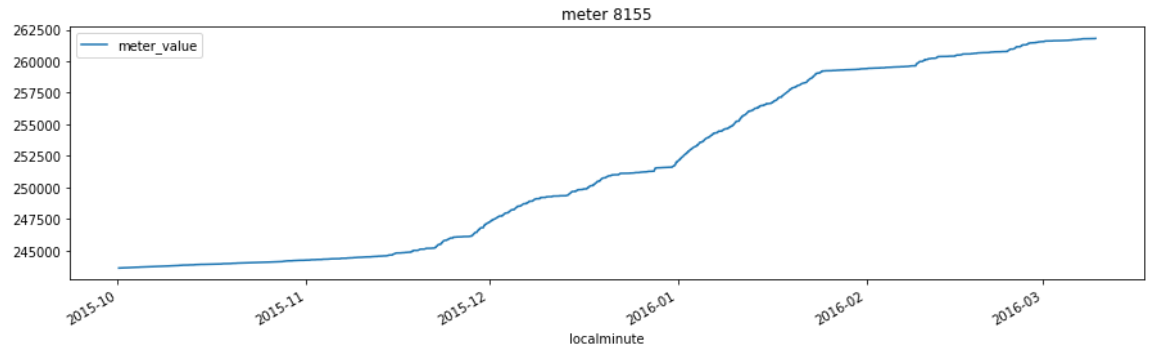
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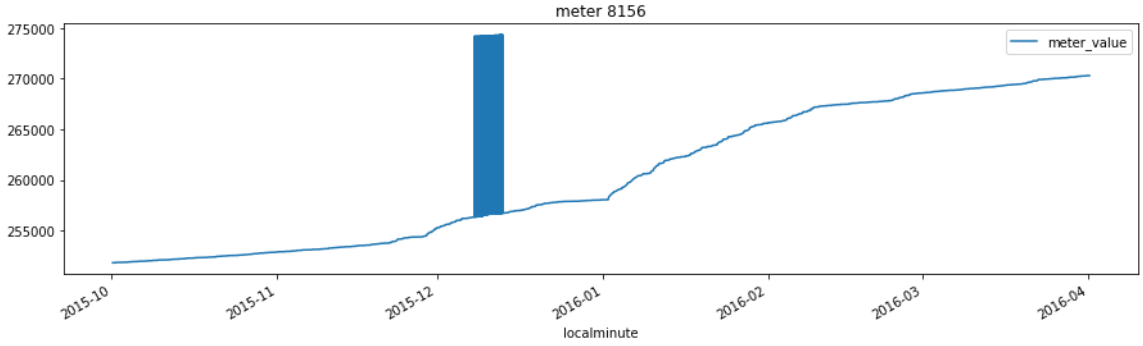
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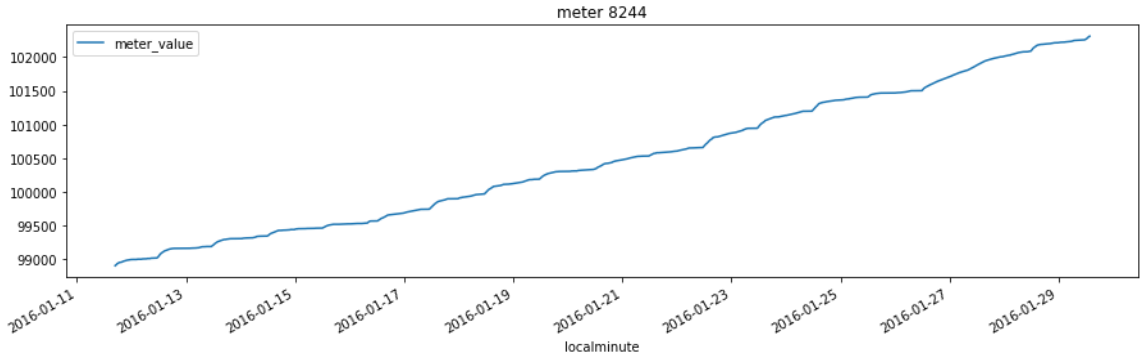
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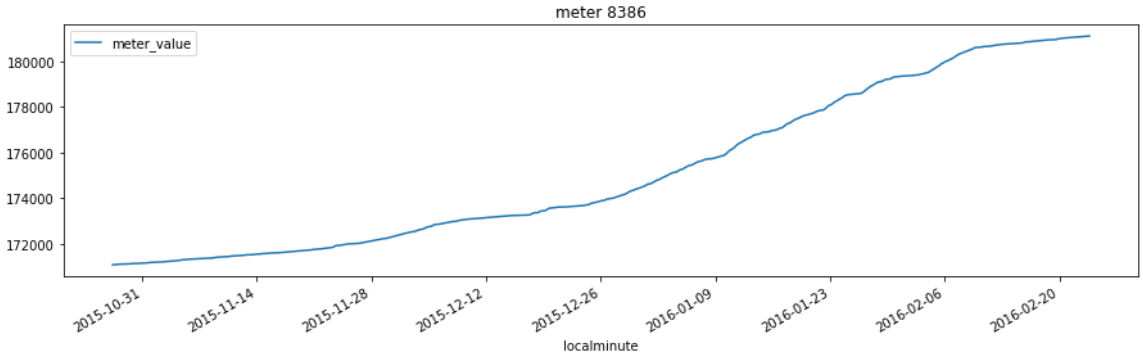
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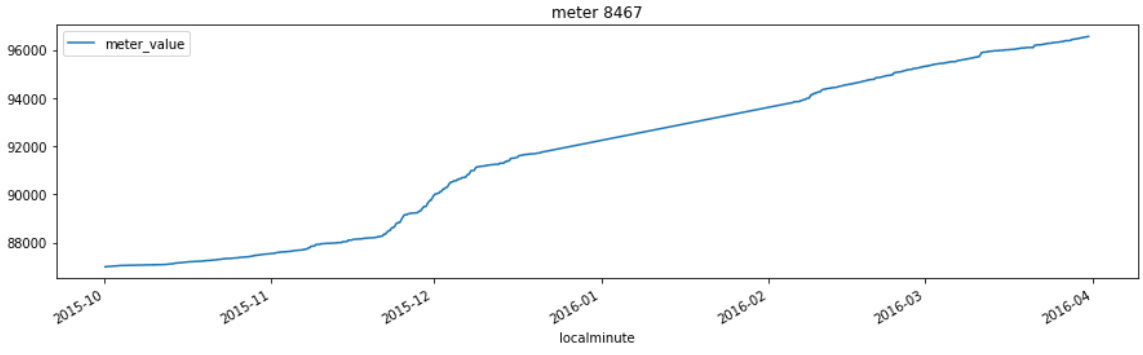
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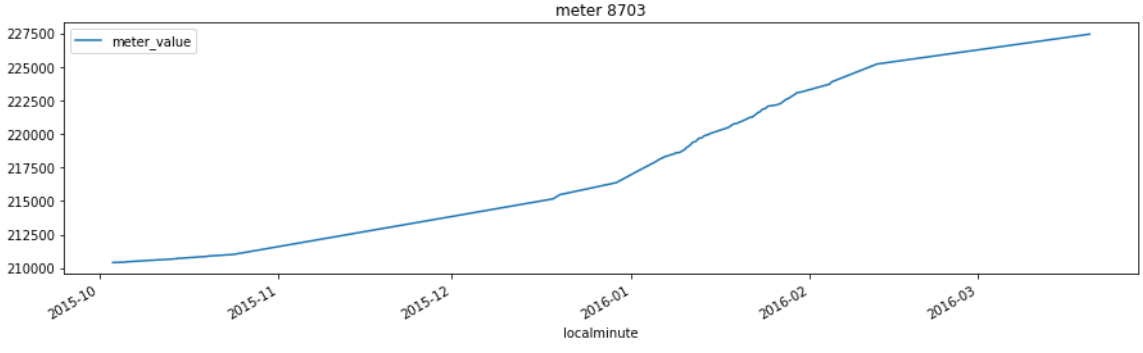
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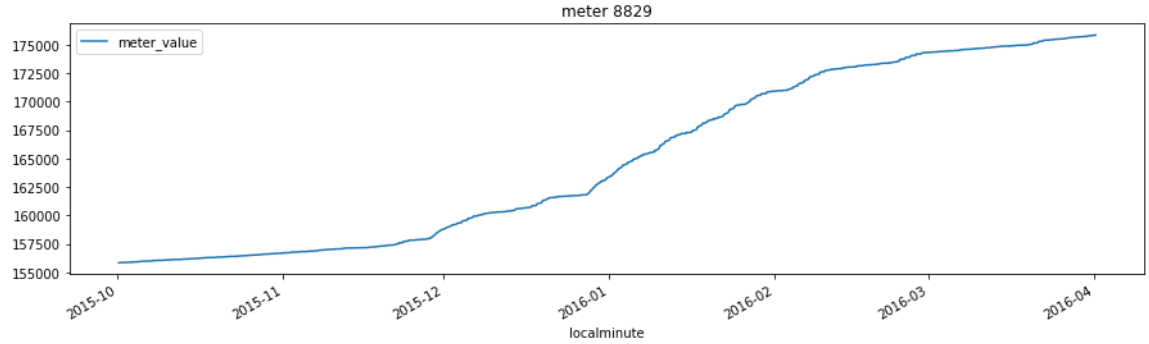
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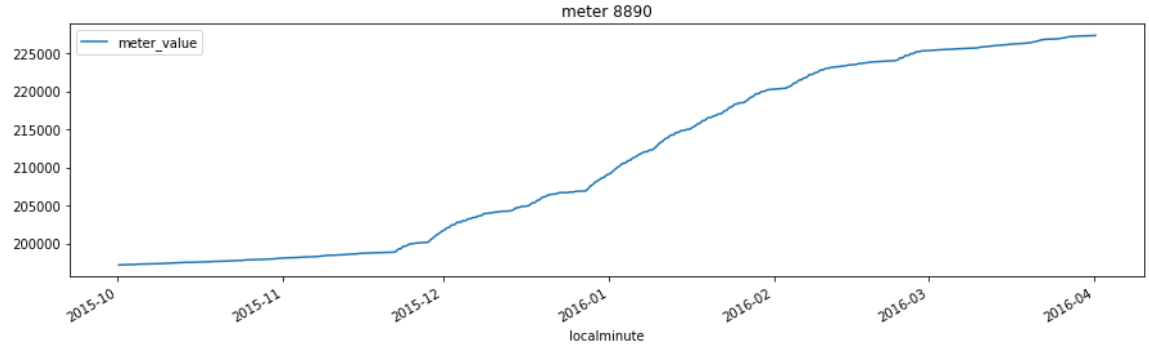
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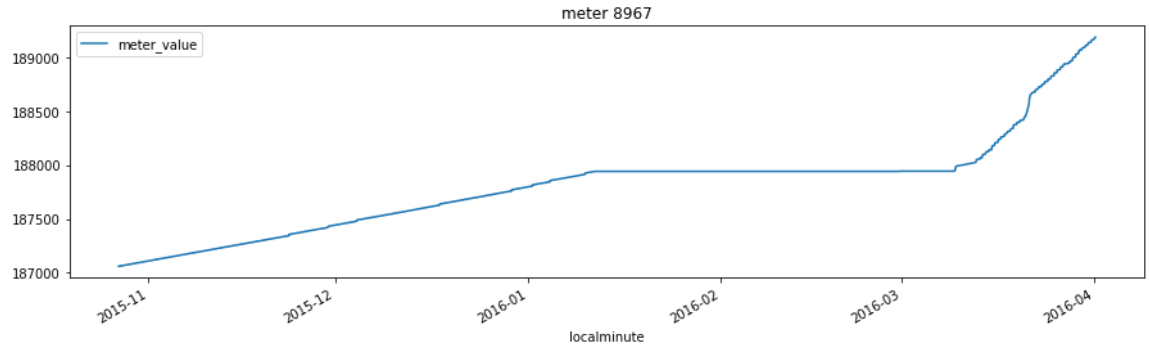
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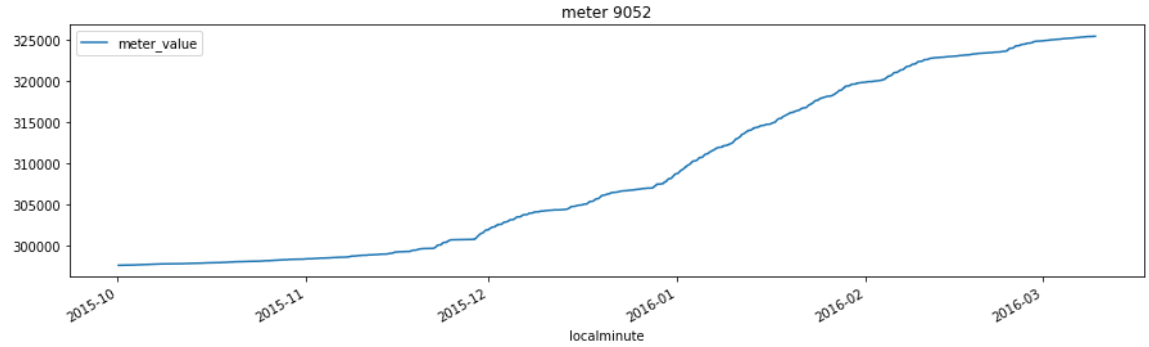
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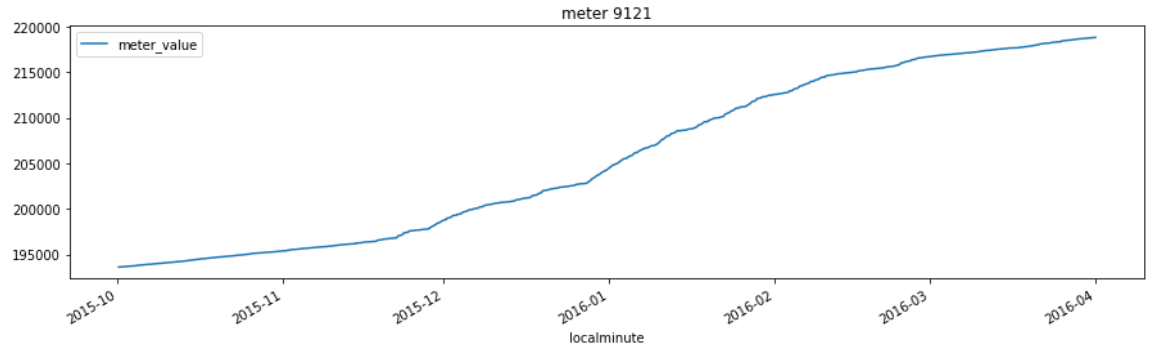
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2016-04
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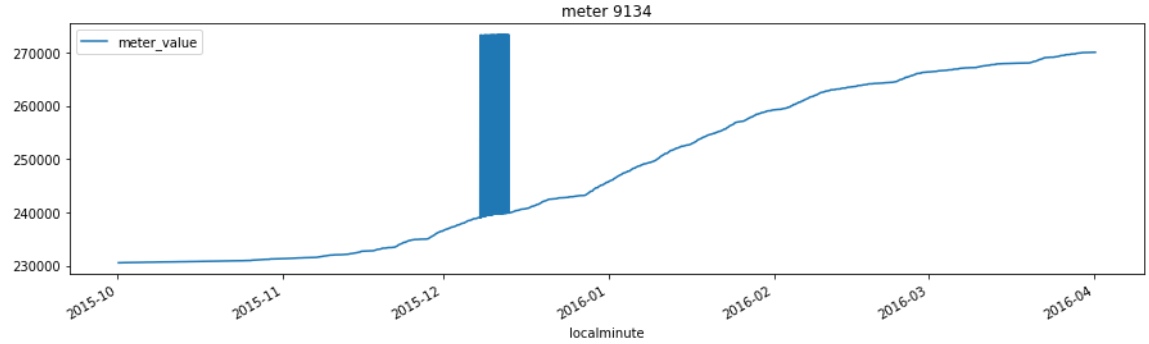
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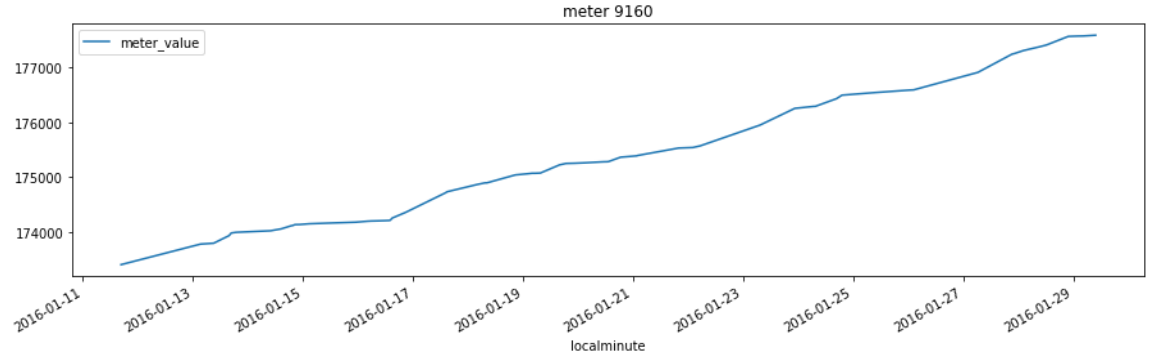
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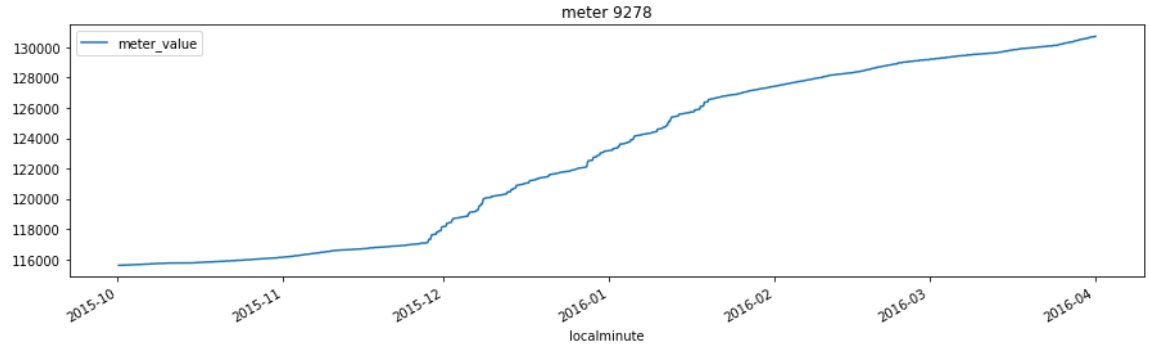
localminute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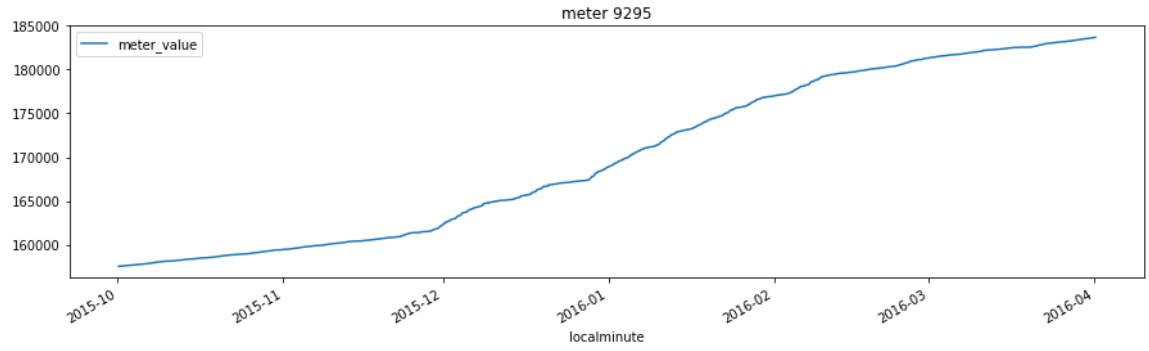
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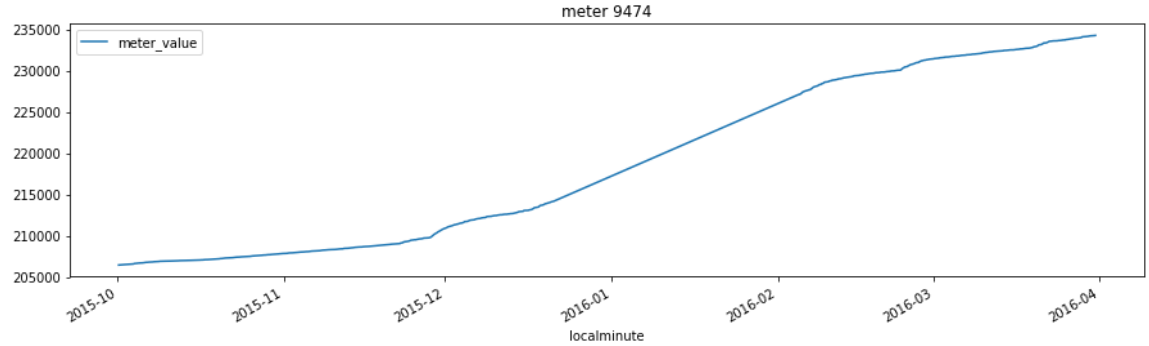
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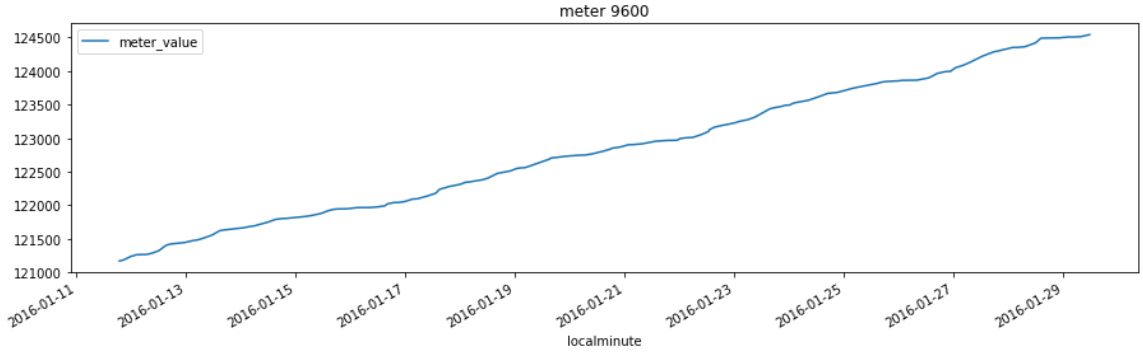
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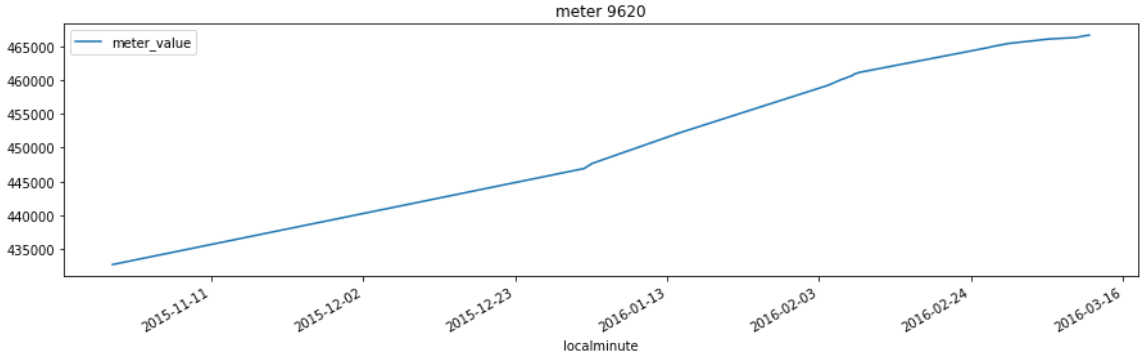
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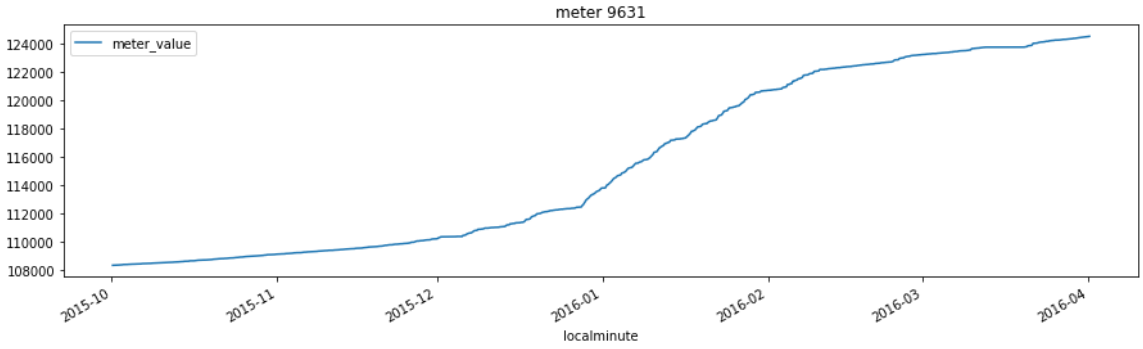
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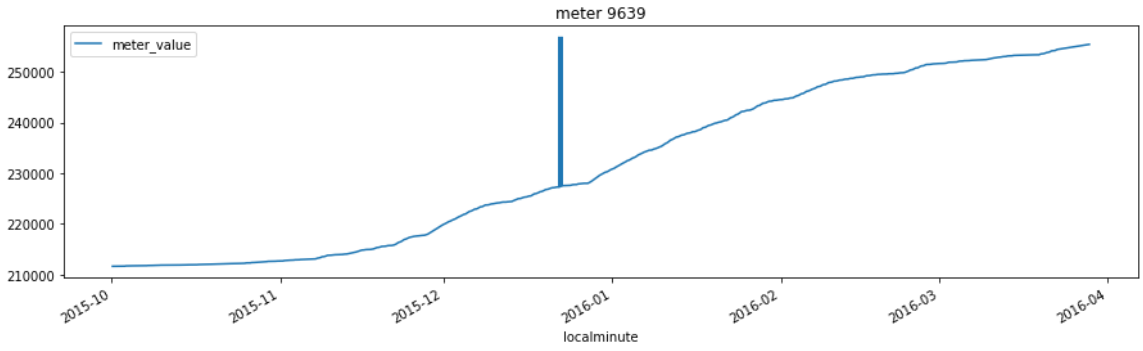
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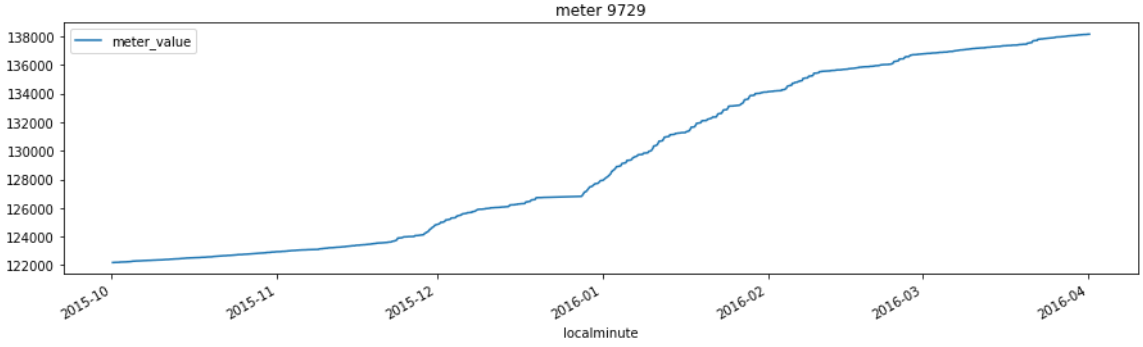
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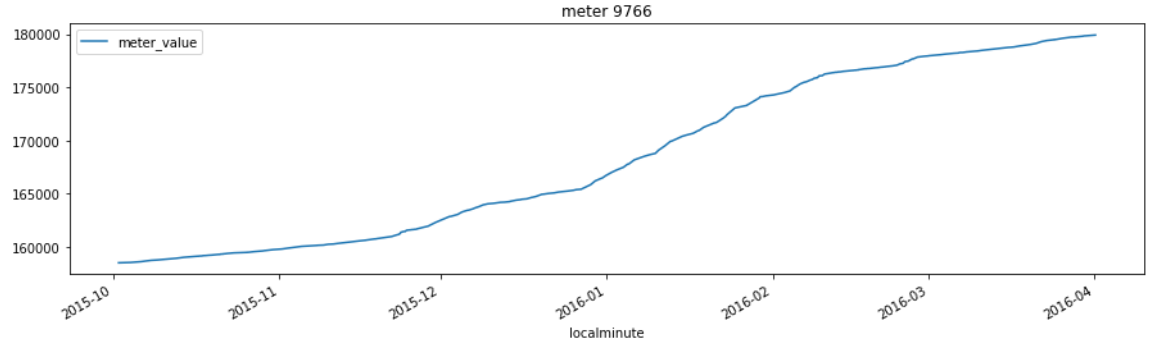
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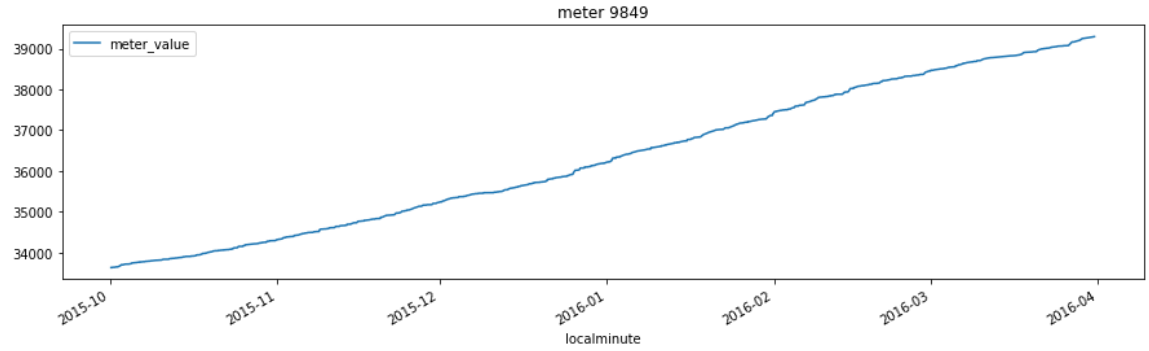
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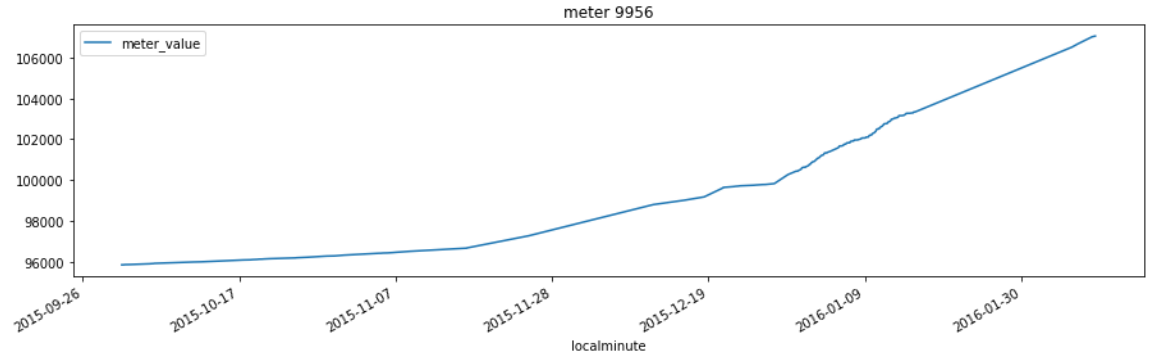
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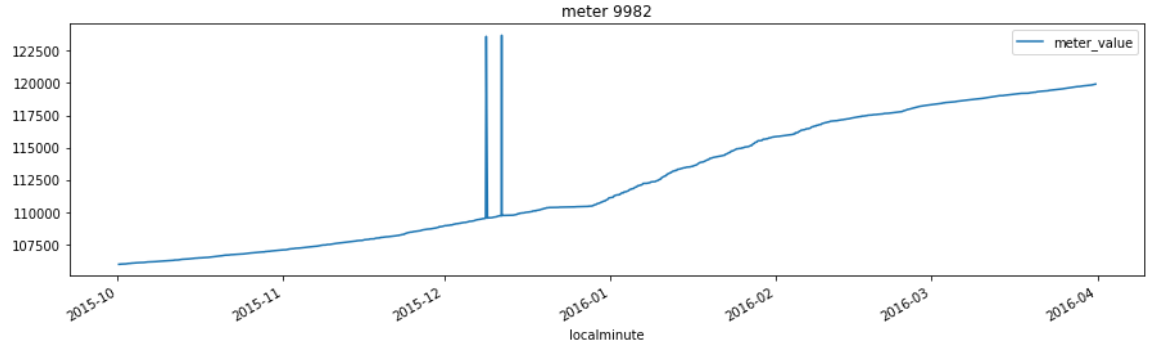
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localminute