In [ ]:

```
# from nilm_metadata import get_appliance_types
# appliance_types = get_appliance_types()
# print(appliance_types)

# import os
# os.getcwd()
```

Carregando bibliotecas...

In [1]:

```
!pip install seaborn

import seaborn as sns

from matplotlib import rcParams
import matplotlib.pyplot as plt
import pandas as pd
import nilmtk
from nilmtk import MeterGroup
from nilmtk.api import API
import warnings
warnings.filterwarnings("ignore")

plt.style.use('ggplot')
rcParams['figure.figsize'] = (13, 10)

# import pathlib
# pathlib.Path().resolve()
```

```
Requirement already satisfied: seaborn in ./miniconda3/envs/nilm_0.4.
3/lib/python3.7/site-packages (0.11.2)
Requirement already satisfied: matplotlib>=2.2 in ./miniconda3/envs/ni
lm_0.4.3/lib/python3.7/site-packages (from seaborn) (3.1.3)
Requirement already satisfied: pandas>=0.23 in ./miniconda3/envs/nilm_
0.4.3/lib/python3.7/site-packages (from seaborn) (0.25.3)
Requirement already satisfied: numpy>=1.15 in ./miniconda3/envs/nilm_
0.4.3/lib/python3.7/site-packages (from seaborn) (1.19.5)
Requirement already satisfied: scipy>=1.0 in ./miniconda3/envs/nilm_0.
4.3/lib/python3.7/site-packages (from seaborn) (1.7.1)
Requirement already satisfied: python-dateutil>=2.1 in ./miniconda3/en
vs/nilm_0.4.3/lib/python3.7/site-packages (from matplotlib>=2.2->seabo
rn) (2.8.2)
Requirement already satisfied: cycler>=0.10 in ./miniconda3/envs/nilm_
0.4.3/lib/python3.7/site-packages (from matplotlib>=2.2->seaborn) (0.1
0.0)
Requirement already satisfied: kiwisolver>=1.0.1 in ./miniconda3/envs/
nilm_0.4.3/lib/python3.7/site-packages (from matplotlib>=2.2->seaborn)
(1.3.2)
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.
1 in ./miniconda3/envs/nilm_0.4.3/lib/python3.7/site-packages (from ma
tplotlib>=2.2->seaborn) (2.4.7)
Requirement already satisfied: six in ./miniconda3/envs/nilm_0.4.3/li
b/python3.7/site-packages (from cycler>=0.10->matplotlib>=2.2->seabor
n) (1.16.0)
Requirement already satisfied: pytz>=2017.2 in ./miniconda3/envs/nilm_
0.4.3/lib/python3.7/site-packages (from pandas>=0.23->seaborn) (2021.
1)
```

Converter

In [ ]:

```
# from nilmtk.dataset_converters import convert_hb
# convert_hb('./BD/CASA/convert', './data/teste17.h5')
```

In [ ]:

```
# st = pd.HDFStore("./data/teste17.h5")
# print (st.keys())

# print (st['/building1/elec/meter1'].head())
# print (st['/building1/elec/meter2'].head())
# print (st['/building1/elec/meter3'].head())

# st.close()
```

Carregando dataset

In [2]:

```
from nilmtk.api import API
import warnings
warnings.filterwarnings("ignore")

from nilmtk import DataSet
from nilmtk.utils import print_dict

hb = DataSet('teste17.h5')
#iawe = DataSet('/data/iawe.h5')

print_dict(hb.metadata)
print_dict(hb.buildings)
```

- **name**: HB
- **long_name**: The Reference Energy Disaggregation Data set
- **creators**:
  - Henrique
- **publication_date**: 2021
- **institution**: IFCE
- **contact**: henrique@ufc.br
- **description**: Several weeks of power data for 6 different homes.
- **subject**: Disaggregated power demand from domestic buildings.
- **number_of_buildings**: 1
- **timezone**: America/Fortaleza
- **geo_location**:
  - **locality**: Fortaleza
  - **country**: BR
  - **latitude**: -3.743443904897663
  - **longitude**: -38.526093995496886
- **related_documents**:
  - http://redd.csail.mit.edu (http://redd.csail.mit.edu)
  - J. Zico Kolter and Matthew J. Johnson. REDD: A public data set for energy disaggregation research. In proceedings of the SustKDD workshop on Data Mining Applications in Sustainability, 2011. http://redd.csail.mit.edu/kolter-kddsust11.pdf (http://redd.csail.mit.edu/kolter-kddsust11.pdf)
- **schema**: https://github.com/nilmtk/nilm_metadata/tree/v0.2 (https://github.com/nilmtk/nilm_metadata/tree/v0.2)
- **meter_devices**:
  - **eMonitor**:
    - **model**: sonoff
    - **manufacturer**: Powerhouse Dynamics
    - **manufacturer_url**: http://powerhousedynamics.com (http://powerhousedynamics.com)
    - **description**: ...
    - **sample_period**: 5
    - **max_sample_period**: 30
    - **measurements**:
      - {'physical_quantity': 'power', 'type': 'active', 'upper_limit': 1142, 'lower_limit': 0}
      - {'physical_quantity': 'power', 'type': 'apparent', 'upper_limit': 1215, 'lower_limit': 0}

- {'physical_quantity': 'power', 'type': 'reactive', 'upper_limit': 901, 'lower_limit': 0}
- {'physical_quantity': 'power factor', 'upper_limit': 1, 'lower_limit': 0}
- {'physical_quantity': 'voltage', 'upper_limit': 232, 'lower_limit': 0}
- {'physical_quantity': 'current', 'upper_limit': 6, 'lower_limit': 0}
- **wireless**: True
- **REDD_whole_house**:
  - **model**: pzem004t
  - **description**: ...
  - **sample_period**: 0.5
  - **max_sample_period**: 30
  - **measurements**:
    - {'physical_quantity': 'voltage', 'upper_limit': 230, 'lower_limit': 0}
    - {'physical_quantity': 'current', 'upper_limit': 15, 'lower_limit': 0}
    - {'physical_quantity': 'power', 'type': 'active', 'upper_limit': 3016, 'lower_limit': 0}
    - {'physical_quantity': 'frequency', 'upper_limit': 61, 'lower_limit': 0}
    - {'physical_quantity': 'power factor', 'upper_limit': 1, 'lower_limit': 0}
  - **wireless**: False

- **1**: Building(instance=1, dataset='HB')

Gráfico Geral

In [3]:

```
build = 1
elec = hb.buildings[build].elec
elec.mains().power_series_all_data().head()
```

Out[3]:

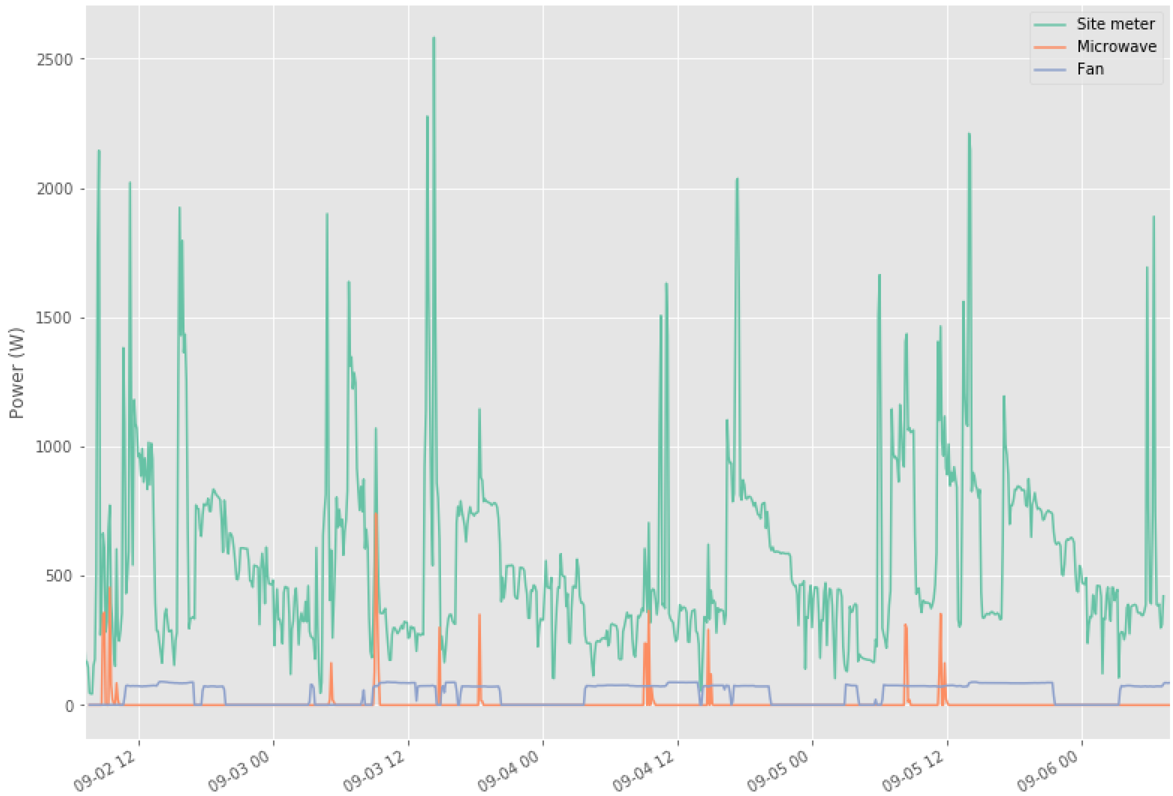
```
2021-09-02 07:14:34.515000-03:00    167.199997
2021-09-02 07:14:35.014000-03:00    167.199997
2021-09-02 07:14:35.513000-03:00    167.199997
2021-09-02 07:14:36.013000-03:00    167.199997
2021-09-02 07:14:36.527000-03:00    166.899994
Name: (power, active), dtype: float32
```

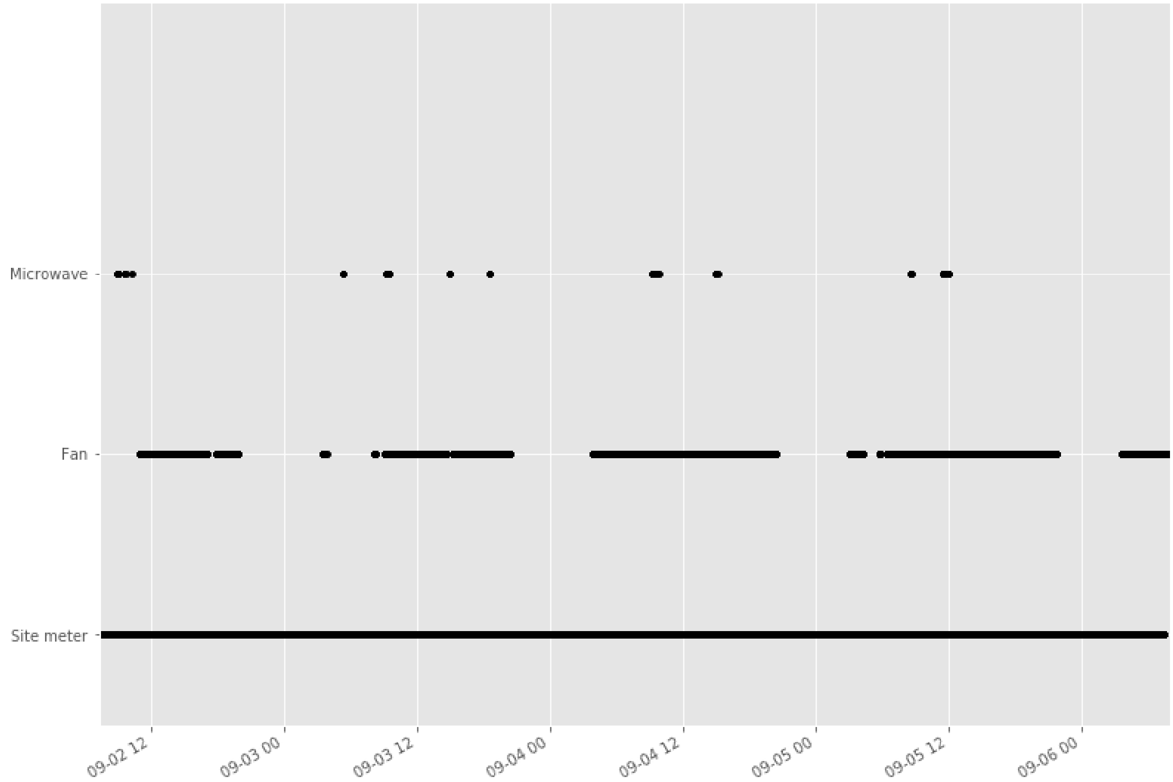
In [4]:

```
sns.set_palette("Set2", n_colors=5)
elec.mains().plot()
elec['microwave'].plot()
elec['fan'].plot()

# Set a threshold to remove residual power noise when devices are off
elec.plot_when_on(on_power_threshold = 40) # Plot appliances when they are in use¶

# elec.draw_wiring_graph()
```

Out[4]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f69815660d0>
```





Dados

Proporção de energia submedida

In [5]:

```
elec.proportion_of_energy_submetered()
```

```
Running MeterGroup.proportion_of_energy_submetered...
```

Out[5]:

```
0.09288249528613458
```

Total Energy

In [6]:

```
elec.mains().total_energy()
```

Out[6]:

```
active    53.946047
dtype: float64
```

Energy per submeter

In [7]:

```
energy_per_meter = elec.submeters().energy_per_meter() # kWh, again
energy_per_meter
```

```
2/2 ElecMeter(instance=3, building=1, dataset='HB', appliances=[Applia
nce(type='microwave', instance=1)])
```

Out[7]:

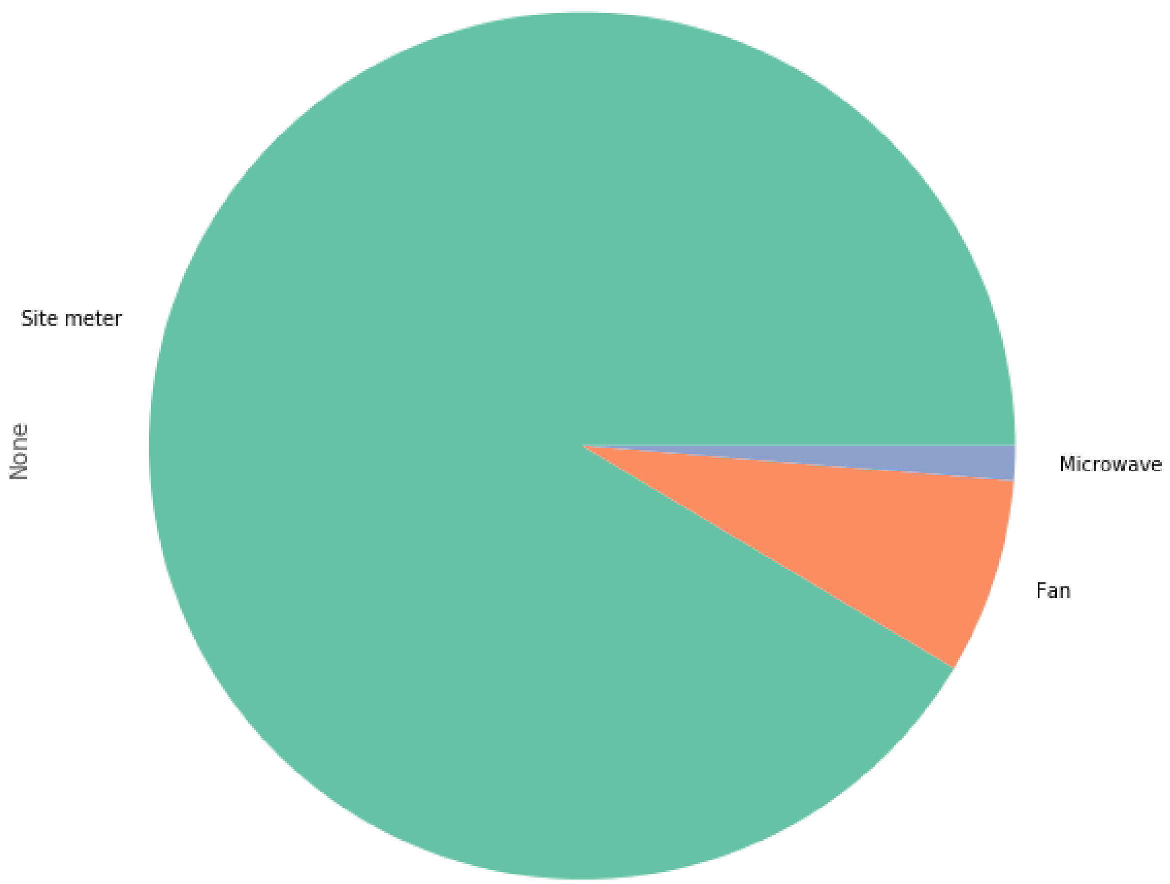
	(2, 1, HB)	(3, 1, HB)
active	4.298278	0.757815
apparent	NaN	NaN
reactive	NaN	NaN

Plot fraction of energy consumption of each appliance

In [8]:

```
# fraction = elec.submeters().fraction_per_meter().dropna()
fraction = elec.fraction_per_meter().dropna()
# Create convenient labels
labels = elec.get_labels(fraction.index)
plt.figure(figsize=(10,30))
fraction.plot(kind='pie', labels=labels);
```

```
3/3 ElecMeter(instance=3, building=1, dataset='HB', appliances=[Applia
nce(type='microwave', instance=1)])
```



Quadro Geral

In [9]:

```
print(elec)
elec.mains()
```

```
MeterGroup(meters=
  ElecMeter(instance=1, building=1, dataset='HB', site_meter, applianc
es=[])
  ElecMeter(instance=2, building=1, dataset='HB', appliances=[Applianc
e(type='fan', instance=1)])
  ElecMeter(instance=3, building=1, dataset='HB', appliances=[Applianc
e(type='microwave', instance=1)])
)
```

Out[9]:

```
ElecMeter(instance=1, building=1, dataset='HB', site_meter, appliances
=[])
```

In [10]:

```
from nilmtk.elecmeter import ElecMeterID##### Quadro Geral

meter1 = elec[ElecMeterID(instance=1, building=build, dataset='HB')]

next(meter1.load()).head()
```

Out[10]:

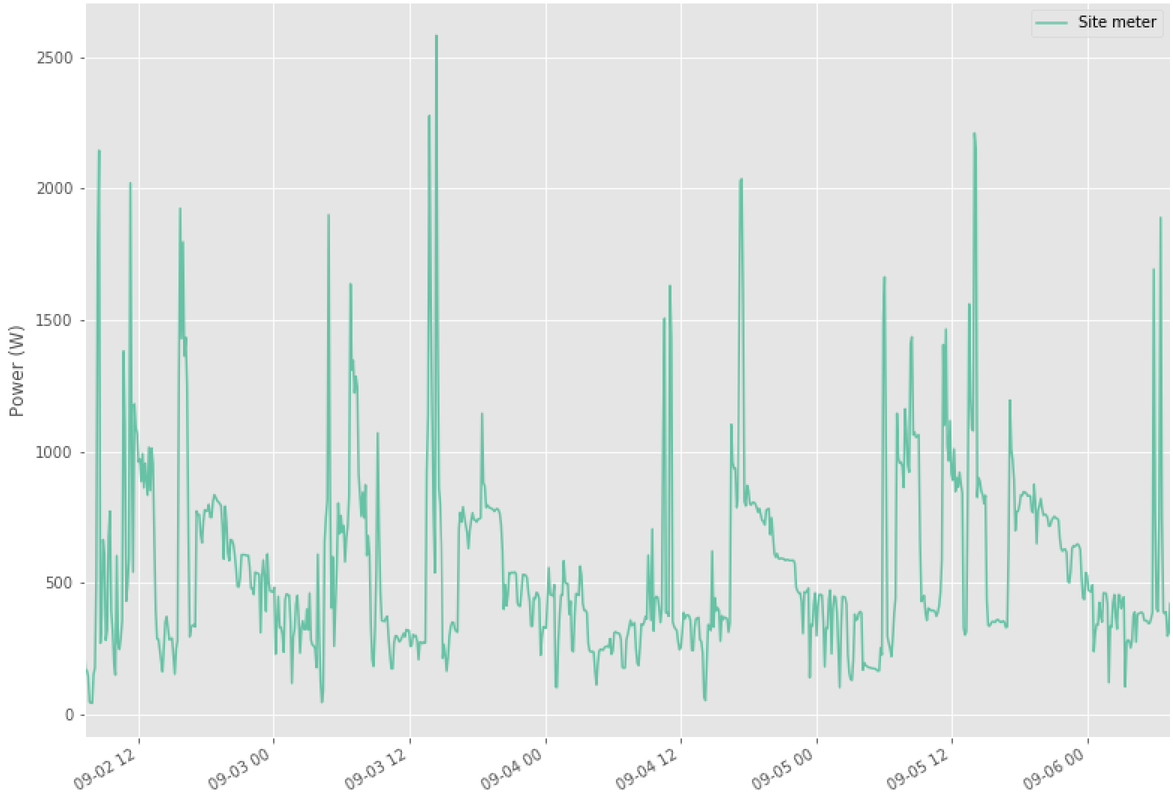
physical_quantity	voltage	power factor	frequency	current	power
type					active
2021-09-02 07:14:34.515000-03:00	221.600006	0.84	60.0	0.896	167.199997
2021-09-02 07:14:35.014000-03:00	221.600006	0.84	60.0	0.896	167.199997
2021-09-02 07:14:35.513000-03:00	221.600006	0.84	60.0	0.896	167.199997
2021-09-02 07:14:36.013000-03:00	221.600006	0.84	60.0	0.896	167.199997
2021-09-02 07:14:36.527000-03:00	221.500000	0.85	60.0	0.890	166.899994

In [11]:

```
meter1.plot()
```

Out[11]:

<matplotlib.axes._subplots.AxesSubplot at 0x7f697d390650>



A taxa de abandono é um número entre 0 e 1 que especifica a proporção de amostras ausentes. Uma taxa de abandono de 0 significa que nenhuma amostra está faltando. Um valor de 1 significaria que todas as amostras estão faltando

In [12]:

```
meter1.dropout_rate()
```

Out[12]:

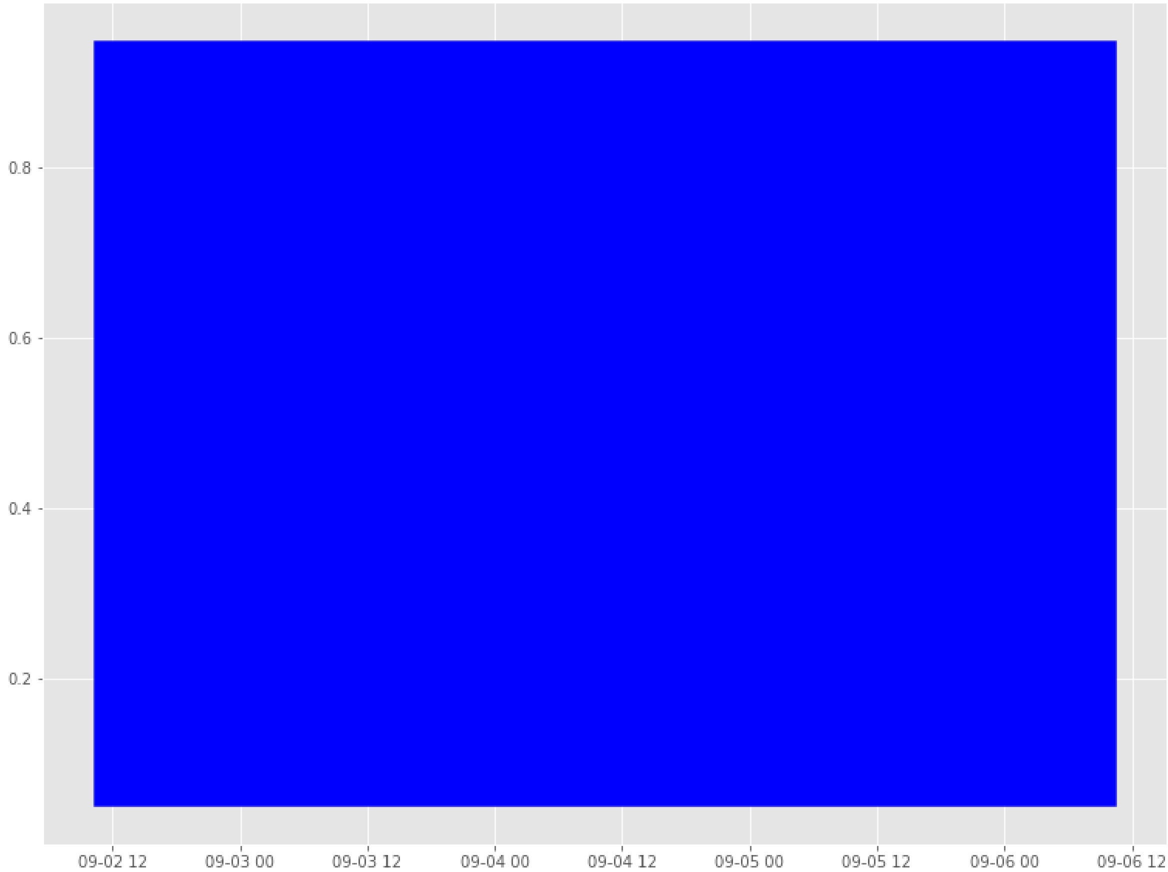
0.0002946431279545747

In [13]:

```
good_sections = meter1.good_sections(full_results=True)
good_sections.plot()
```

Out[13]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f697fd5d150>
```



In [14]:

```
good_sections.combined()
```

Out[14]:

```
[TimeFrame(start='2021-09-02 07:14:34.515000-03:00', end='2021-09-06 0
7:24:15.557000-03:00', empty=False)]
```

Microondas

In [15]:

```
microwave= elec['microwave']
#microwave.available_columns()
next(microwave.load()).head()
```

Out[15]:

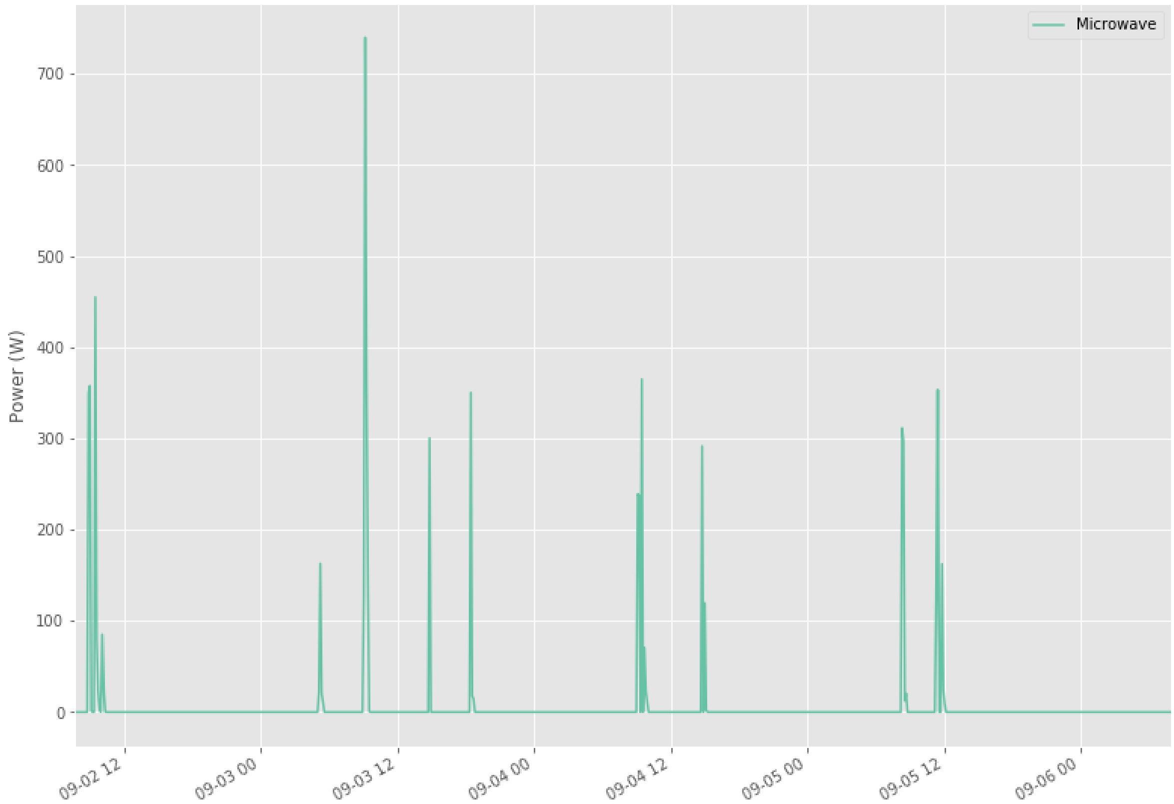
physical_quantity	voltage	power factor	power	current	power	
type			reactive		apparent	active
2021-09-02 07:47:51-03:00	221.882004	0.0	0.0	0.0	0.0	0.0
2021-09-02 07:47:56-03:00	221.882004	0.0	0.0	0.0	0.0	0.0
2021-09-02 07:48:01-03:00	222.406006	0.0	0.0	0.0	0.0	0.0
2021-09-02 07:48:06-03:00	222.143997	0.0	0.0	0.0	0.0	0.0
2021-09-02 07:48:11-03:00	221.621994	0.0	0.0	0.0	0.0	0.0

In [16]:

```
microwave.plot()
```

Out[16]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f697d2cd950>
```



A taxa de abandono é um número entre 0 e 1 que especifica a proporção de amostras ausentes. Uma taxa de abandono de 0 significa que nenhuma amostra está faltando. Um valor de 1 significaria que todas as amostras estão faltando

In [17]:

```
microwave.dropout_rate()
```

Out[17]:

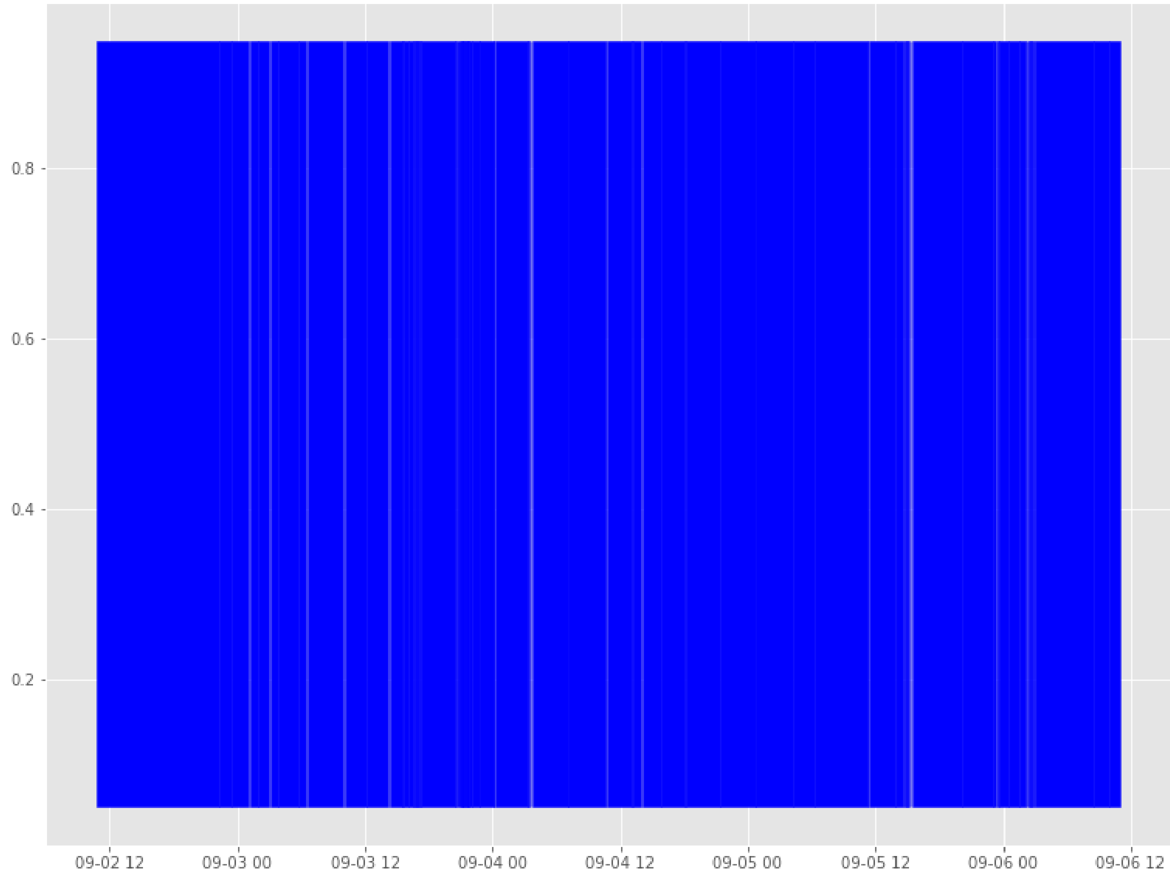
0.001913041828182637

In [18]:

```
good_sections = microwave.good_sections(full_results=True)
good_sections.plot()
```

Out[18]:

<matplotlib.axes._subplots.AxesSubplot at 0x7f6986b355d0>



In [19]:

```
good_sections.combined()
```

Out[19]:

```
[TimeFrame(start='2021-09-02 07:47:51-03:00', end='2021-09-02 19:17:21
-03:00', empty=False),
 TimeFrame(start='2021-09-02 19:20:01-03:00', end='2021-09-02 20:25:21
-03:00', empty=False),
 TimeFrame(start='2021-09-02 20:26:06-03:00', end='2021-09-02 22:07:21
-03:00', empty=False),
 TimeFrame(start='2021-09-02 22:07:56-03:00', end='2021-09-02 22:59:11
-03:00', empty=False),
 TimeFrame(start='2021-09-02 23:00:03-03:00', end='2021-09-03 00:01:28
-03:00', empty=False),
 TimeFrame(start='2021-09-03 00:05:58-03:00', end='2021-09-03 00:51:43
-03:00', empty=False),
 TimeFrame(start='2021-09-03 00:53:23-03:00', end='2021-09-03 02:39:33
-03:00', empty=False),
 TimeFrame(start='2021-09-03 02:40:18-03:00', end='2021-09-03 03:30:48
-03:00', empty=False),
 TimeFrame(start='2021-09-03 03:33:08-03:00', end='2021-09-03 07:00:39
-03:00', empty=False),
 TimeFrame(start='2021-09-03 07:02:10-03:00', end='2021-09-03 09:10:29
-03:00', empty=False),
 TimeFrame(start='2021-09-03 09:11:09-03:00', end='2021-09-03 11:13:15
-03:00', empty=False),
 TimeFrame(start='2021-09-03 11:15:39-03:00', end='2021-09-03 12:31:03
-03:00', empty=False),
 TimeFrame(start='2021-09-03 12:31:49-03:00', end='2021-09-03 12:32:03
-03:00', empty=False),
 TimeFrame(start='2021-09-03 12:32:49-03:00', end='2021-09-03 12:39:04
-03:00', empty=False),
 TimeFrame(start='2021-09-03 12:40:29-03:00', end='2021-09-03 13:05:33
-03:00', empty=False),
 TimeFrame(start='2021-09-03 13:06:09-03:00', end='2021-09-03 13:28:08
-03:00', empty=False),
 TimeFrame(start='2021-09-03 13:28:53-03:00', end='2021-09-03 13:40:23
-03:00', empty=False),
 TimeFrame(start='2021-09-03 13:40:58-03:00', end='2021-09-03 13:49:08
-03:00', empty=False),
 TimeFrame(start='2021-09-03 13:50:28-03:00', end='2021-09-03 13:50:38
-03:00', empty=False),
 TimeFrame(start='2021-09-03 13:51:29-03:00', end='2021-09-03 13:55:33
-03:00', empty=False),
 TimeFrame(start='2021-09-03 13:56:54-03:00', end='2021-09-03 14:00:33
-03:00', empty=False),
 TimeFrame(start='2021-09-03 14:01:13-03:00', end='2021-09-03 14:05:53
-03:00', empty=False),
 TimeFrame(start='2021-09-03 14:07:48-03:00', end='2021-09-03 14:13:28
-03:00', empty=False),
 TimeFrame(start='2021-09-03 14:15:29-03:00', end='2021-09-03 17:29:05
-03:00', empty=False),
 TimeFrame(start='2021-09-03 17:30:14-03:00', end='2021-09-03 17:35:59
-03:00', empty=False),
 TimeFrame(start='2021-09-03 17:37:57-03:00', end='2021-09-03 17:39:02
-03:00', empty=False),
 TimeFrame(start='2021-09-03 17:40:12-03:00', end='2021-09-03 17:41:02
-03:00', empty=False),
 TimeFrame(start='2021-09-03 17:42:52-03:00', end='2021-09-03 17:43:02
```

```
-03:00', empty=False),
 TimeFrame(start='2021-09-03 17:44:12-03:00', end='2021-09-03 17:45:02
-03:00', empty=False),
 TimeFrame(start='2021-09-03 17:46:57-03:00', end='2021-09-03 17:47:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 17:49:02-03:00', end='2021-09-03 17:49:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 17:50:17-03:00', end='2021-09-03 17:51:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 17:52:17-03:00', end='2021-09-03 17:53:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 17:54:18-03:00', end='2021-09-03 17:55:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 17:55:47-03:00', end='2021-09-03 17:57:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 17:58:17-03:00', end='2021-09-03 17:59:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:00:17-03:00', end='2021-09-03 18:01:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:01:47-03:00', end='2021-09-03 18:03:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:03:47-03:00', end='2021-09-03 18:05:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:05:47-03:00', end='2021-09-03 18:06:52
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:08:22-03:00', end='2021-09-03 18:09:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:09:47-03:00', end='2021-09-03 18:10:12
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:10:52-03:00', end='2021-09-03 18:11:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:12:17-03:00', end='2021-09-03 18:13:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:14:17-03:00', end='2021-09-03 18:15:07
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 TimeFrame(start='2021-09-03 18:16:17-03:00', end='2021-09-03 18:17:08
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:18:17-03:00', end='2021-09-03 18:19:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:20:17-03:00', end='2021-09-03 18:21:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:22:17-03:00', end='2021-09-03 18:23:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:24:17-03:00', end='2021-09-03 18:25:07
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 TimeFrame(start='2021-09-03 18:26:17-03:00', end='2021-09-03 18:27:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:28:17-03:00', end='2021-09-03 18:29:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:30:17-03:00', end='2021-09-03 18:31:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:31:47-03:00', end='2021-09-03 18:33:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:33:47-03:00', end='2021-09-03 18:35:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:37:02-03:00', end='2021-09-03 18:37:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:37:47-03:00', end='2021-09-03 18:39:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:40:57-03:00', end='2021-09-03 18:44:08
-03:00', empty=False),
```

```
 TimeFrame(start='2021-09-03 18:44:48-03:00', end='2021-09-03 18:45:07
-03:00', empty=False),
 TimeFrame(start='2021-09-03 18:47:53-03:00', end='2021-09-03 19:05:41
-03:00', empty=False),
 TimeFrame(start='2021-09-03 19:06:21-03:00', end='2021-09-03 19:43:06
-03:00', empty=False),
 TimeFrame(start='2021-09-03 19:43:52-03:00', end='2021-09-03 19:47:36
-03:00', empty=False),
 TimeFrame(start='2021-09-03 19:48:41-03:00', end='2021-09-03 21:04:57
-03:00', empty=False),
 TimeFrame(start='2021-09-03 21:05:42-03:00', end='2021-09-03 21:07:08
-03:00', empty=False),
 TimeFrame(start='2021-09-03 21:07:47-03:00', end='2021-09-03 21:07:52
-03:00', empty=False),
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```
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```

Ventilador

In [20]:

```
fan = elec['fan']
#microwave.available_columns()
next(fan.load()).head()
```

Out[20]:

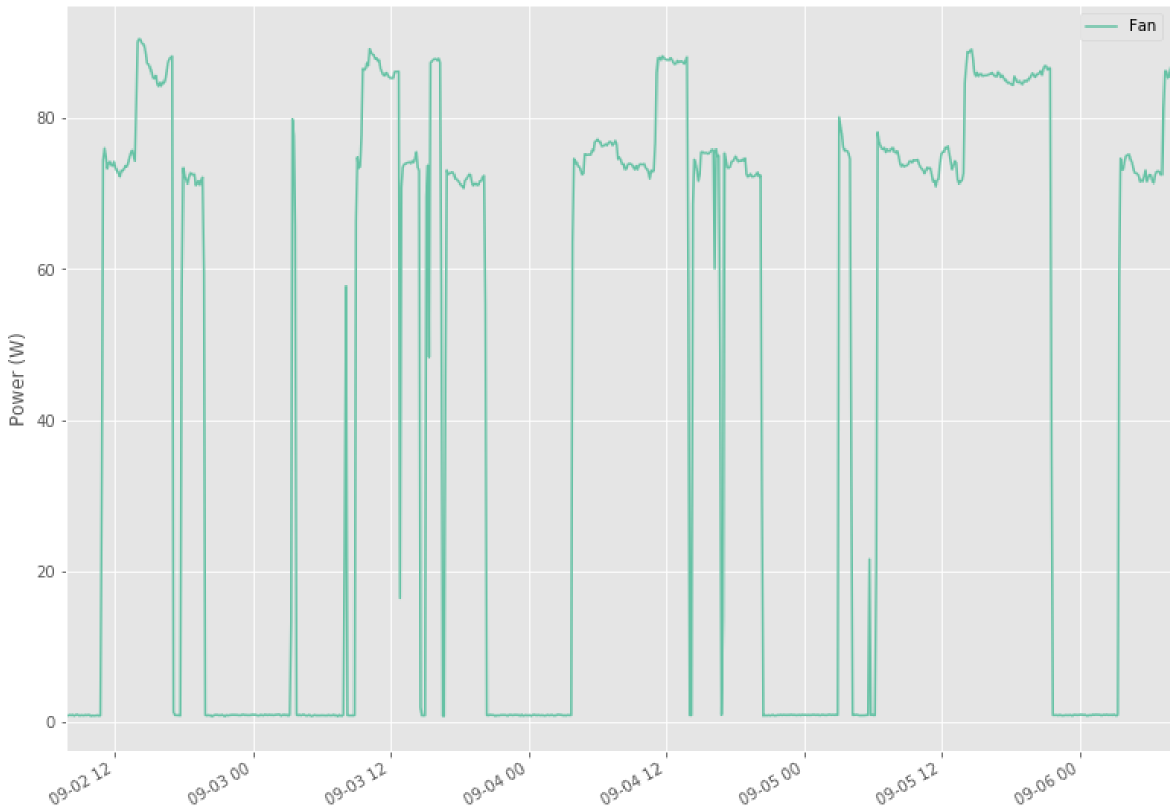
physical_quantity	voltage	power factor	power	current	power	
type			reactive		apparent	active
2021-09-02 07:47:51-03:00	222.287003	0.04	18.400000	0.083	18.454000	0.767
2021-09-02 07:47:56-03:00	222.546997	0.03	31.700001	0.143	31.761999	1.091
2021-09-02 07:48:01-03:00	222.028000	0.05	20.400000	0.092	20.479000	1.091
2021-09-02 07:48:06-03:00	222.287003	0.03	31.200001	0.140	31.187000	0.923
2021-09-02 07:48:11-03:00	221.770004	0.04	23.200001	0.105	23.195999	0.923

In [21]:

```
fan.plot()
```

Out[21]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f697d02b150>
```

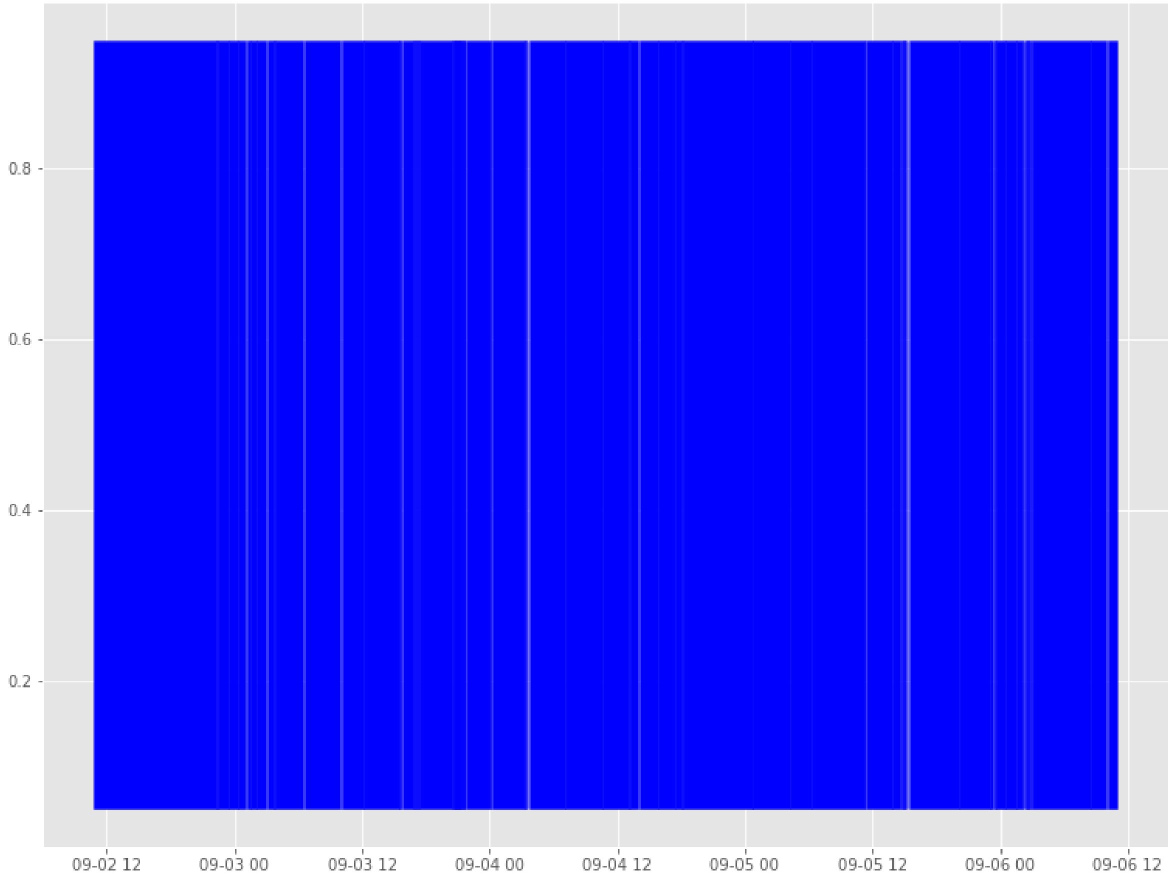


In [22]:

```
good_sections = fan.good_sections(full_results=True)
good_sections.plot()
```

Out[22]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f698158f7d0>
```



A taxa de abandono é um número entre 0 e 1 que especifica a proporção de amostras ausentes. Uma taxa de abandono de 0 significa que nenhuma amostra está faltando. Um valor de 1 significaria que todas as amostras estão faltando

In [23]:

```
fan.dropout_rate()
```

Out[23]:

```
0.002014694526278486
```

In [24]:

```
good_sections.combined()
```

Out[24]:

```
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```

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-03:00', empty=False)]
```

Autocorrelation Plot

In [25]:

```
# from pandas.plotting import autocorrelation_plot
# elec.mains().plot_autocorrelation();
```

Dataframe de correlação dos aparelhos

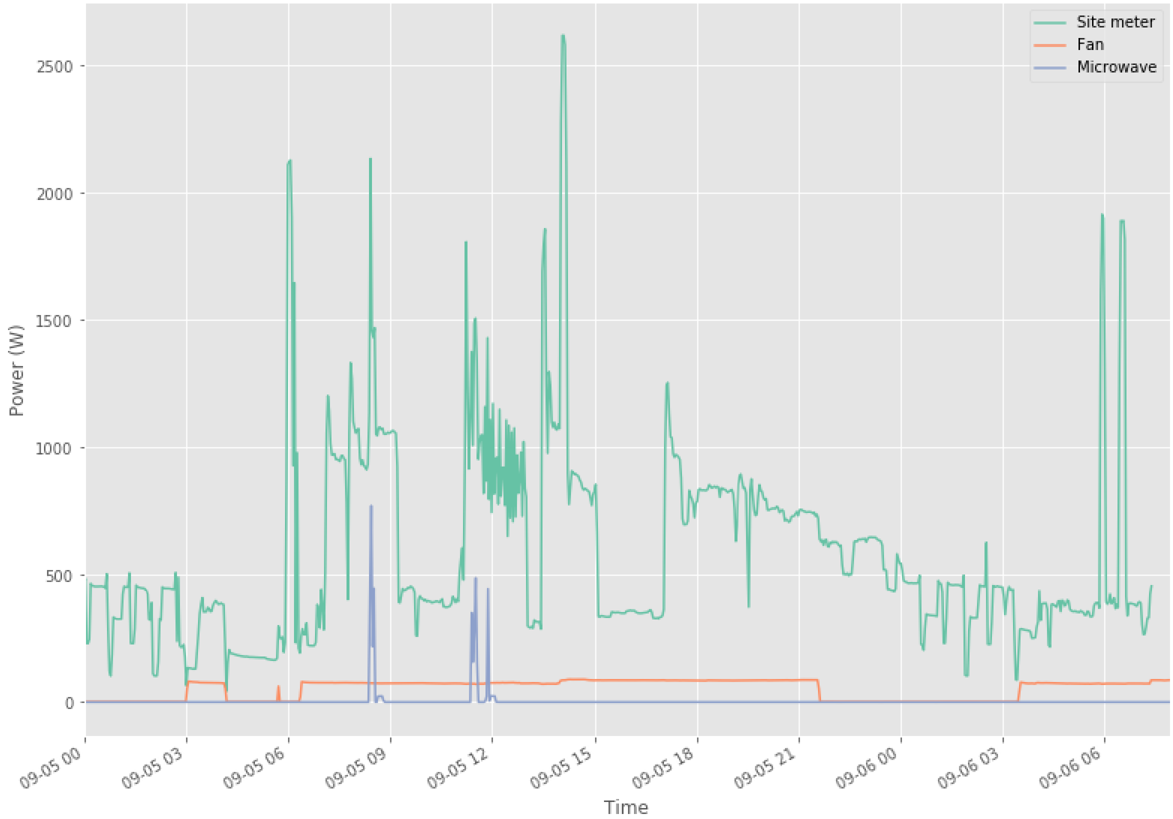
In [26]:

```
# correlation_df = elec.pairwise_correlation()
# correlation_df
```

Traçar dados submedidos em um 1 dia

In [27]:

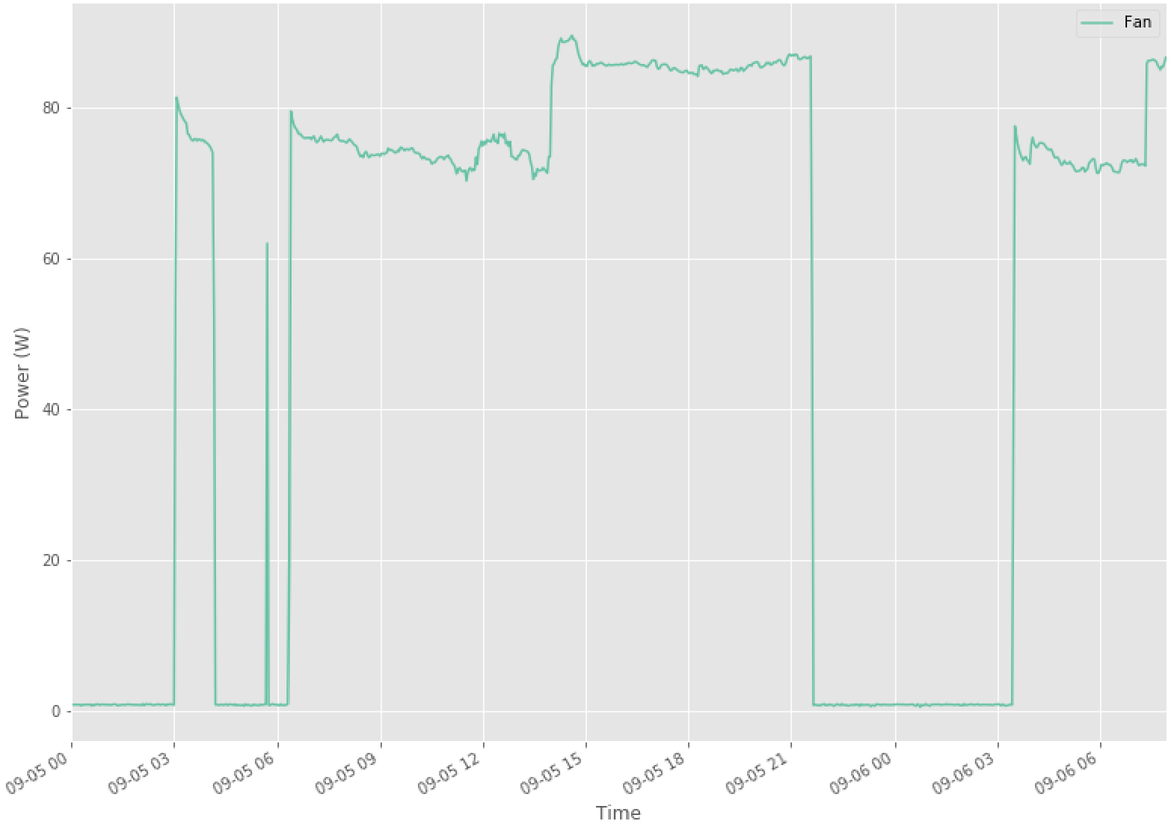
```
hb.set_window(start='2021-09-05', end='2021-09-07')
elec.plot();
plt.xlabel("Time");
```



In [28]:

```
# hb.set_window(start='2021-09-05 00:00:00', end='2021-09-06 23:59:59')
hb.set_window(start='2021-09-05', end='2021-09-07')

# elec['microwave'].plot()
elec['fan'].plot()
plt.xlabel("Time");
```



Importamos os algoritmos que desejamos executar os experimentos:

Mean: Mean Algorithm

Hart's Algorithm

CO: Combinatorial Optimization

Discriminative Sparse Coding

Additive Factorial Hidden Markov Model

Additive Factorial Hidden Markov Model with Signal Aggregate Constraints

DSC: Discriminative Sparse Coding

RNN: Long short-term memory - LSTM

DAE: Denoising Auto Encoder

Seq2Point*

Seq2Seq

WindowGRU/Online GRU: Similar a LSTM, mas usa Gated Recurrent Unit (GRU)

ELM

In [29]:

```
from nilmtk.disaggregate import Mean,CO,Hart85
# from nilmtk_contrib.disaggregate import AFHMM,AFHMM_SAC,DSC,RNN,Seq2Point,Seq2Seq
from nilmtk_contrib.disaggregate import RNN,Seq2Point,Seq2Seq,WindowGRU
```

```
Using TensorFlow backend.
```

Em seguida, inserimos os valores para os diferentes parâmetros no dicionário. Como precisamos de vários aparelhos, inserimos os nomes de todos os aparelhos necessários no parâmetro 'appliances'.

Métricas: [https://github.com/nilmtk/nilmtk/blob/master/nilmtk/losses.py (https://github.com/nilmtk/nilmtk/blob/master/nilmtk/losses.py)](https://github.com/nilmtk/nilmtk/blob/master/nilmtk/losses.py)

Error: [https://github.com/nilmtk/nilmtk-contrib/issues/56 (https://github.com/nilmtk/nilmtk-contrib/issues/56)](https://github.com/nilmtk/nilmtk-contrib/issues/56)

In [30]:

```
d = {
  'power': {
    'mains': ['active'],
    'appliance': ['active']
#     'mains': ['active', 'frequency', 'power factor', 'current', 'voltage'],
#     'appliance': ['active', 'apparent', 'reactive', 'power factor', 'current', 'v
  },
  'artificial_aggregate': True,
  'sample_rate': 5,
  'display_predictions': True,
  'appliances': ['microwave', 'fan'],
  'methods': {
      'Mean':Mean({}),
      #"CO":CO({}),
      #'Hart85':Hart85({}),
      'RNN':RNN({'n_epochs':50,'batch_size':1024}),
      'Seq2Point':Seq2Point({'n_epochs':50,'batch_size':1024}),
      #'Seq2Seq':Seq2Seq({'n_epochs':50,'batch_size':1024}),
      #'WindowGRU':WindowGRU({'n_epochs':30,'batch_size':1024})
  },
 'train': {
    'datasets': {
      'hb': {
        'path': 'teste17.h5',
        'buildings': {
              1: {
                'start_time': '2021-09-02',
                'end_time': '2021-09-04'
              },

        }
      },

    }
  },

  'test': {
    'datasets': {
      'hb': {
        'path': 'teste17.h5',
        'buildings': {
              1: {
                    'start_time': '2021-09-05',
                    'end_time': '2021-09-07'
          }
        }
      }
    },
    'metrics':['rmse', 'mae', 'relative_error', 'r2score', 'nde', 'nep', 'f1score']
  }
}
```

raiz do erro quadrático médio (RMSE) e o erro médio absoluto (MAE)

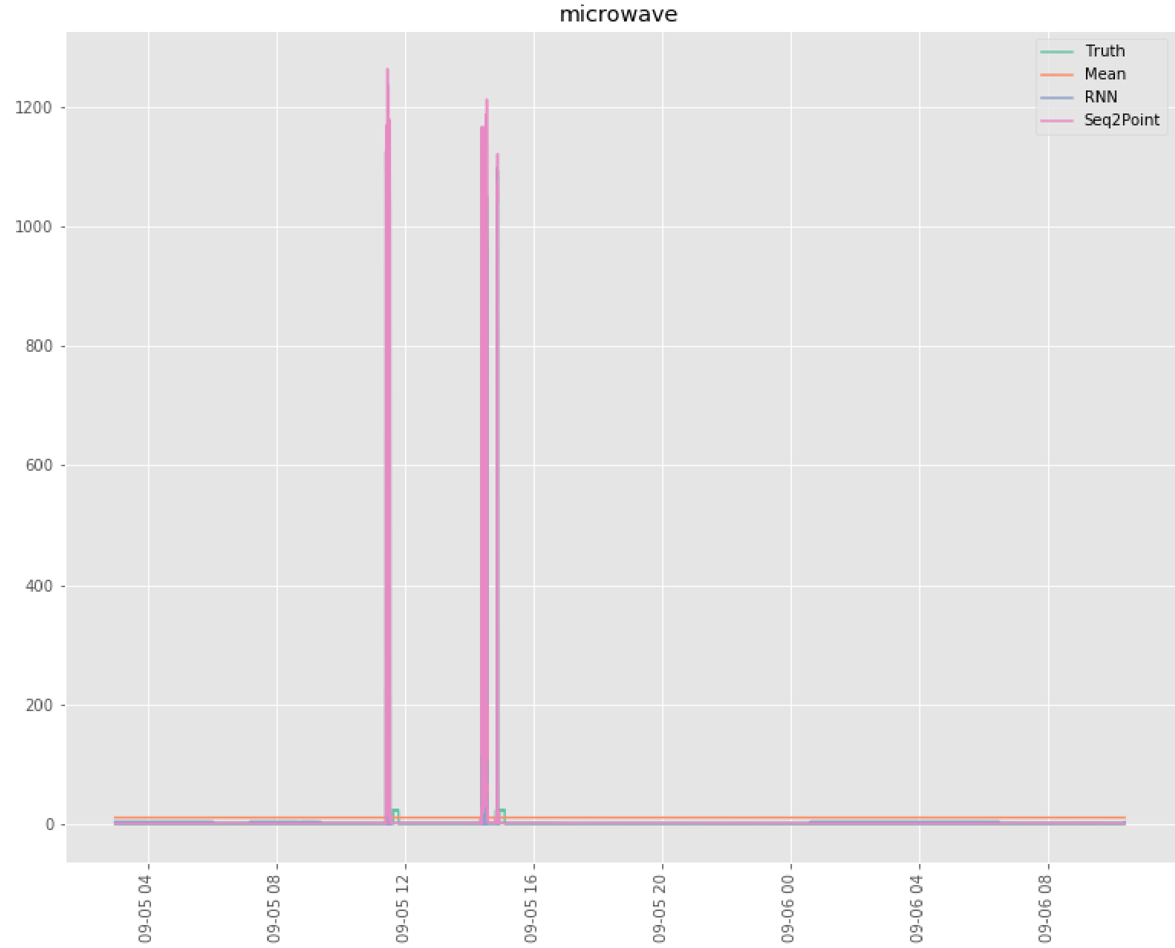
Quanto menor o seu valor, melhor é o modelo, já que a previsão se mostra mais próxima ao valor real. Comparando as duas métricas têm se que o RMSE penaliza desvios grandes, enquanto o MAE tem pesos iguais para todos os desvios.

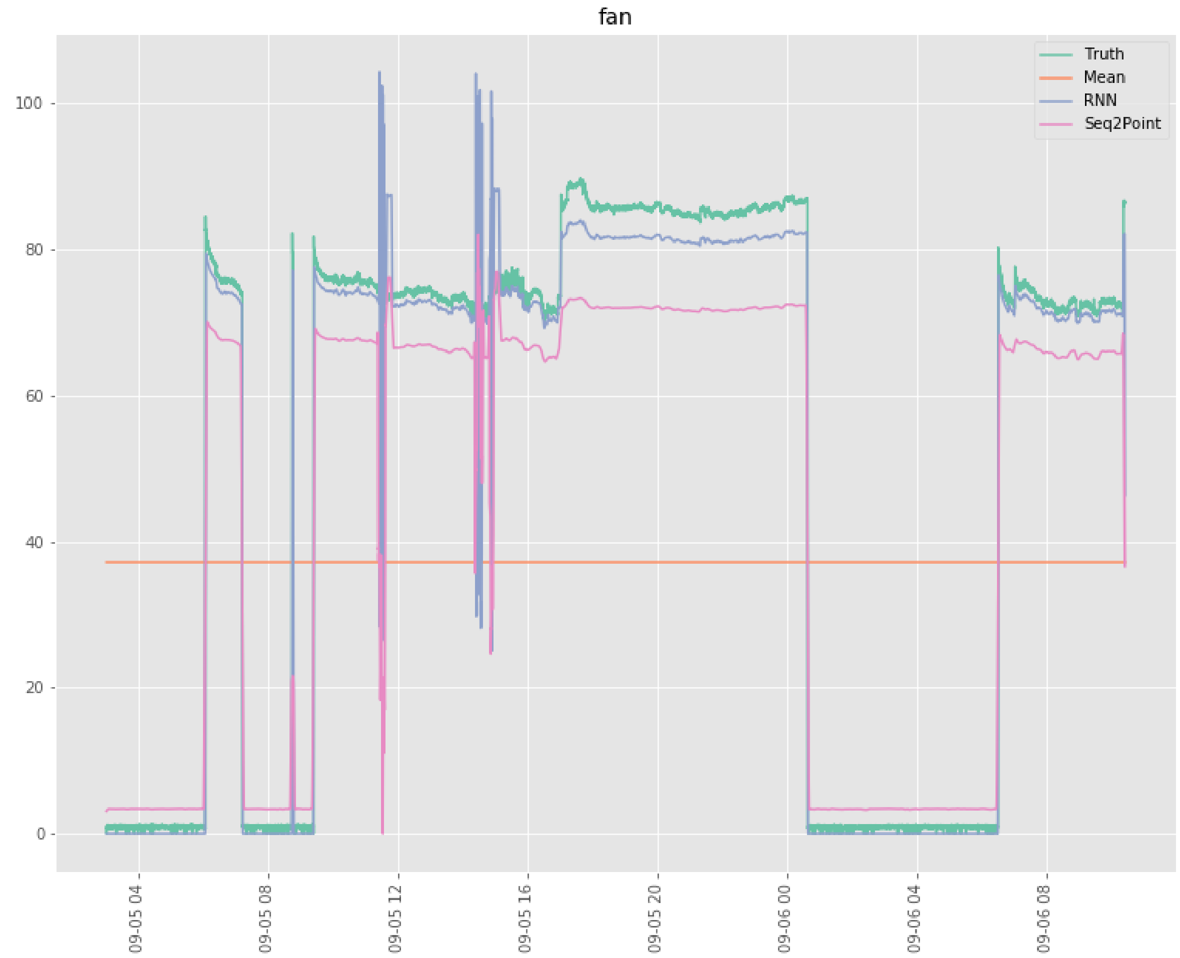
We can observe the prediction vs. truth graphs in the above cell. The accuracy metrics can be accessed using the following commands:

In [31]:

```
api_res = API(d)
```

```
Joint Testing for all algorithms
Loading data for  hb  dataset
Dropping missing values
Creating an Artificial Aggregate
Generating predictions for : Mean
Generating predictions for : RNN
Generating predictions for : Seq2Point
............  rmse  ..............
                Mean        RNN  Seq2Point
microwave  71.061497  18.567101  13.656823
fan        39.949631   4.458335  10.537032
............  mae  ..............
                Mean       RNN  Seq2Point
microwave  15.992266  4.190049   2.184784
fan        39.587982  2.445842   8.009280
............  relative_error  ..............
               Mean       RNN  Seq2Point
microwave  1.294125  0.891352   0.605286
fan        1.037269  0.337709   0.337533
............  r2score  ..............
               Mean       RNN  Seq2Point
microwave -0.007740  0.931203    0.96278
fan       -0.141613  0.985782    0.92058
............  nde  ..............
               Mean       RNN  Seq2Point
microwave  1.001237  0.261605   0.192421
fan        0.629842  0.070290   0.166126
............  nep  ..............
               Mean       RNN  Seq2Point
microwave  3.117446  0.816786   0.425890
fan        0.772661  0.047737   0.156322
............  f1score  ..............
               Mean       RNN  Seq2Point
microwave  0.041294  0.412646   0.590909
fan        0.786794  0.998885   0.993166
```


microwave
Truth
Mean
RNN
Seq2Point
1200
1000
800
600
400
200
0
09-05 04
09-05 08
09-05 12
09-05 16
09-05 20
09-06 00
09-06 04
09-06 08



In [ ]:

```
import numpy as np
import pandas as pd

vals = np.concatenate([np.expand_dims(df.values,axis=2) for df in api_res.errors],a


cols = api_res.errors[0].columns
indexes = api_res.errors[0].index


mean = np.mean(vals,axis=2)
std = np.std(vals,axis=2)
print ('\n\n')
print ("Mean")
print (pd.DataFrame(mean,index=indexes,columns=cols))
print ('\n\n')
print ("Standard Deviation")
print (pd.DataFrame(std,index=indexes,columns=cols))
```

In [ ]:

```

```