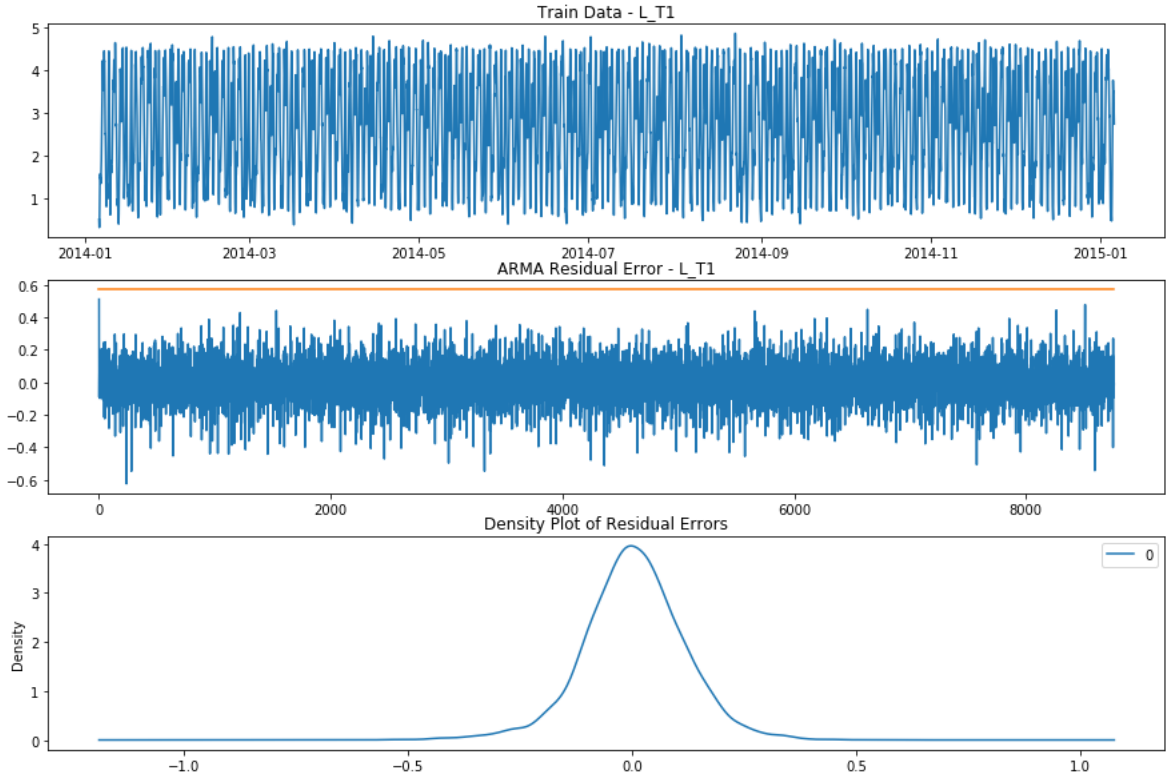
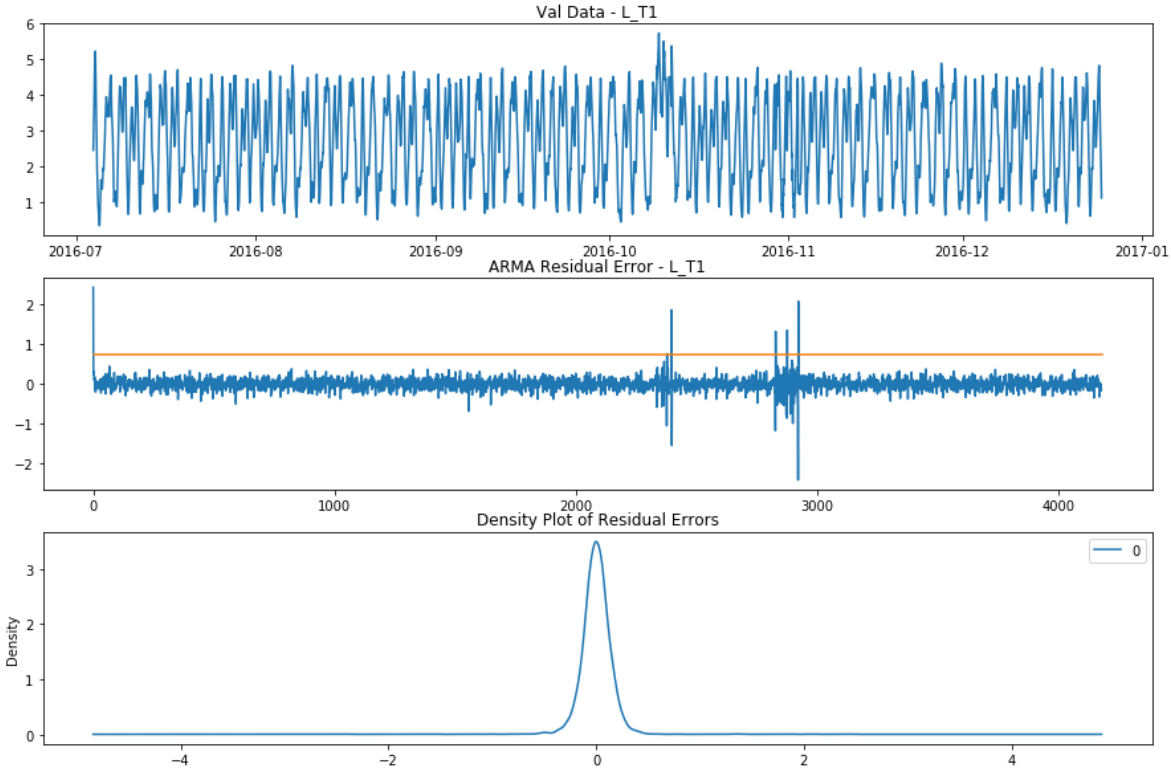
```
            print (' - Val MSE : ', round(mse, 2), ' || Val RMSE : ', round(np.sq
            plt.title('Prediction - Validation - Col:' + col + ' (RMSE:' + str(ro
            plt.show()

            det_anom_lit = model_val.resid[model_val.resid > threshold]
            ind = []
            TP = 0
            FP = 0
            for index, a in det_anom_lit.items():
                ind.append(index)
                if df_val['ATT_FLAG'][index] == 1 : TP += 1
                else                              : FP += 1

            print ('  -- TP : ', TP, ' || FP : ', FP)

            return model_train_best, model_val
    except:
        pass

if __name__ == "__main__":
    for i,col in enumerate(df_train.columns):
    # for col in ['F_PU1', 'F_PU2', 'F_V2', 'P_J289', 'P_J269', 'P_J307', 'P_J14'
        doARIMA(df_train, df_val, col)

"""
Add all values to a dataframe and print towards the end
"""
```

executed in 6m 16s, finished 00:23:45 2019-05-24

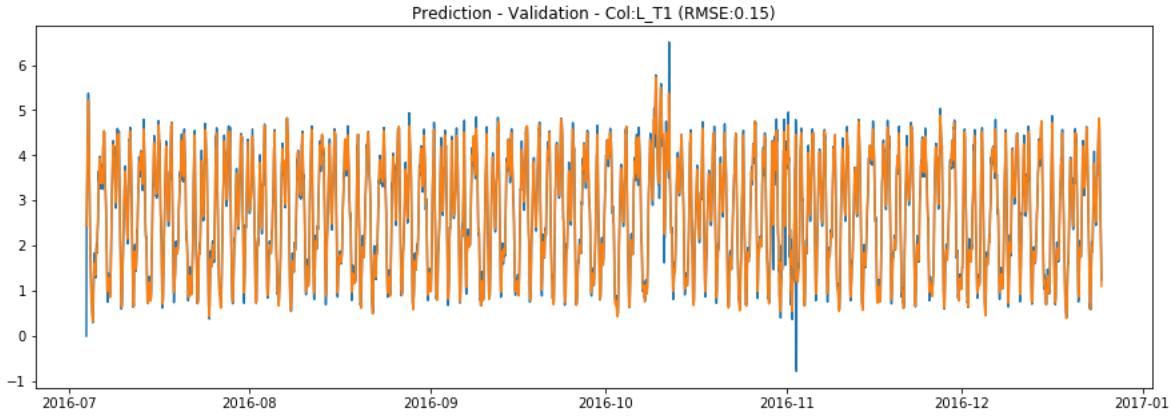
```
 ------------------ col :  L_T1  --------------------
 - ARIMA Results :  3 2  || AIC :  -13208.621407606468  (Time :  28.24
s)
  -- Threshold Train :  0.569
```



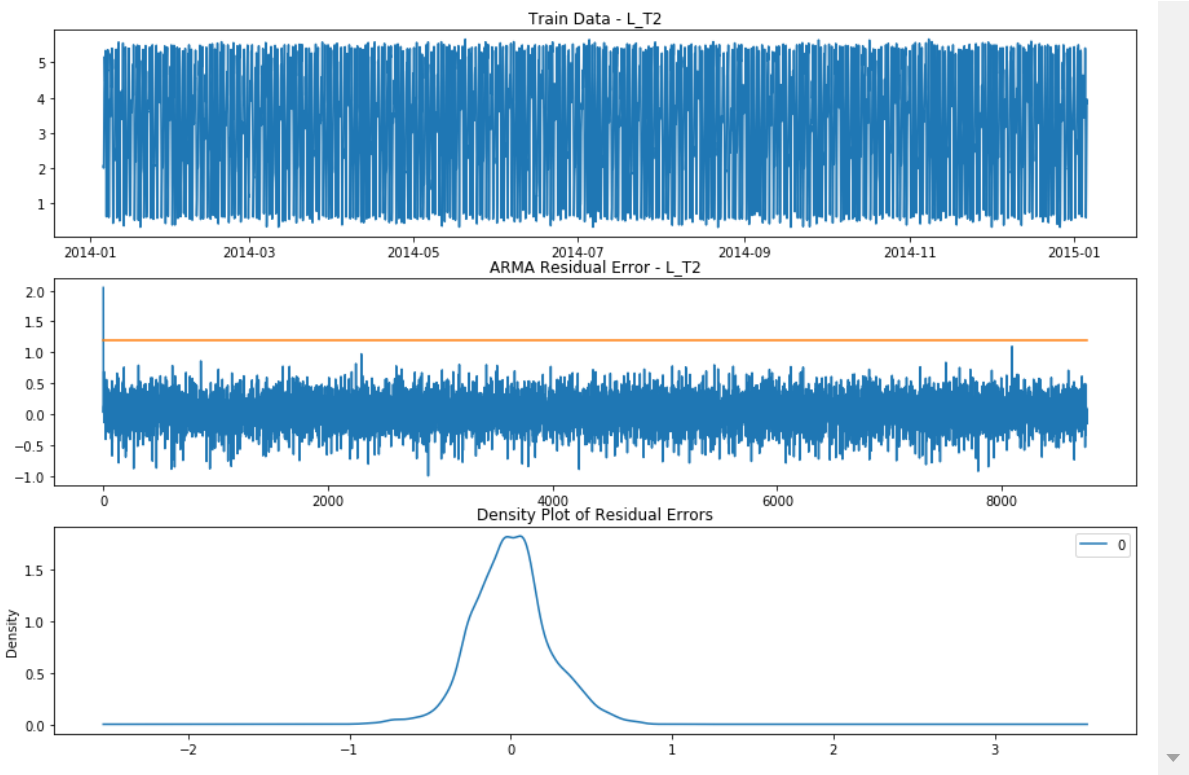

```
  -- Threshold Val:  0.762
```



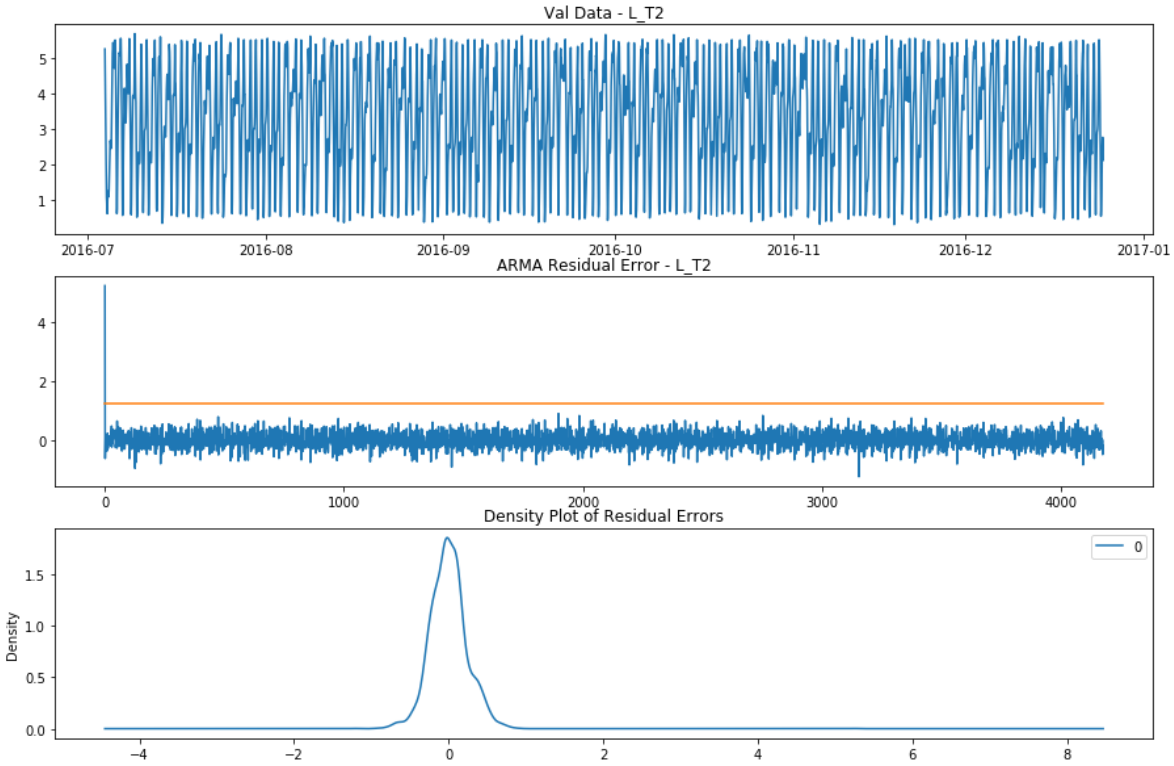

```
 - Val MSE :  0.02  || Val RMSE :  0.15
```




```
  -- TP :  0  || FP :  0

 ------------------ col :  L_T2  --------------------
 - ARIMA Results :  3 3  || AIC :  -191.12162818290744  (Time :  40.92
s)
  -- Threshold Train :  1.2
```



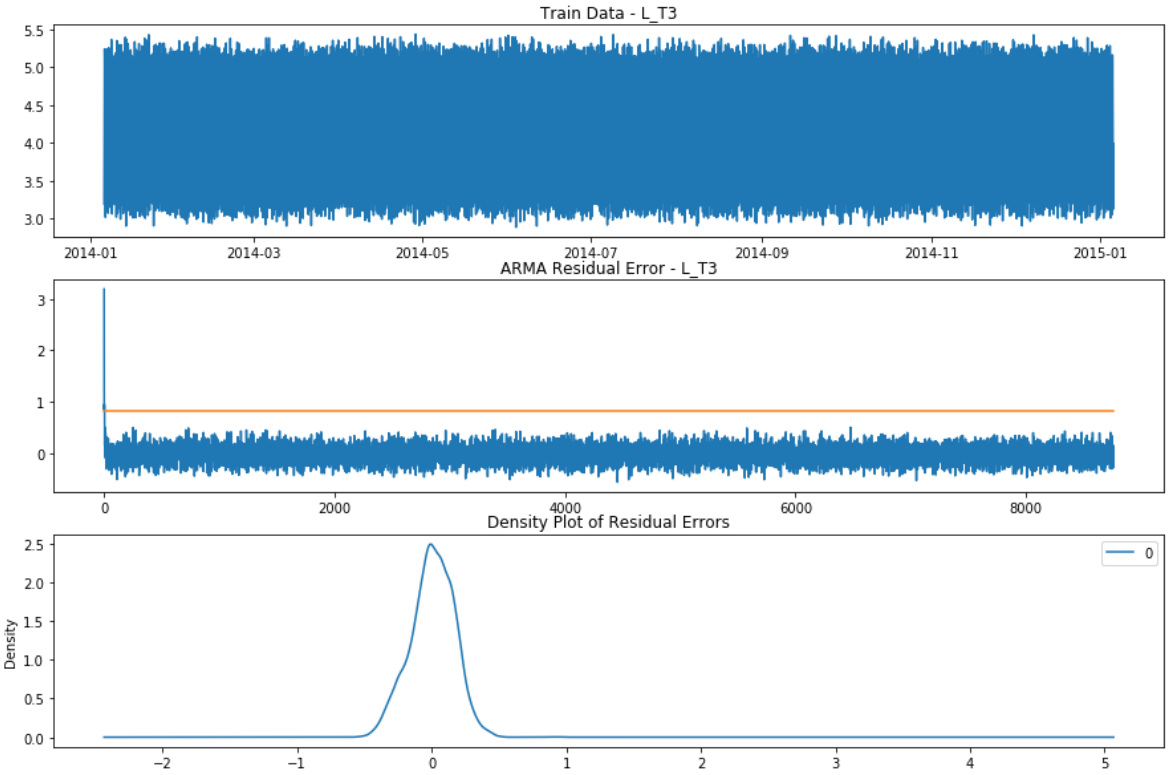
-- Threshold Val: 1.25



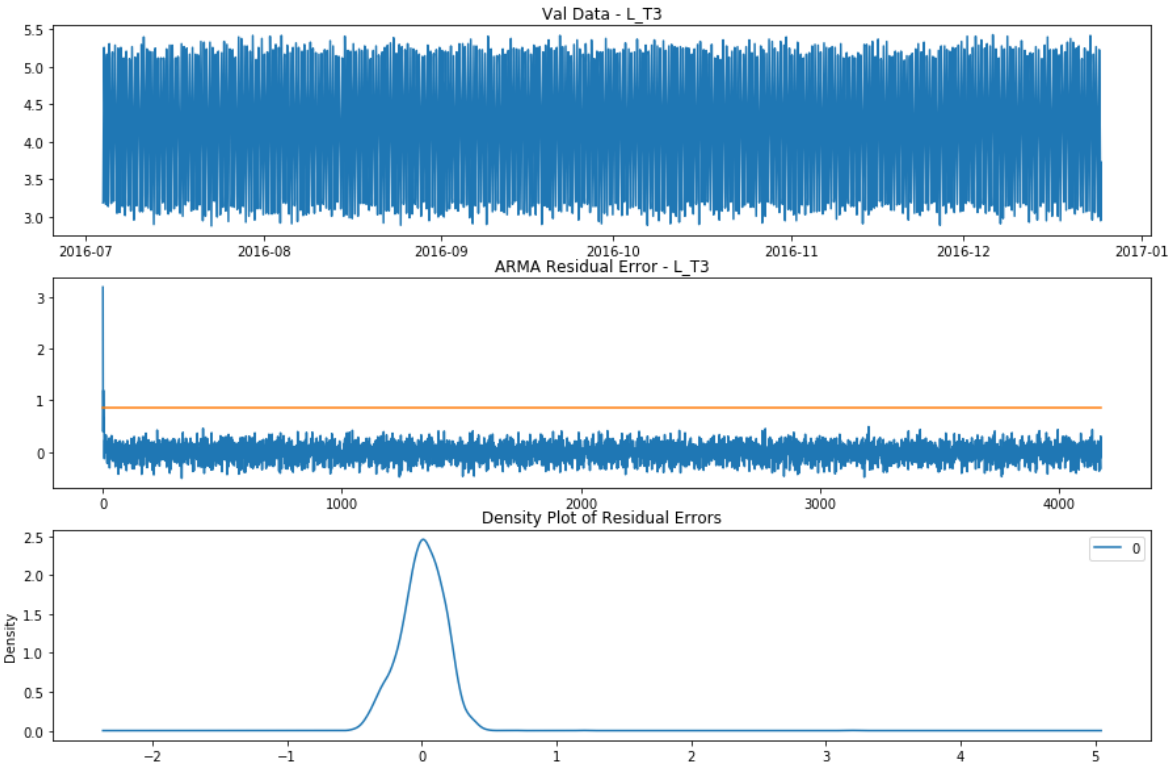
- Val MSE : 0.06 || Val RMSE : 0.25

Prediction - Validation - Col:L_T2 (RMSE:0.25)

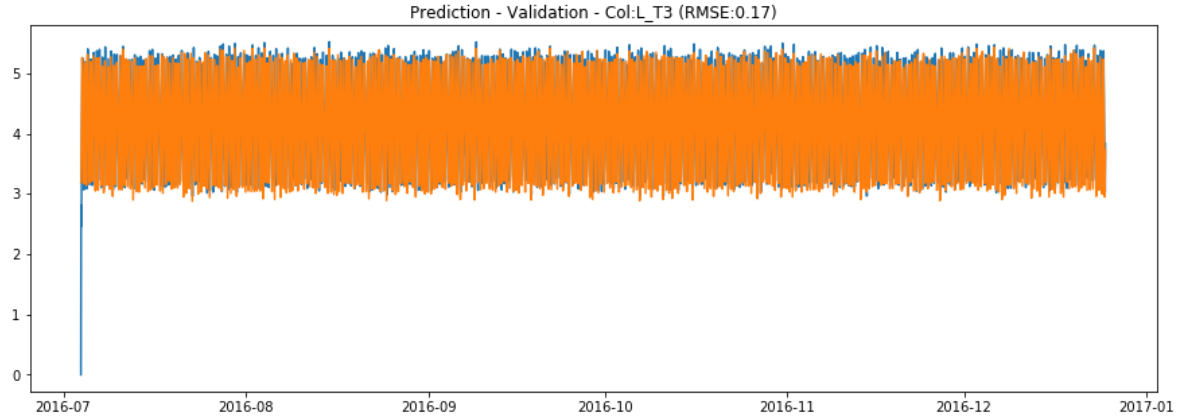
```
 -- TP :  0  || FP :  0

 ------------------ col :  L_T3  --------------------
 - ARIMA Results :  3 3  || AIC :  -6949.554599197989  (Time :  21.4
5 s)
 -- Threshold Train :  0.833
```




```
 -- Threshold Val:  0.86
```

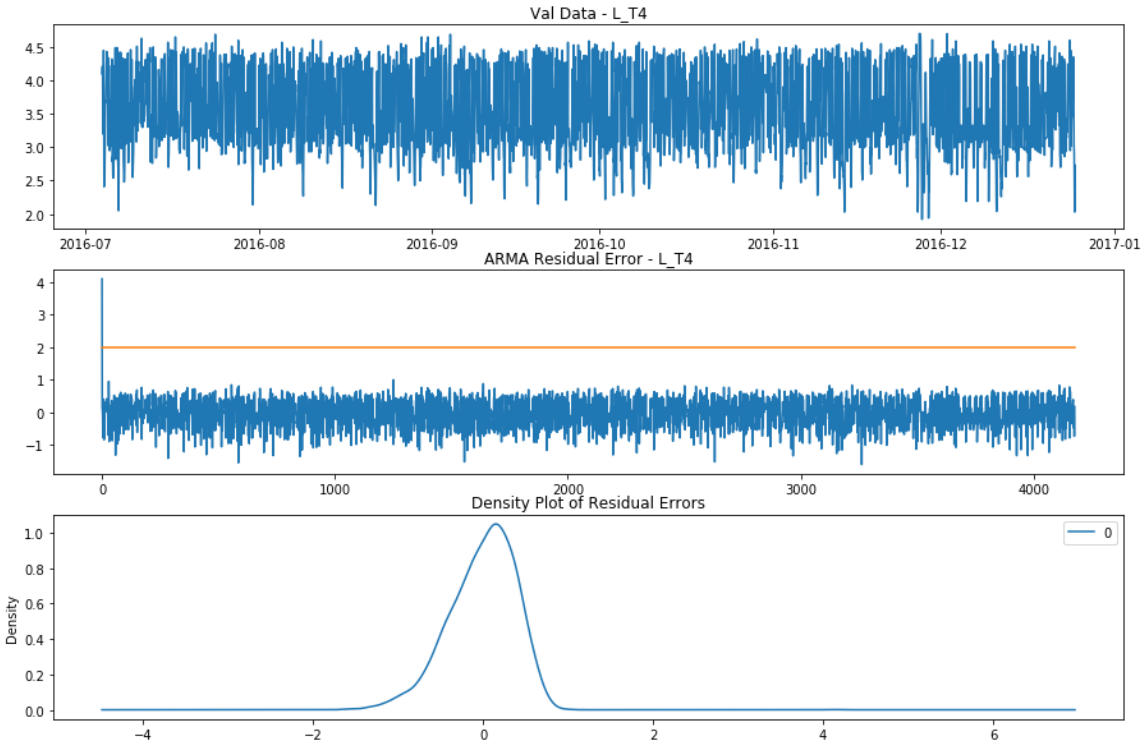


```
 - Val MSE :  0.03  || Val RMSE :  0.17
```

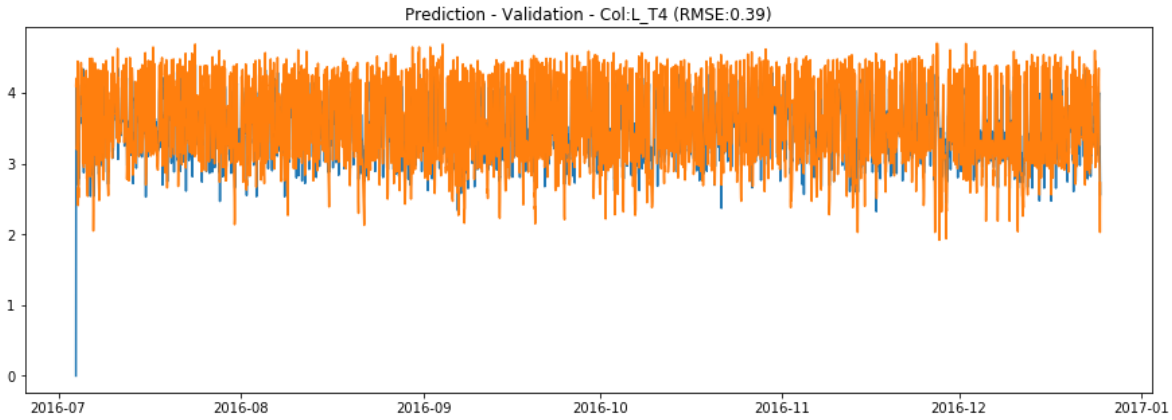



```
  -- TP :  0  || FP :  0

 ------------------ col :  L_T4  --------------------
 - ARIMA Results :  3 3  || AIC :  8244.837538810014  (Time :  48.02
s)
  -- Threshold Train :  1.941
```

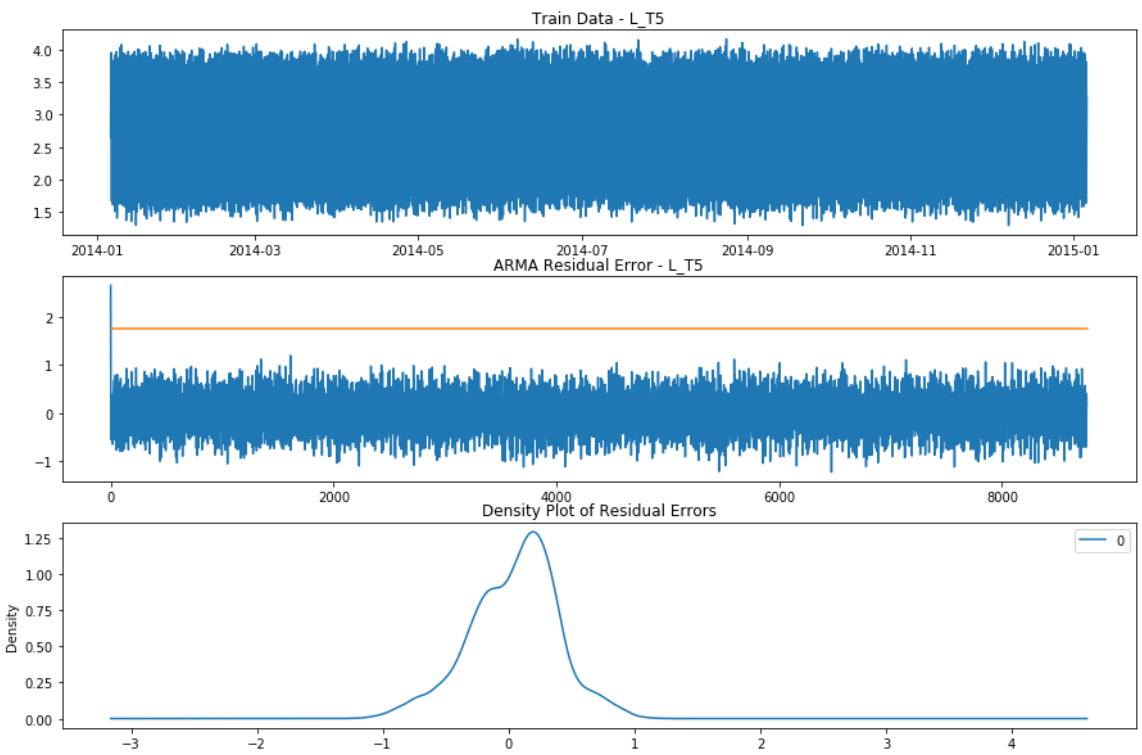

```
-- Threshold Val:  1.972
```



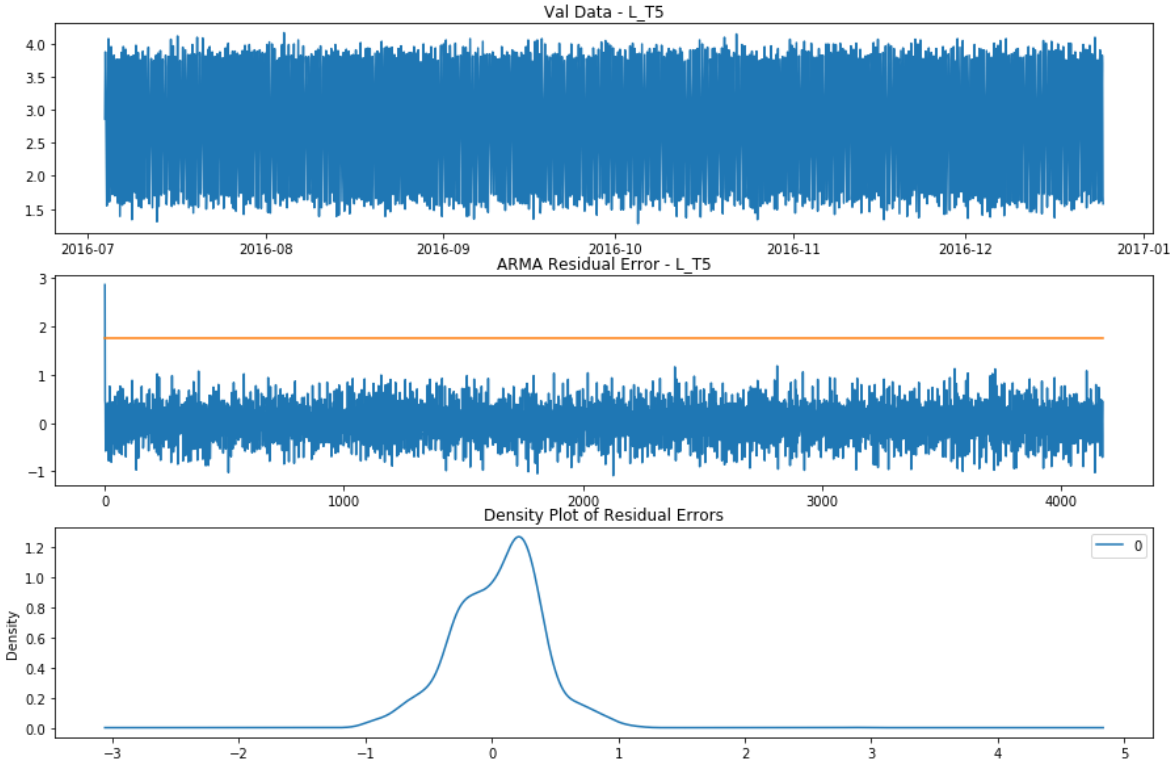

```
- Val MSE :  0.16  || Val RMSE :  0.39
```



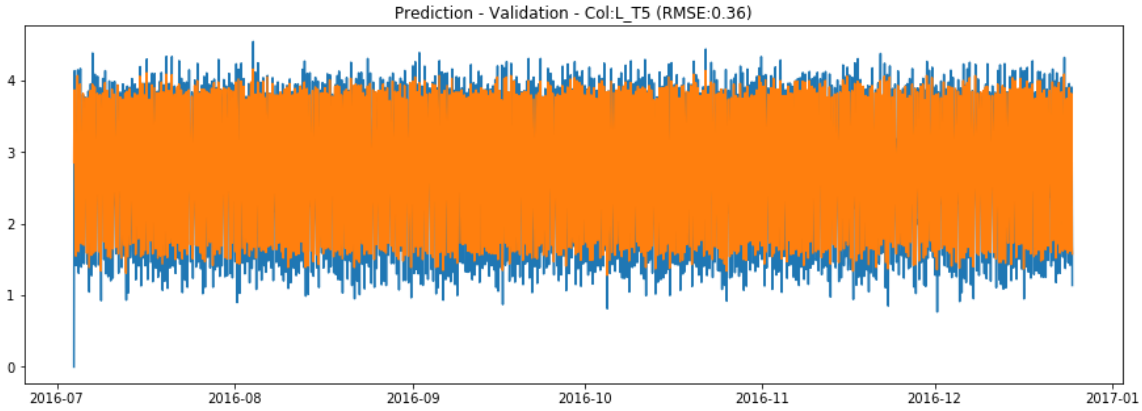

```
 -- TP :  0  || FP :  0

------------------ col :  L_T5  --------------------
- ARIMA Results :  1 2  || AIC :  6683.474477683667  (Time :  13.9 s)
 -- Threshold Train :  1.761
```



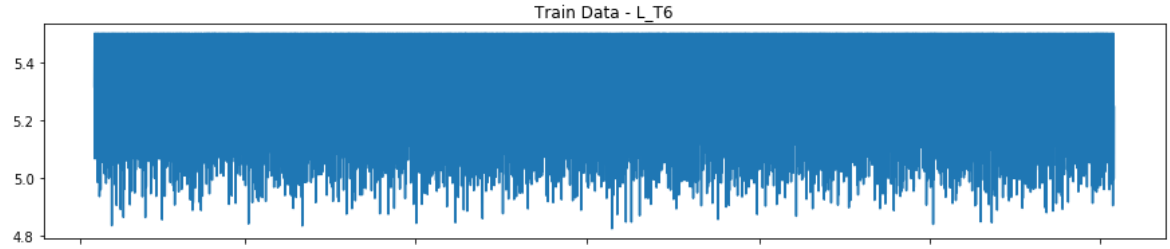

```
-- Threshold Val:  1.764
```



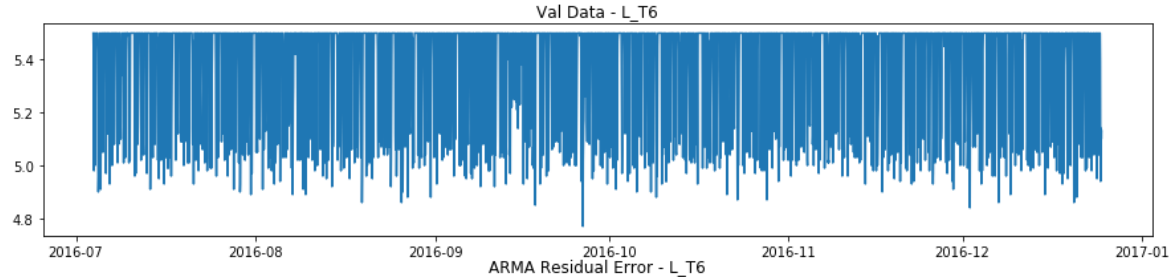
```
 - Val MSE :  0.13  || Val RMSE :  0.36
```

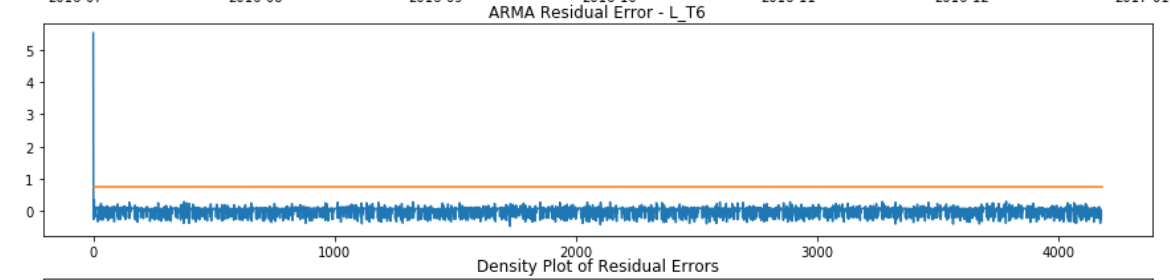


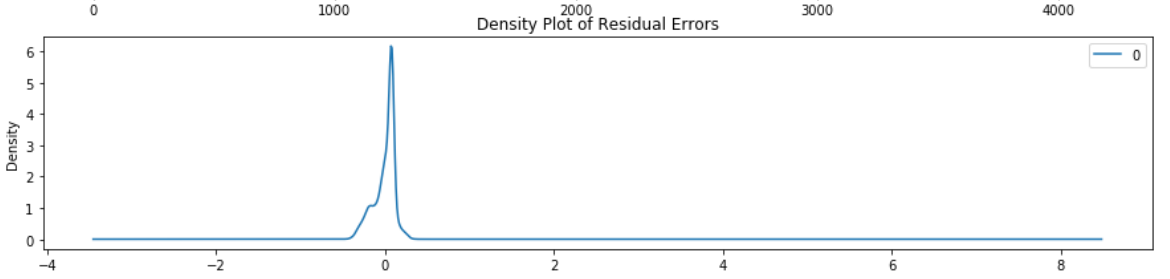

```
  -- TP :  0  || FP :  0

 ------------------ col :  L_T6  --------------------
 - ARIMA Results :  3 1  || AIC :  -12171.734393833129  (Time :  22.39
s)
  -- Threshold Train :  0.667
```



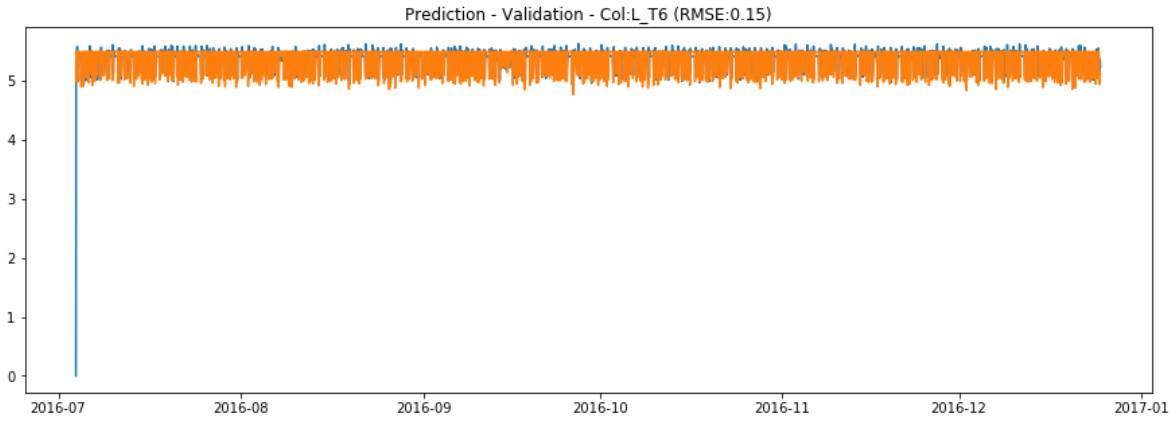

```
-- Threshold Val:  0.74
```



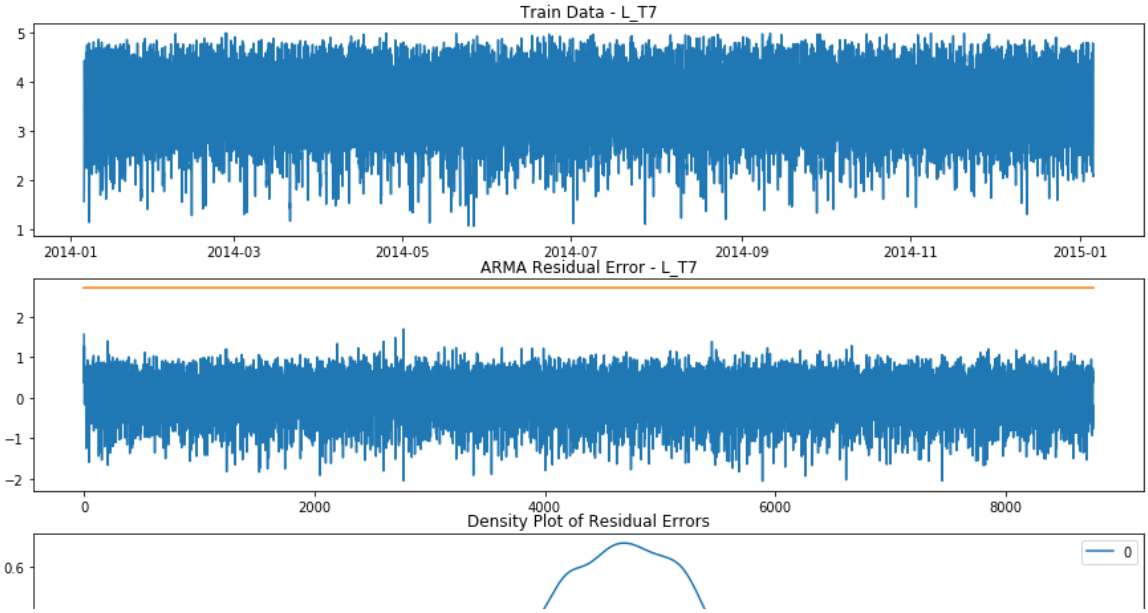




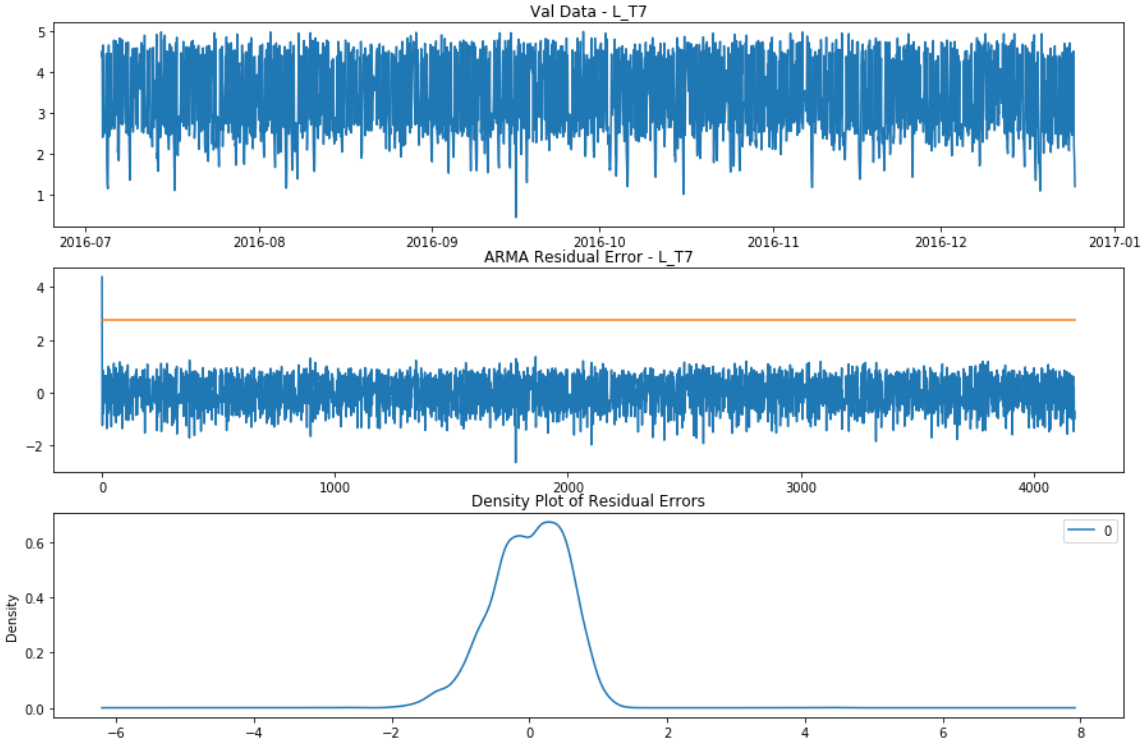

```
- Val MSE :  0.02  || Val RMSE :  0.15
```



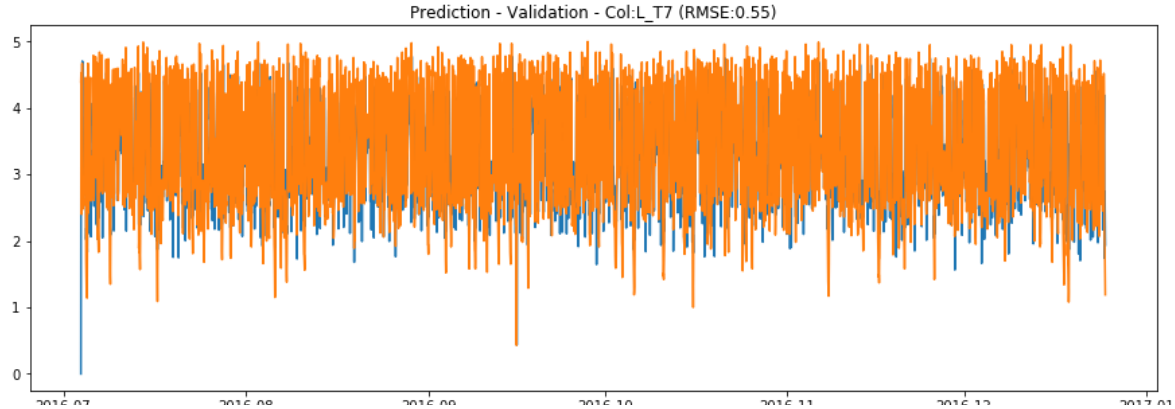

```
  -- TP :  0  || FP :  0

 ------------------ col :  L_T7  --------------------
 - ARIMA Results :  3 3  || AIC :  14090.37896266067  (Time :  47.23
s)
  -- Threshold Train :  2.702
```



-- Threshold Val: 2.738

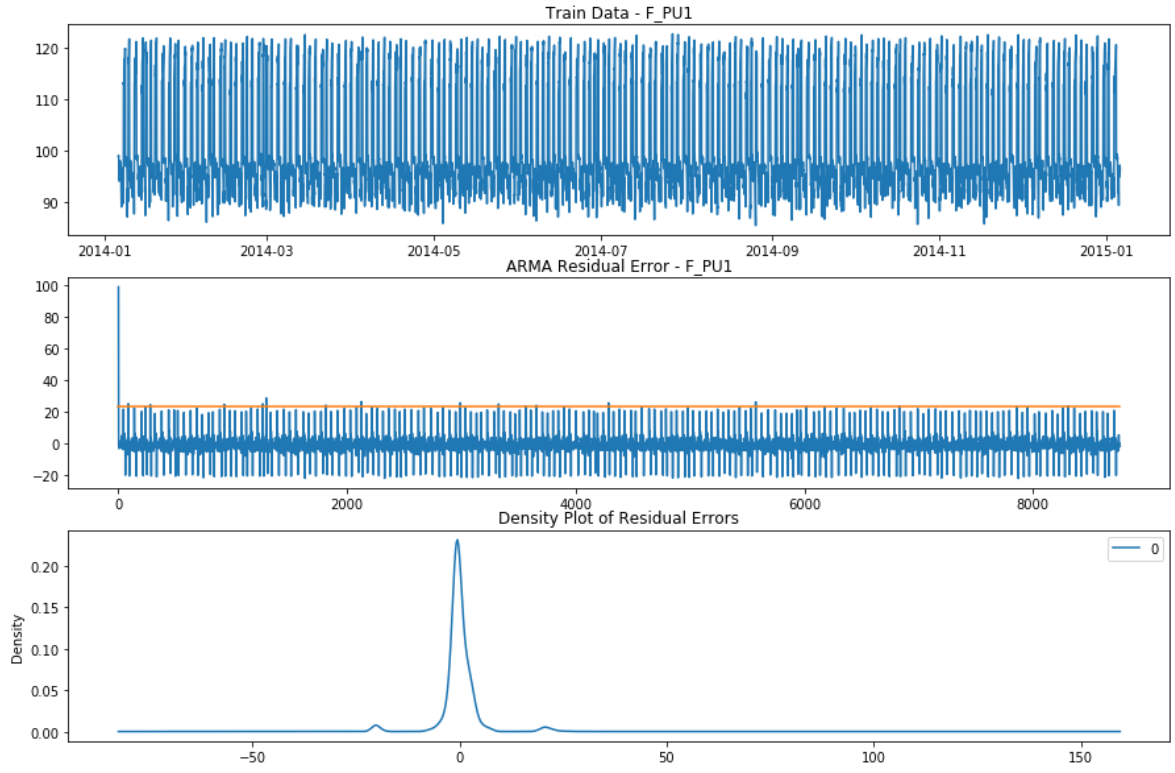


- Val MSE : 0.3 || Val RMSE : 0.55

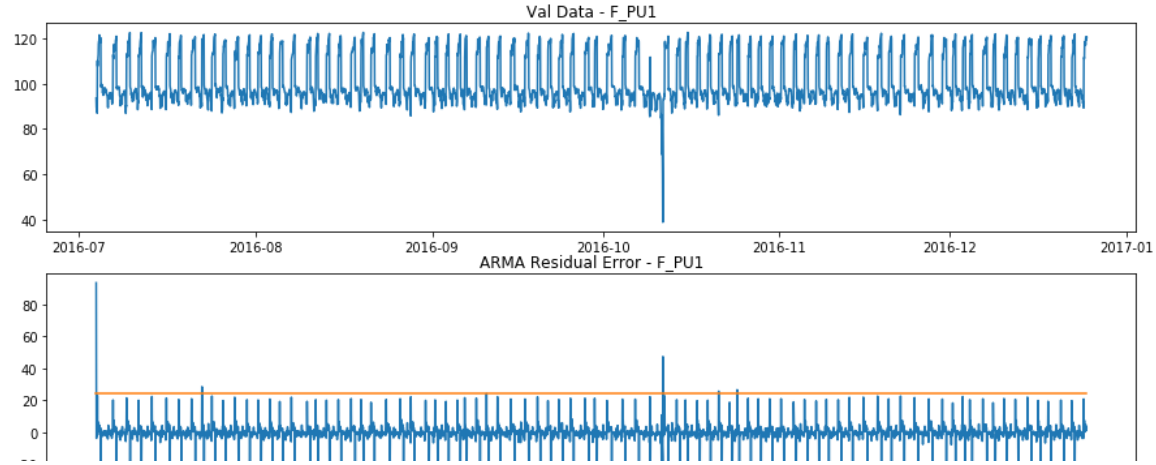



```
 -- TP :  0  || FP :  0
```

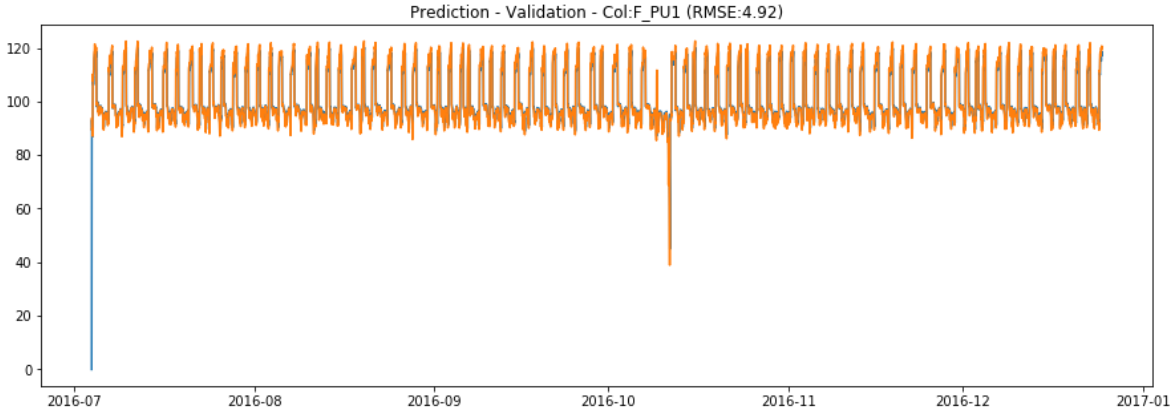
```
------------------- col :  F_PU1  ---------------------
- ARIMA Results :  3 3  || AIC :  51650.25042447398  (Time :  47.8 s)
 -- Threshold Train :  23.633
```



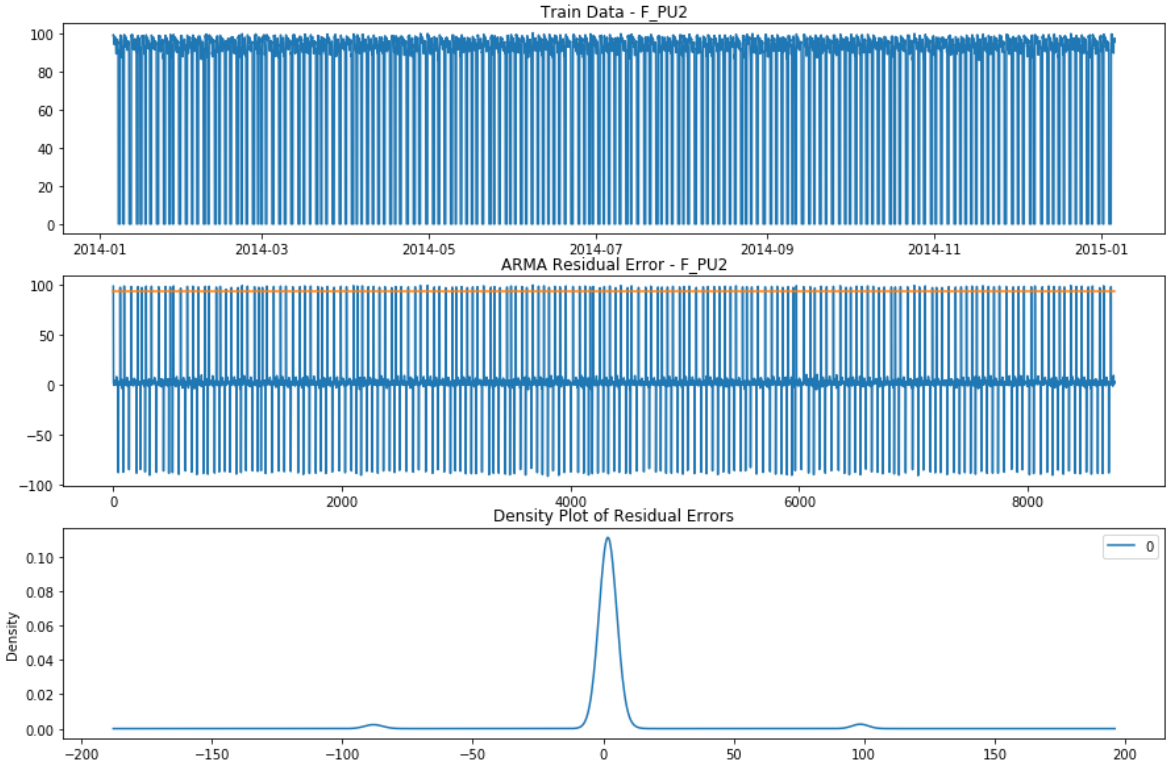

```
 -- Threshold Val:  24.612
```



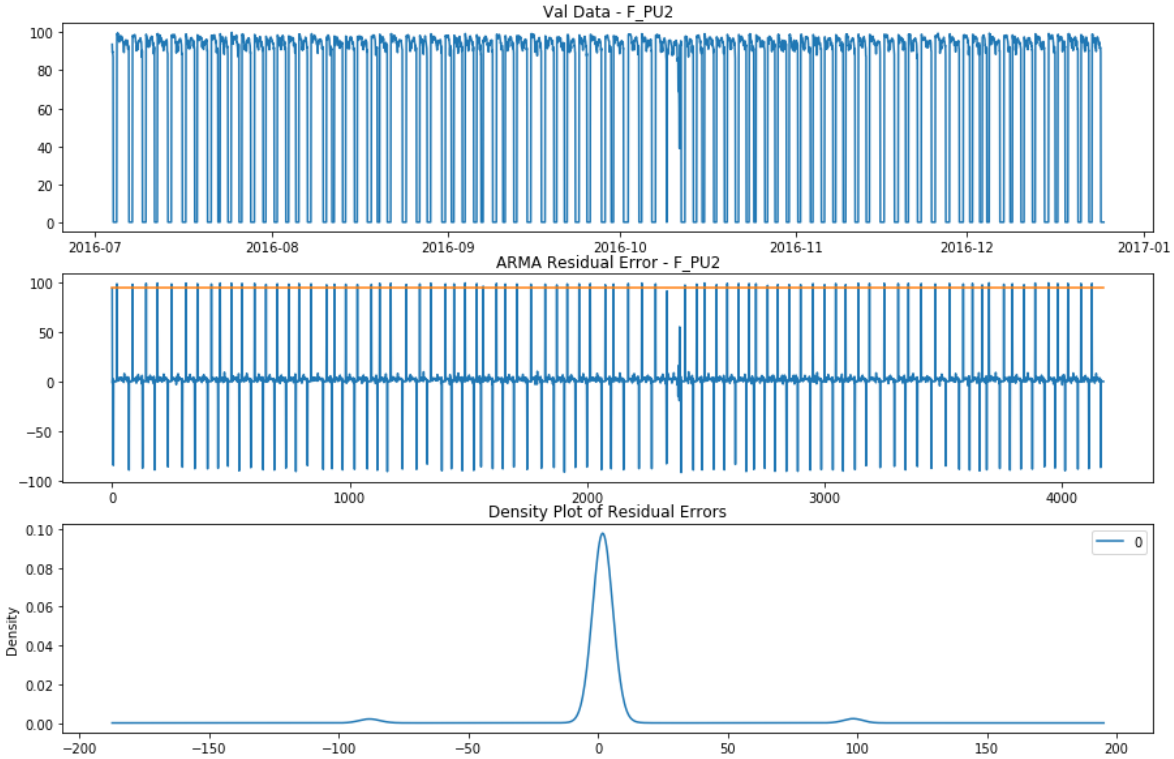

```
 - Val MSE :  24.23  || Val RMSE :  4.92
```



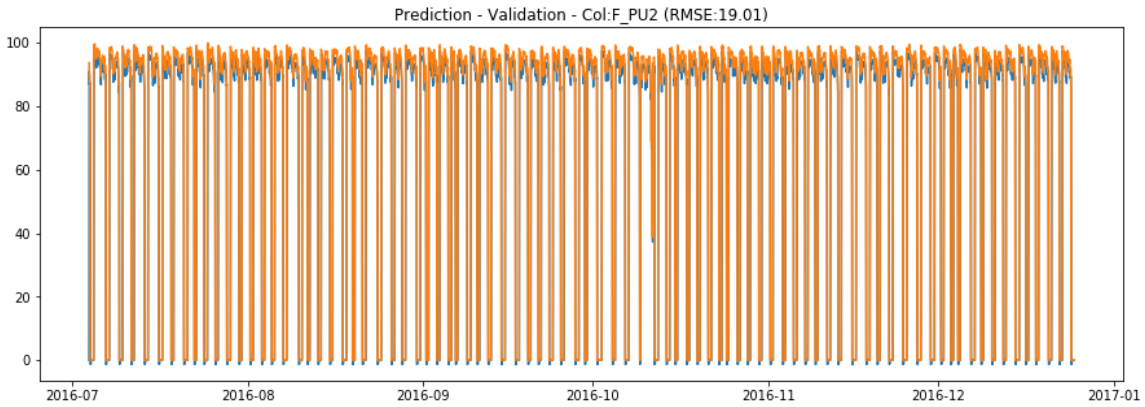

```
  -- TP :  1  || FP :  4

 ------------------- col :  S_PU1  ---------------------
 - ARIMA Results :  -1 -1  || AIC :  inf  (Time :  18.02 s)

 ------------------- col :  F_PU2  ---------------------
 - ARIMA Results :  1 3  || AIC :  76308.24216397341  (Time :  14.88
s)
  -- Threshold Train :  93.757
```



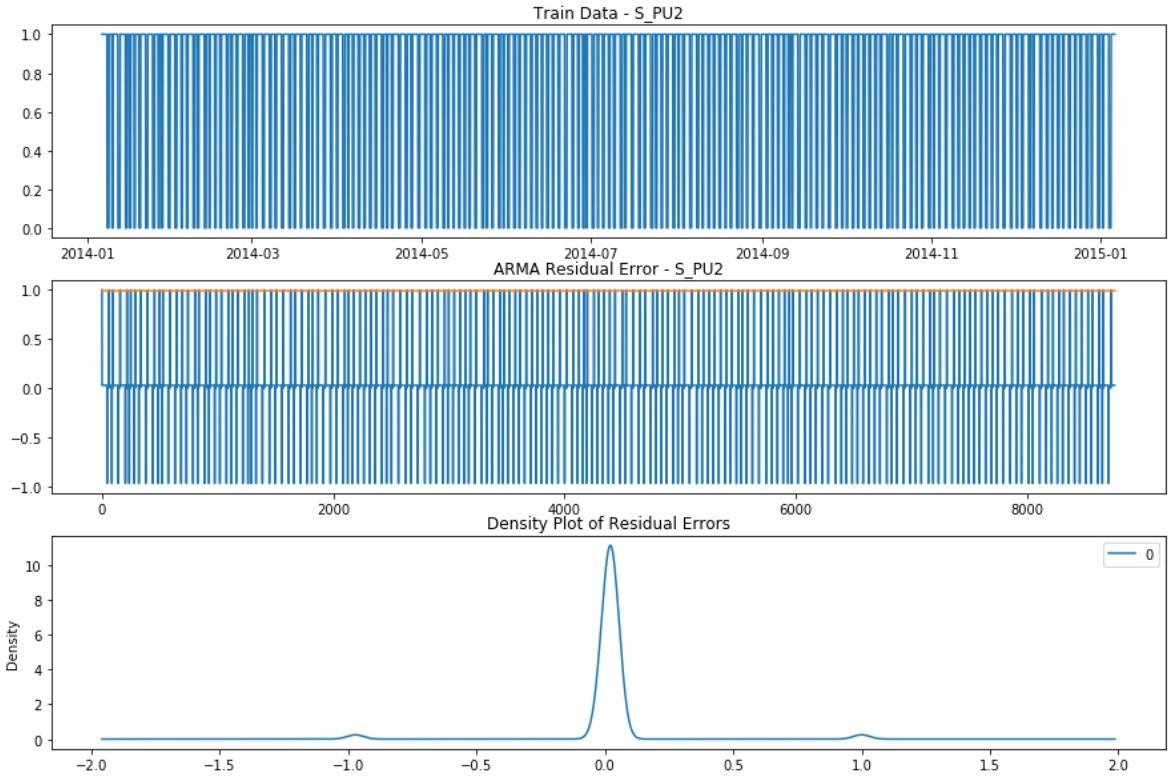
```
-- Threshold Val:  94.511
```



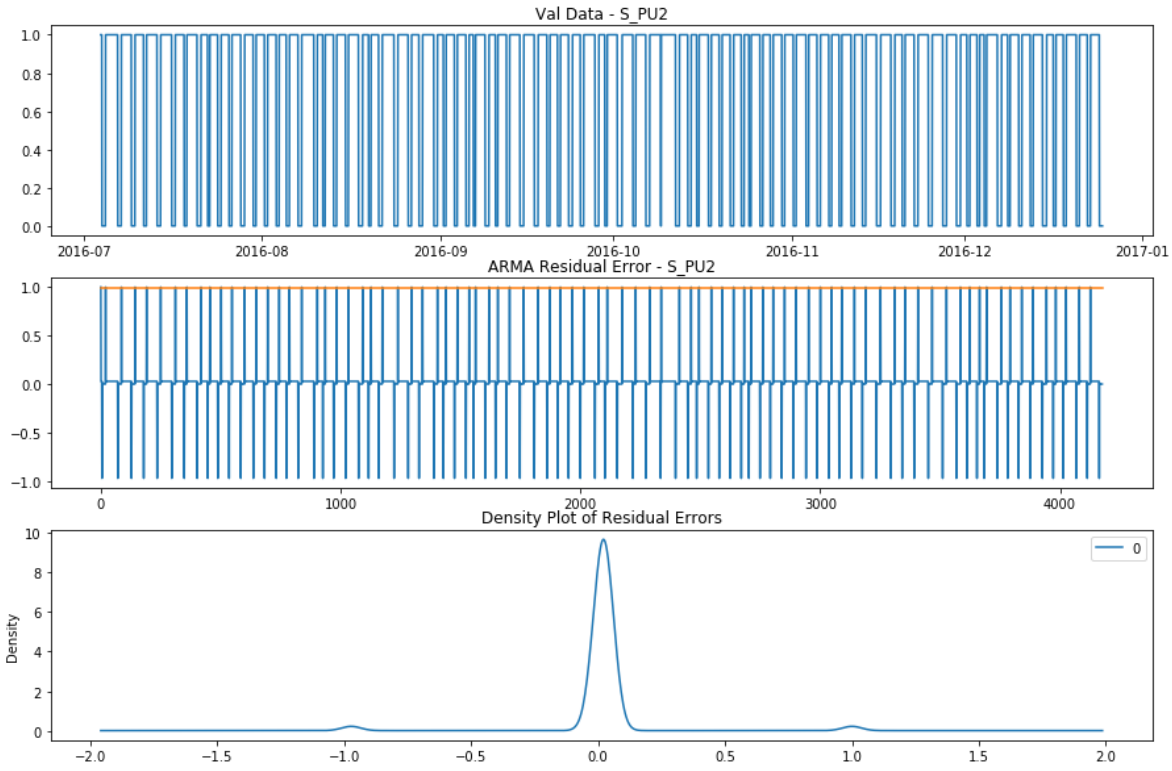

```
- Val MSE :  361.27  || Val RMSE :  19.01
```



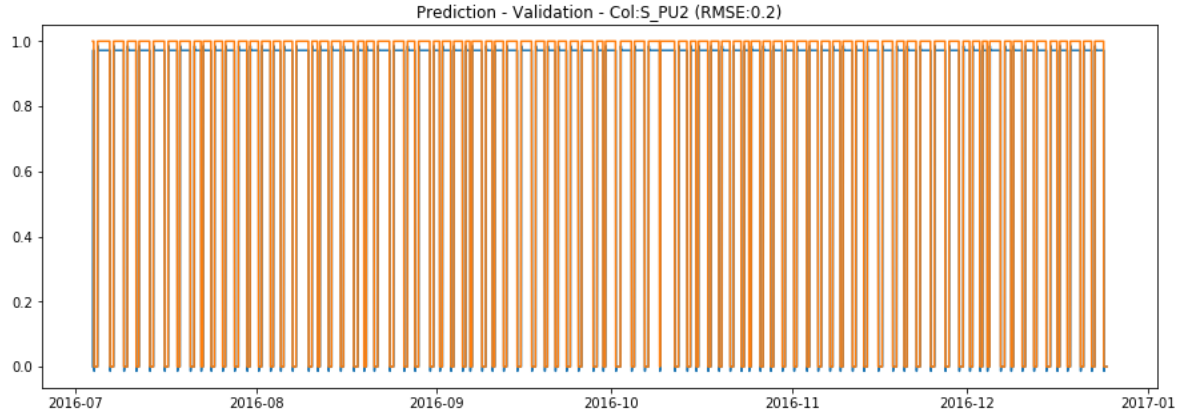
```
  -- TP :  6  || FP :  80

 ------------------ col :  S_PU2  --------------------
 - ARIMA Results :  1 1  || AIC :  -3460.890907807705  (Time :  13.83
s)
  -- Threshold Train :  0.989
```




```
  -- Threshold Val:  0.996
```



```
 - Val MSE :  0.04  || Val RMSE :  0.2
```




```
  -- TP :  0  || FP :  0

 ------------------ col :  F_PU3  --------------------
 - ARIMA Results :  1 1  || AIC :  -inf  (Time :  9.68 s)
  -- Threshold Train :  0.0

---------------------------------------------------------------------------
-----
LinAlgError                               Traceback (most recent call
 last)
<ipython-input-42-896afba225e3> in <module>()
     77     for col in df_train.columns:
     78     # for col in ['F_PU1', 'F_PU2', 'F_V2', 'P_J289', 'P_J26
9', 'P_J307', 'P_J14' ]:
---> 79         doARIMA(df_train, df_val, col)

<ipython-input-42-896afba225e3> in doARIMA(df_train, df_val, col, res_
std_factor)
     35         axarr[1].set_title('ARMA Residual Error - ' + str(col)
)
     36         residuals = pd.DataFrame(model_train_best.resid)
---> 37         residuals.plot(kind='kde', ax=axarr[2], title='Density
 Plot of Residual Errors')
     38         plt.show()
     39

/home/strider/anaconda3/lib/python3.5/site-packages/pandas/tools/plott
ing.py in __call__(self, x, y, kind, ax, subplots, sharex, sharey, lay
out, figsize, use_index, title, grid, legend, style, logx, logy, loglo
g, xticks, yticks, xlim, ylim, rot, fontsize, colormap, table, yerr, x
err, secondary_y, sort_columns, **kwds)
   3738                          fontsize=fontsize, colormap=colormap
, table=table,
   3739                          yerr=yerr, xerr=xerr, secondary_y=se
condary_y,
```