EXP. No. (1)
Short Transmission Line

Introduction:

The effect of capacitance can be neglected in short line in overhead of lines a length of 50 Km to 60 Km in short, but in cables the distance is considerably less before capacitance has an appreciable effect.

So, a short single –phase transmission line may be represented by the equipment circuit shown in fig (1).

Apparatus:

3 voltmeters, 2 watt meters, 1 ammeter, molded line and suitable variable load.

Object:

The aim of the experiment is:

1-To determine the parameters of the line (R and X_L) as:

Z=$\frac{|\Delta V|}{|Ir|}$............................ (1)

P_{loss}= $P_s - P_r$................. (2)

P_{loss}=I^2.R

X_L=$\sqrt{Z^2 - R^2}$.............. (3)

2- To study the characteristics of the short line (η and Ɛ)

η is the efficiency and Ɛ is the voltage regulation.

3-To plot the phasor diagram at lag, unity and lead power factor.

Procedure:

1-Connect the circuit as shown in fig. (1).

2-Set the sending voltage to 100 V, then record **I**s, Vr, Ps, Pr and Vd at unity power factor.

3-Repeat several times by varying the value of load.

4-Repeat step 2 and 3 at 0.86 lagging and 0.86 leading power factor.

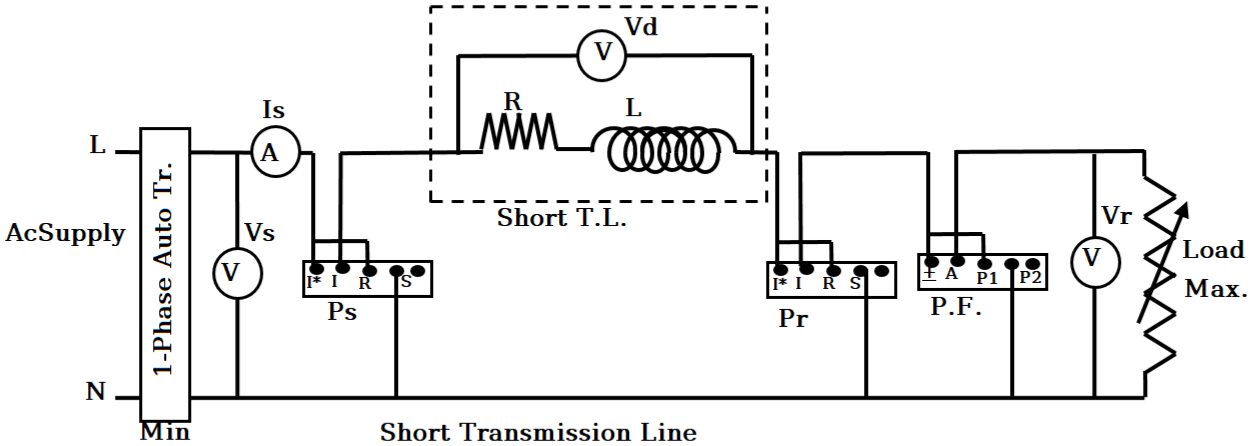
Report:

1-Plot the phasor diagram at unity, lagging and leading P.F.

2-Calculate the (η%) and (Ɛ%).

3- Determine the short transmission line parameters(R andX_L).

Vs.(v)	Is(A)	Ps(W)	Pr(W)	Vr(v)	VD(v)	η%	Ɛ%
100							



Short Transmission Line
Load=Pure Resistive Load/UnityP.F

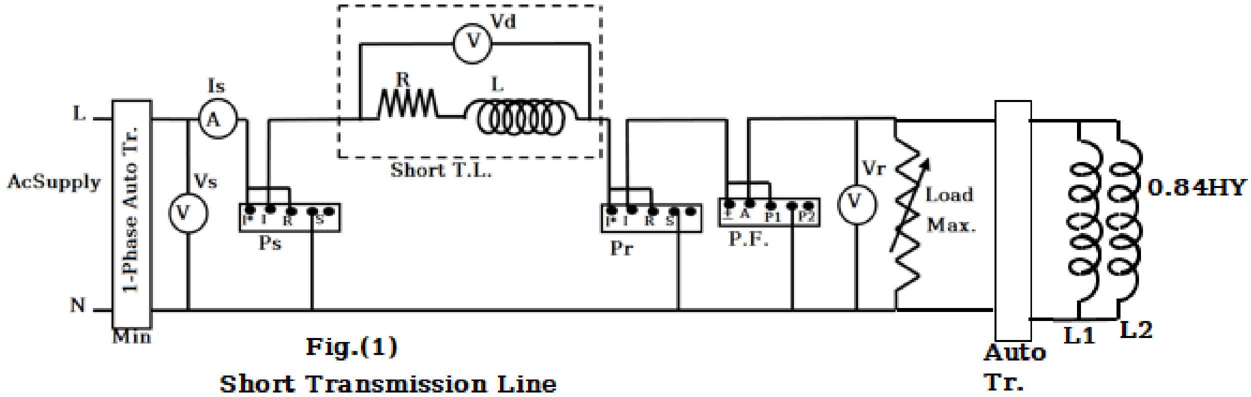


Fig.(1)
Short Transmission Line
Load=Inductive Load/0.86 Lagging P.F

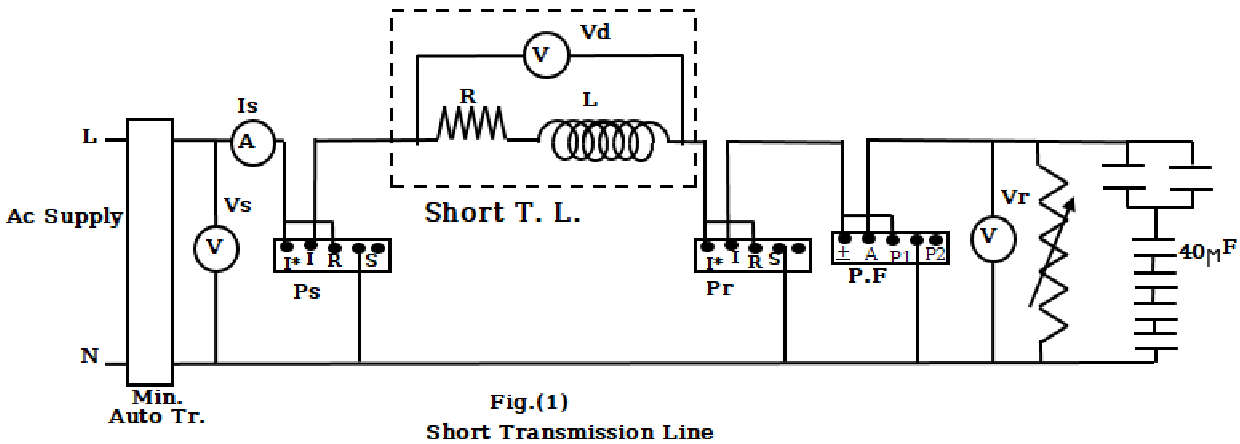


Fig.(1)
Short Transmission Line
Load=Capacitive Load/0.86 Leading P.F