



ANALYSIS OF DRIVER SYSTEM WITH HARMONIC FILTER

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ABSTRACT

Today, the increase use of non-linear loads with the power system harmonics has become an important issue. Non-linear loads produced by the harmonic-frequency currents through the network and turning the harmonic frequency of the surrounding circuits, voltage consumers. In addition to the basic component in the non-linear wave form, consists of the harmonic components. Along with the development of technology has been used quite extensively in the semiconductor parts. In addition, the use of very low-voltage levels during the full automation of production running to spread the electronic devices. On the one hand, while, on the other hand, non-linear loads due to the sensitivity of the AC power waveform pure originating from. In this study, 22 kW induction motor alternator. Right next to the front side of the motor drive circuit consisting of harmonics by attaching a filter named 'harmonix' according to reactance exchange and length of cable.

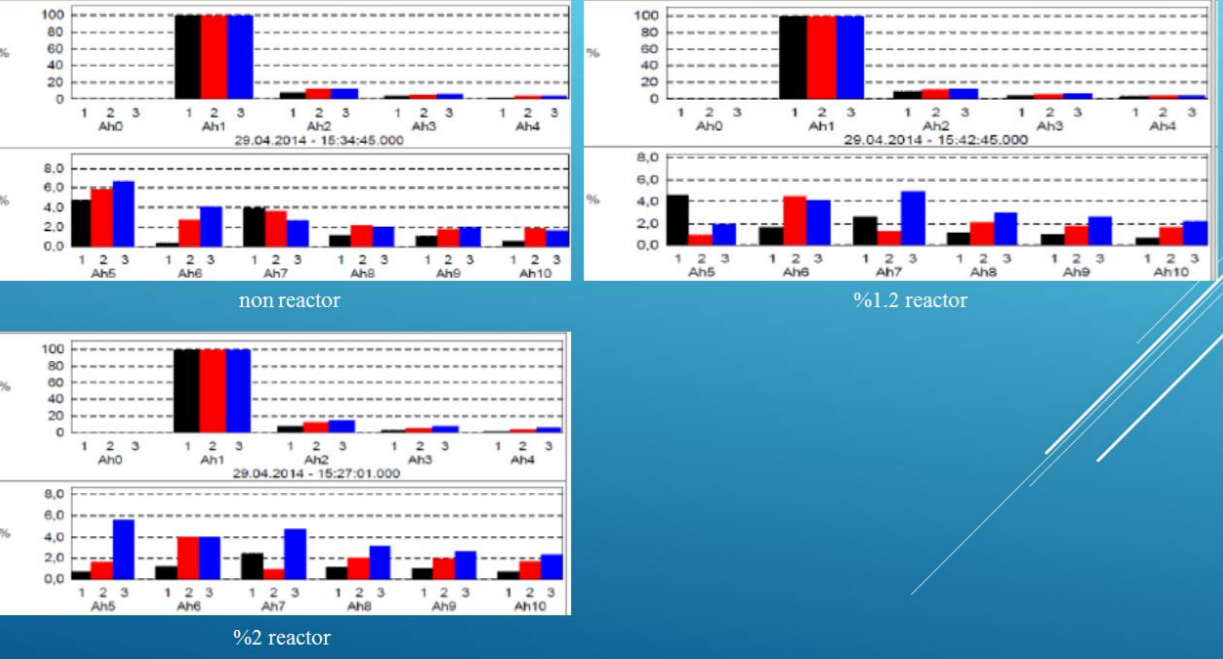
THE EFFECT OF FILTER REACTANCE AT DRIVER SYSTEM WITH HARMONIC FILTER FOR 100 METERS CABLE

100 meter, KF Comparison

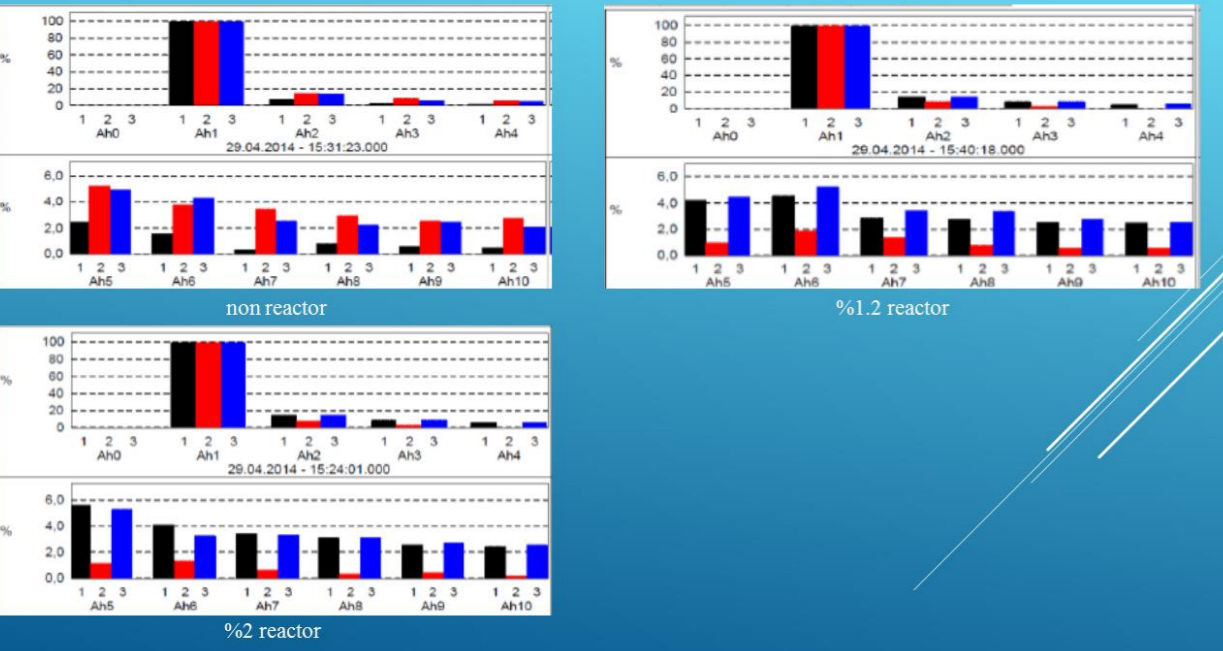
Comparison of KF			(Minimum Current)		
Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
Non Reactor	%1.2 Reactor	%2 Reactor	Non Reactor	%1.2 Reactor	%2 Reactor
KF1	2.888	2.821	2.971	3.105	2.882
KF2	2.575	2.753	2.331	2.788	2.978
KF3	2.986	2.824	2.668	2.957	3.013

- $K = \frac{[I_T^2 \cdot (h_h)^2]}{[I_T^2 \cdot (h_h)^2]}$
- $D = \frac{1.15}{(1+0.15K)}$
- $S_H = D \times S_N$
- K : Coefficient of KF
- h : Harmonic of number
- D : The reduction in power transformer coefficients.
- S_N : The effects of harmonic power transformer.
- S_N : Nominal transformer power.

Maximum Current, 100 meters, Ah (Harmonic of Current) Comparison

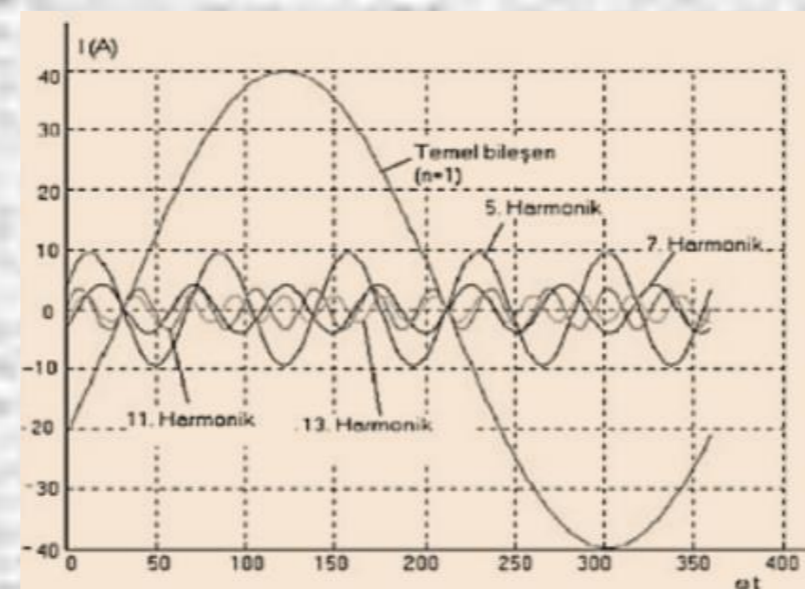


Minimum Current, 100 meters, Ah (Harmonic of Current) Comparison



HARMONICS

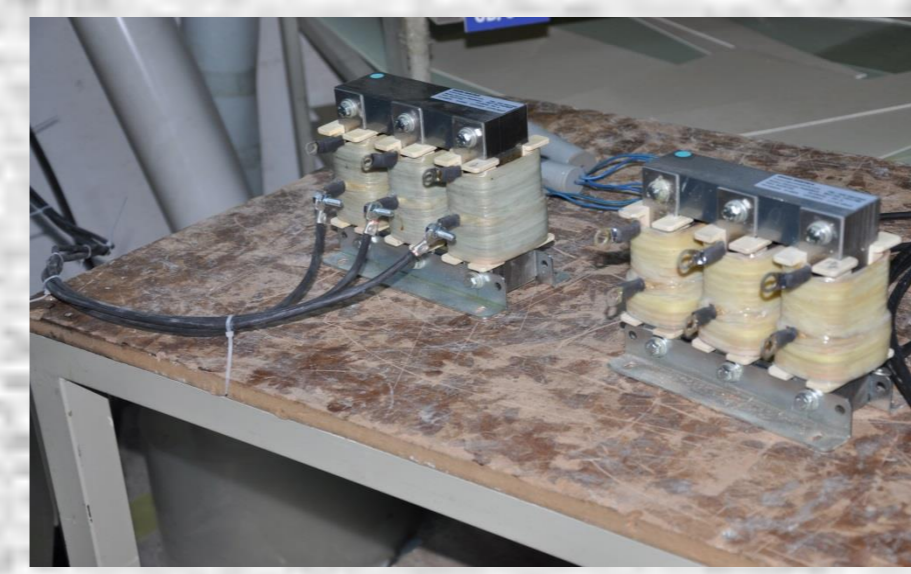
Power system harmonics is a subject that is receiving a great deal of attention recently. This is primarily due to the non-linear loads which are harmonic generators. The increase use of non-linear loads in power systems cause stricter limits to impose by the utilities. A wariness of harmonic issues can help to increase power system reliability.



INTRODUCTION

HARMONIC REACTOR FILTER

- Used in places where inductive load requirement.
- To fix the capacitive load of the cables used to generate
- Product that are needed to test the testing apparatus used in inductive currents



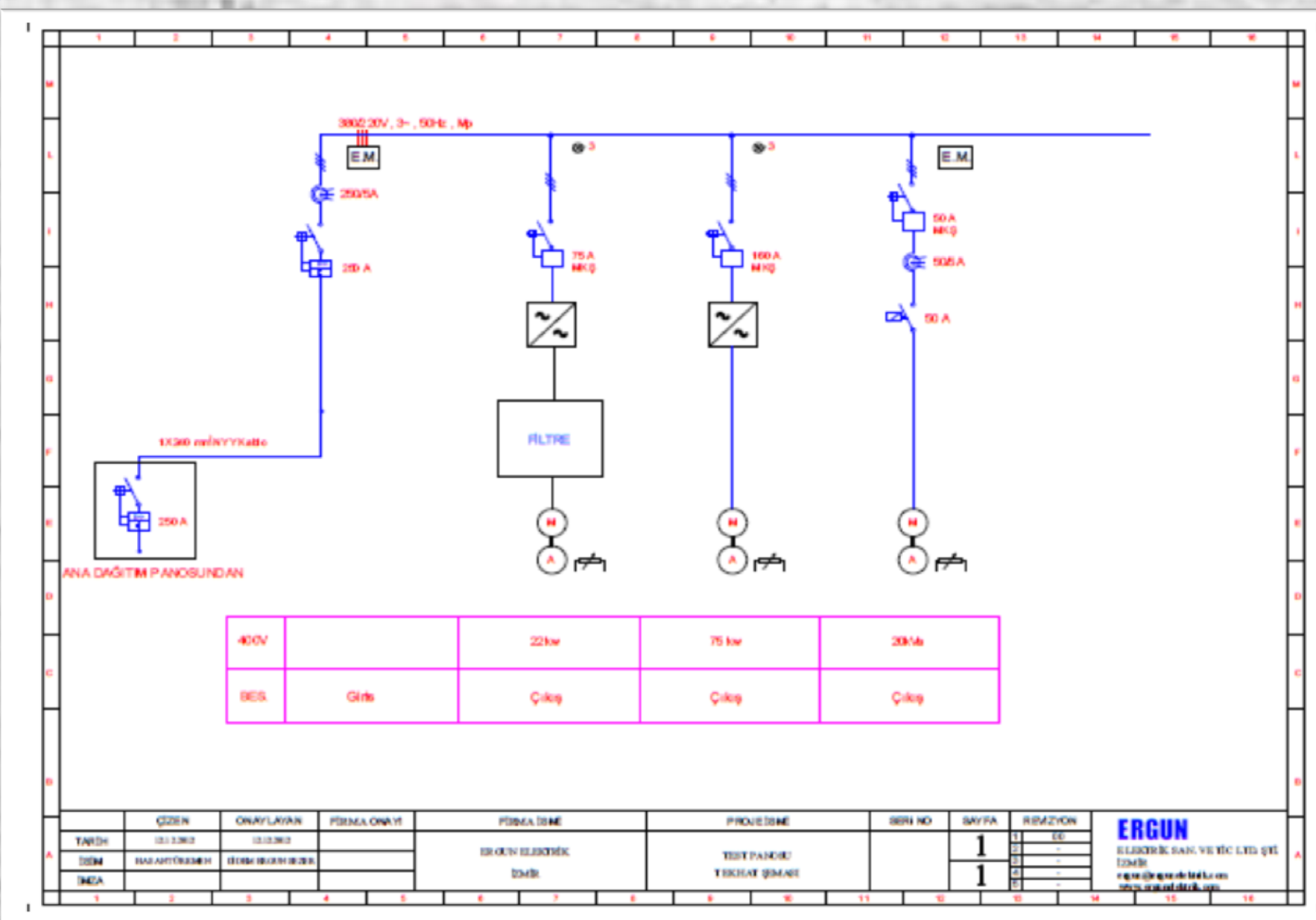
AC MOTOR SPEED CONTROLLER

Altivar 71

- Variable-speed drive (VSD) describes equipment used to control the speed of machinery.

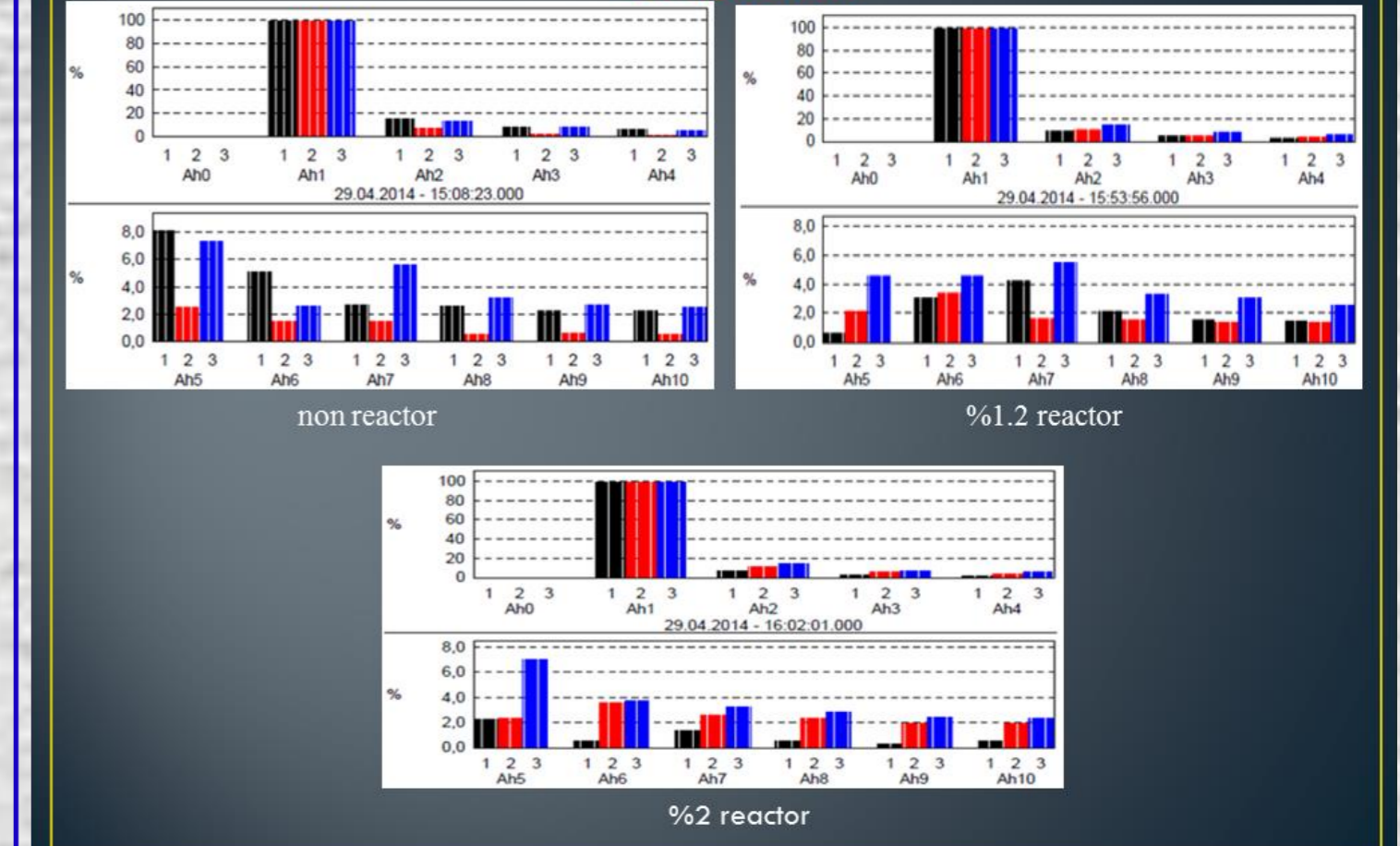


SINGLE LINE DIAGRAM

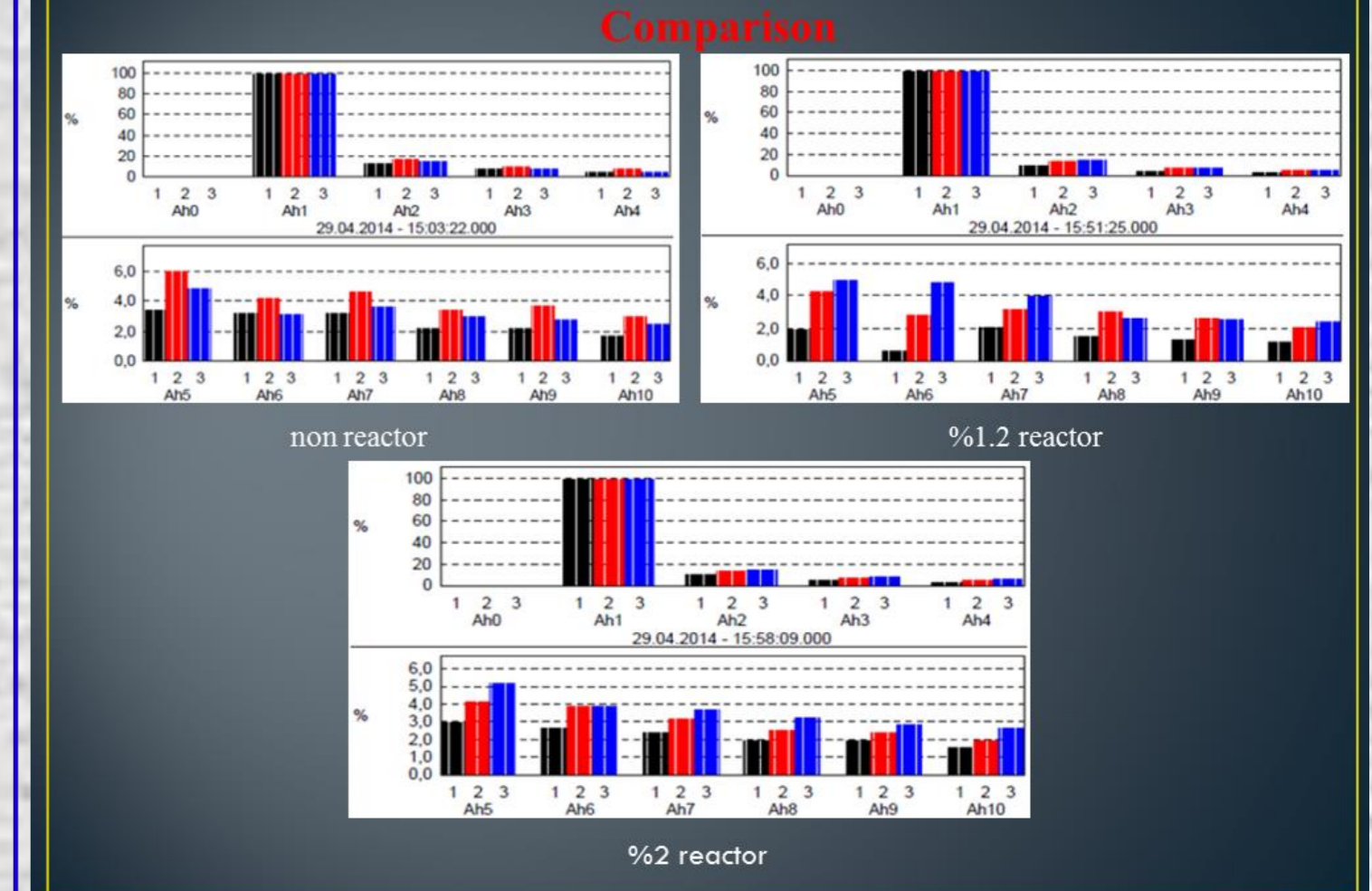


THE EFFECT OF FILTER REACTANCE AT DRIVER SYSTEM WITH HARMONIC FILTER FOR 10 METERS CABLE

Maximum Current, 10 Meters, Ah (Current harmonic) Comparison



Minimum Current, 10 Meters, Ah (Current harmonic) Comparison



Maximum and Minimum Current, 10 Meters, K Factor Comparison

	AVERAGE VALUES			AVERAGE VALUES		
	Non Reactor	Reactor %1.2	Reactor %2	Non Reactor	Reactor %1.2	Reactor %2
KF1	2.87	2.873	2.951	3.568	3.074	2.855
KF2	2.714	2.78	2.489	3.331	2.712	2.888
KF3	2.77	2.754	2.629	3.337	3.197	3.201

(Maximum Current) (Minimum Current)

- $D = \frac{1.15}{(1+0.15K)}$
- $K = \frac{[\sum_{h=1}^n (I_h)^2]}{[I_T^2]}$
- $S_H = D \times S_N$
- K : Coefficient of KF
- D : The reduction in power transformer coefficients.
- h : Harmonic of number
- S_H : When the effects of harmonic power transformer
- S_N : Nominal transformer power

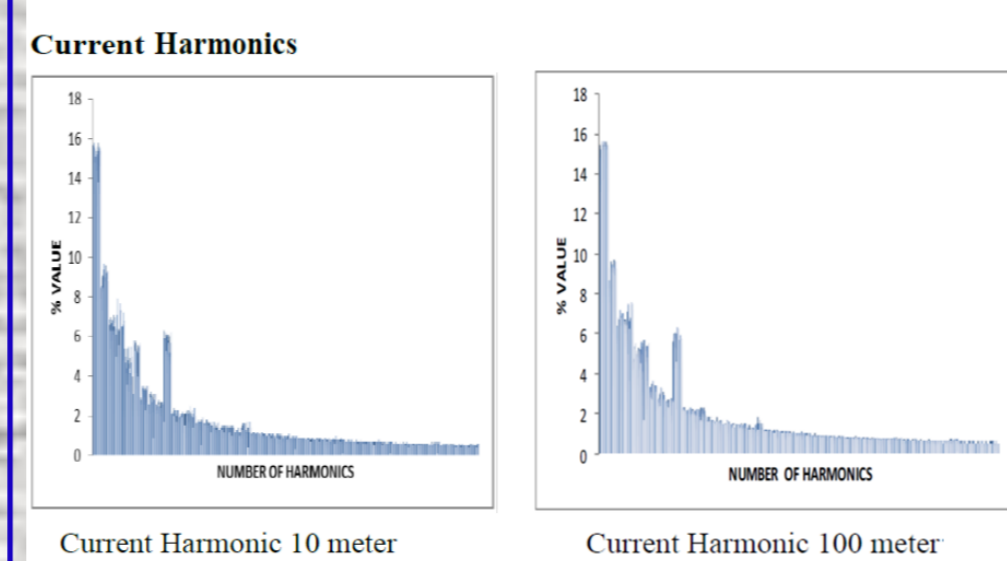
THE EFFECT OF THE LENGTH OF CABLE ON DRIVER SYSTEM WITH HARMONIC FILTER

	10 meter avg	100 meter avg
KF1	2,873	2,821
KF2	2,78	2,753
KF3	2,754	2,824

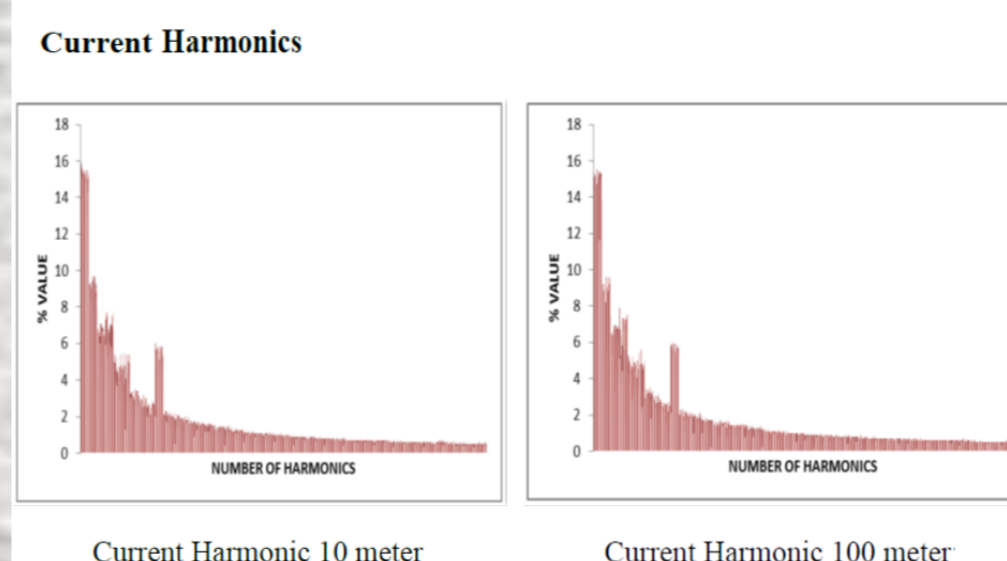
	10 meter avg	100 meter avg
KF1	2,951	2,921
KF2	2,489	2,331
KF3	2,969	2,668

	10 meter avg	100 meter avg
KF1	2,857	2,888
KF2	2,714	2,575
KF3	2,77	2,986

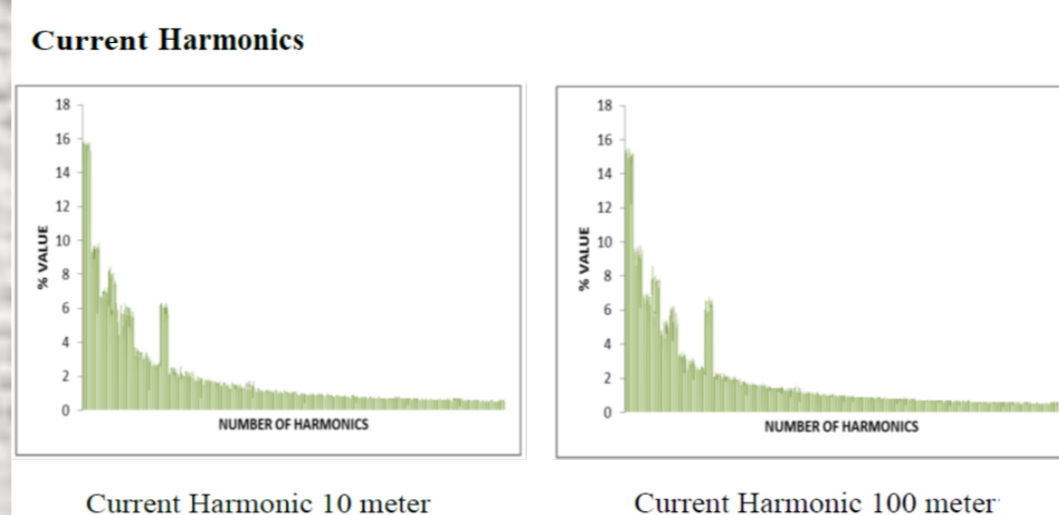
Comparison of Harmonics



Comparison of Harmonics



Comparison of Harmonics



We thank to ERGUN ELEKTRİK for their support and guidance for this project.