STANDARD PRODUCTION LINE OF LINE CONDITIONERS

TYPE	EAFS018	EAFS036	EAFS072	EAFS050-S (SM)
Passing voltage (kVA)	18	36	72	50
Rated voltage (V)	3x230/400			
Inverter power (kVA)	3,6	7,2	14,4	10
Output current (A)	26	52	104	72
Input voltage fluctuation	-20% (184 V) to +10% (253 V)			-20% (184 V) to +15% (264 V)
Output voltage fluctuation	-5% (218 V) to +10% (253 V)			-2% (225 V) to +2% (235 V)
Congestion	1 h 10% / 1 min 30% / 1 s 100%			
Frequency (Hz)	50 (optional 60)			
Efficiency	> 95%			
Version	Outdoor (indoor optional)			
Dimensions H × W × D (mm)	1200 × 1050 × 600			
Weight (kg)	270	305	405	415

USE OF CONDITIONING TECHNOLOGY FOR OTHER NETWORKS

The line conditioner can be used for both LV and HV networks up to a throughput of MVA. Custom manufacturing guarantees delivery of the equipment exactly according to the customer's needs.

SKUPINA ČEZ

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ELCOM, a. s. is a provider of highly specialized comprehensive services in the field of high voltage electrical engineering, measuring technology and industrial automation with an international scope. We offer our customers tailor-made solutions to meet specific needs thanks to our own team of highly regarded experts in electrical engineering, mechanical engineering and software development, as well as our complete understanding of the issues surrounding material engineering, electronics, data management and process engineering. We implement projects completely in-house in accordance with our own integrated process management policy. As one of the few companies in the Czech Republic, we are part of the National Instruments Alliance program, where we have achieved the level of Gold Alliance Partner.

Gold Partner
SYSTEM INTEGRATION

ISO 9001
ISO 14001
ISO 45001
BUREAU VERITAS Certification

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ELCOM

- Stabilises output voltage
- Significantly reduces flickering
- Improves the qualitative parameters of electricity
- Outdoor and indoor design for MVA performance

LINE CONDITIONER

TO ENSURE QUALITY ELECTRICITY

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GENERAL

USE OF CONDITIONING TECHNOLOGY FOR ENERGY

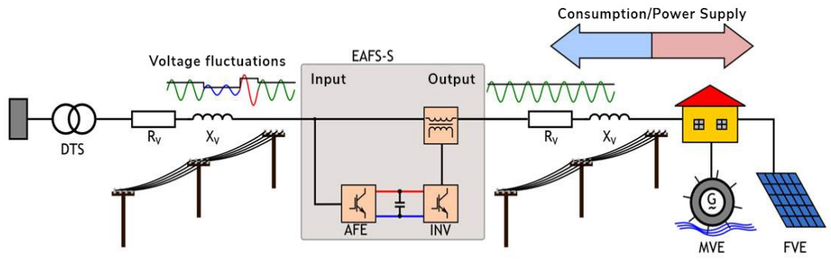
There are a number of locations on the LV network where electricity is not supplied in the quality according to the prescribed standards. There are interruptions, drops and fluctuations in voltage which severely restrict the end consumer. The infrastructure status restricts small producers from supplying electricity, as the management of these dispersed sources will limit or interrupt production if there is a risk of adverse effects on the grid. In these locations, it is then necessary to reinforce or even reconstruct the entire grid to ensure the power quality. Line conditioning represents a significantly less time-consuming and costly solution. By including a line conditioner, small-scale generation is also shielded from the influence of the infrastructure, allowing it to be fully utilised when water/sun/wind is available.

A line conditioner is a device operating on the principle of series compensation of changes in mains voltage by means of transformers connected in series and fed by a voltage source implemented by a pulse-width modulated inverter. The device operates as a power voltage stabiliser for power distribution over a wide input voltage range with independent stabilising effect of individual output phases, fast action and compensation of short-term drops. The conditioner handles only a portion of the power necessary to make up the deficit created by line losses to calm the load. The line conditioner regulates the effective voltage value in period, thereby stabilising the line voltage at the point of consumption and reducing the flicker effect. In the version with a special control system and FW with very fast regulation (active series filter), it allows to suppress the distortion power (smooth the voltage curve) or reduce certain harmonics. In the event of an equipment failure, the circuit is safely bridged and thus the power supply is guaranteed in its original state.

The line conditioner contributes to improving the power quality, especially in the following parameters:

- Voltage stabilization
- Deviations from rated voltage
- Significant voltage drops
- Cyclic voltage fluctuation (flicker effect)
- Does not affect the signal frequency level (HDO)

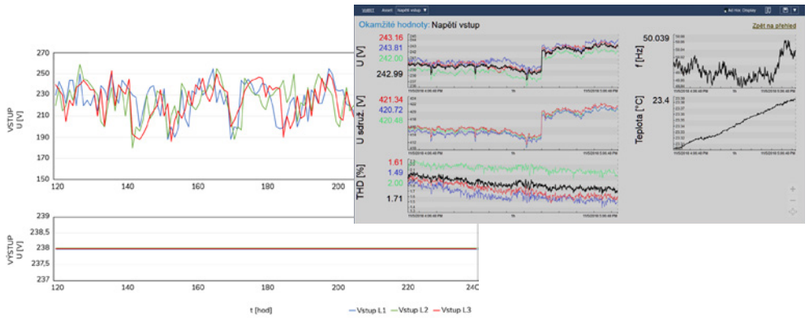
The better these qualitative parameters are guaranteed, the more complex the equipment is. The conditioner is designed as a converter with filtration and auxiliary circuits in a steel sheet cabinet with IP43 protection, which is mounted with its side on the power distribution pillar.



The line conditioner is used in long network spurs, where it is usually placed in front of the consumption point. The output voltage is stabilised to the desired value, while the voltage on the grid side can be over- or under-voltage depending on the current operating conditions of the LV distribution system. The basic function of the line conditioner is to shield the consumption point from the adverse effects of long line impedance. If the line conditioner is to do this in all modes, regardless of the prevailing consumption or production on the customer's side (dispersed generation or RES), its inverter part must be able to operate also in regenerative mode.

IMPROVEMENTS IN POWER QUALITY

The power of the line conditioner is specified as the throughput power; the actual power of the inverter is smaller, representing approximately 20% of the throughput power. For example, a 36 kVA line conditioner has an inverter capacity of 7.2 kVA. Since the inverters operate at greater than 90% efficiency, the inverter power dissipation is approximately 300 W at maximum throughput current. The conditioner is not a power source and therefore the output voltage compensation has physical limits. A voltage drop of 30% or more can be considered as the limit of the principle of series line loss compensation.



SMART LINE CONDITIONER

By extending the standard line conditioner with power quality analysers, a central system and virtual and augmented reality elements offers a system is enabling remote monitoring, analysis, diagnosis and possibly prediction of the condition of the equipment itself. The aim is to equip common equipment in the power industry with features that will increase its utility and information value and facilitate its maintenance.

The following elements are integrated into the line conditioner:

- ENA-NXG measuring platform
- Central OSISOFT PI or ENA SCADA system
- Additional visualisation with Microsoft HoloLens

Benefits of SMART line conditioner:

- Control and analysis of electrical and non-electrical quantities (U, I, S, P, Q, flicker effect size, temperature, and humidity)
- Optimisation of the output voltage setting to minimise device losses
- Remote fault detection and assessment, trend evaluation and prediction of unit functionality (fan operation, contactor tripping, and 24 V DC auxiliary power supply behaviour) to ensure maximum component lifetime