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**ABB SACE**  
**A division of ABB S.p.A.**  
**L.V. Breakers**  
Via Pescaria 5,  
24123 Bergamo - Italy  
Phone: +39 035 395.111  
Fax: +39 035 395.306-433

**[abb.com/lowvoltage](http://abb.com/lowvoltage)**

BROCHURE

# SACE Emax 2 for UL 1066

The all-in-one innovation







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The world of electrical power distribution changes fast and major new trends such as renewables, energy storage and microgrids are now crowding onto the stage. These trends lead to new customer and application demands.

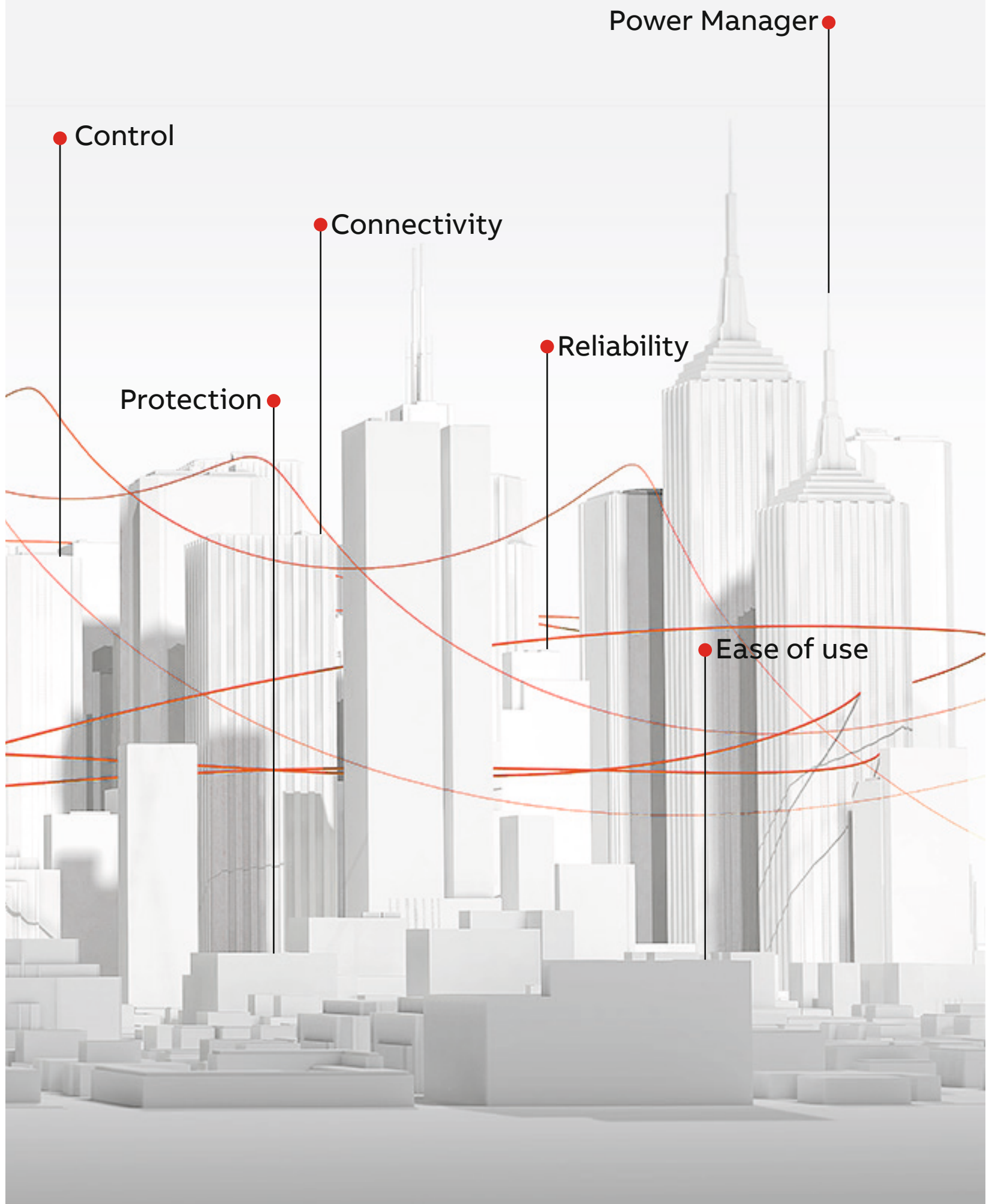
To meet these demands, ABB has now unveiled the innovative Emax 2 all-in-one, the evolution of the Emax 2 into a multifunctional platform that is able to manage the next generation of electrical distribution systems such as microgrids.

Emax 2 all-in-one is the first circuit breaker that meets new grid requirements. It enables a direct communication to the new energy management cloud-computing platform ABB Ability™ Electrical Distribution Control System.

Smart plug and play architecture makes Emax 2 all-in-one easy to use. Leveraging also unmatched electrical performances, Emax 2 sets a new circuit breaker benchmark for the needs of today and tomorrow.

SACE Emax 2, the all-in-one solution to manage "low-voltage distribution systems".





# Efficiency and control

## The power needed, when needed

### Efficiency

Achieving maximum efficiency of an electrical installation requires intelligent management of power supplies and energy use. For this reason, the new technologies used in the SACE Emax 2 circuit breakers allow the productivity and reliability of installations to be optimized, and at the same time, power consumption to be reduced while fully respecting the environment.

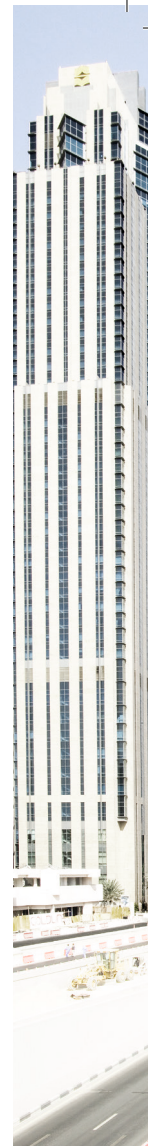
New advanced functionalities, together with Protection trip units, Communication and system devices contribute to make SACE Emax 2 the circuit breaker that maximizes efficiency in all low-voltage electrical installation.

### Control

SACE Emax 2 circuit breaker is the first single device ready to manage all the dynamics of a low-voltage electrical installation.

Managing loads in any condition is now possible thanks to Advanced Functionalities such as:

- **Adaptive load shedding.**  
Fast load shedding to guarantee continuity for critical loads during black-outs. Typical scenario is when LV distribution is disconnected from the grid (MV).
- **Predictive load shedding.**  
Slow load shedding to avoid overloads, giving the possibility to modulate loads consumption.
- **Power controller.**  
Patented algorithm to reduce the peak of power consumed, allowing savings on electricity bills. Managing different power sources and connecting them to main grid is also crucial, so that service continuity is maximized.
- **Embedded ATS functions.**  
An automatic transfer switch system used in all application where continuity is essential and where there are multi source supplies.
- **Synchro-reclosing.**  
Synchronization and automatic reconnection of the Microgrid to the main grid when the power is back. Emax 2 is able to act as a controller of Main grid condition, disconnecting a plant when necessary and also to adapt protection to on-grid or off-grid conditions.
- **Interface protection system and Interface Device.**  
Check of grid-connected operation that shall be immediately and automatically interrupted in case of outage of the distribution grid or when the voltage and frequency values of the grid itself are out of the range of values defined by the Distribution System Operator (DSO).
- **Adaptive protection.**  
Network changes recognition and automatic set of thresholds to guarantee protection and coordination in on-grid and off-grid conditions.









# Connectivity

## Integration is easy. Even from afar

SACE Emax 2 series circuit breakers can be integrated perfectly into all automation and energy management systems to improve productivity and energy consumption and to carry out remote service.

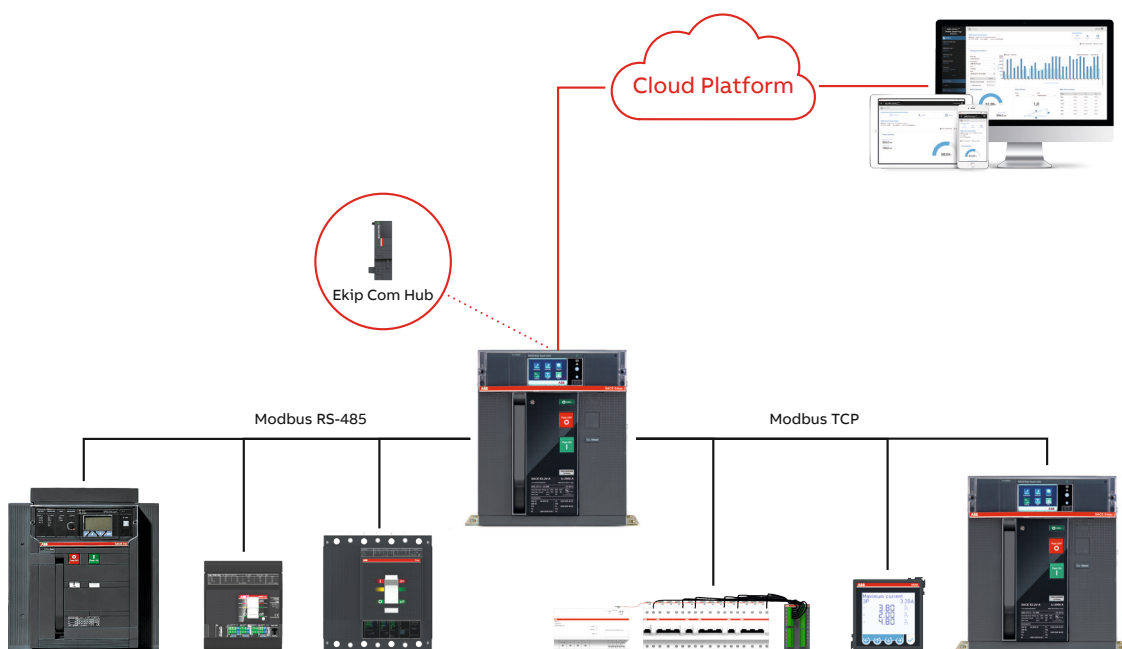
All circuit breakers can be equipped with communication units for use with Modbus, Profibus, and DeviceNet™ protocols as well as the modern Modbus TCP, Profinet, EtherNet/IP™ and Open ADR.

The cartridge-type modules can be easily installed directly on the terminal box, even at a later date. Furthermore, the integrated IEC61850 communication module enables connection to automation systems widely used in medium voltage power distribution to create intelligent networks (Smart Grids).

All circuit breaker functions are also accessible via the Internet, in complete safety, through the **Ekip Link** switchgear supervision system and the **Ekip Control Panel**.

Furthermore with an easy connection thanks to the Ekip Com Hub module, SACE Emax 2 can be integrated into an energy management system, **ABB Ability™ Electrical Distribution Control System**. The power and auxiliary connections are optimized to simplify connection to the switchgear.

The power terminals, which can be oriented horizontally or vertically, have been designed for the most common busbars, while the push-in connections of the auxiliaries ensure immediate and safe wiring.



## CONNECTIVITY





# Performance

## A size for every requirement

The SACE Emax 2 range is made up of 4 sizes: E1.2, E2.2, E4.2 and E6.2 up to 6000A, which enable switchgear of compact dimensions and high ratings to be built with busbars of reduced length and cross-section.

The protection trip units, auxiliary connections and main accessories are the same throughout the range to simplify design and installation. Furthermore, the sizes from E2.2 to E6.2 have the same height and depth.

The rating levels are updated and standardized throughout the sizes to meet the demands and needs of today's installations, from 42kA to 150kA, and to standardize switchgear projects. High short-time currents, together with the efficiency of the protection functions, guarantee complete selectivity in all situations.

Accurate design and choice of materials enable optimization of the overall dimensions of the circuit breaker. In this way switchgear of compact dimensions can be built and outstanding savings at the same performance can be obtained.

The SACE Emax 2 range is available with UL certification, IEC certification, and now with UL, IEC, and CCC triple certification up to 5000A.

E1.2



E2.2



E4.2



E6.2









## Ease of use

### Everything under control and problem free

The entire range is available in fixed and withdrawable versions, with double insulation between the front of the switchgear and the live parts. The circuit breakers can be powered indifferently from the lower terminals or the upper terminals.

All essential information is available in the central area of the front shield and enables immediate identification of the status of the circuit breaker: open, closed, ready to close, charged and discharged springs. Maintenance is simple and safe. Thanks to the new front shield design, the main accessories can be installed without completely removing it.

The withdrawable circuit breaker is inserted and removed via dedicated guide rails that simplify movement. The correct movement from racked-in, test isolated, to racked-out position is guaranteed by a lock in each position.

As a further guarantee of safety, the shutters of the fixed part can be locked from the front when the circuit breaker is removed. The shutters of the upper terminals are independent of those of the lower terminals to facilitate checking and maintenance operations.

The **Ekip Touch protection trip units** are equipped with a large color touch-screen display which enables safe and intuitive operation. Furthermore the Ekip units can be programmed and consulted from a tablet, smart phone or portable PC via the Ekip Connect application and all the advanced functionalities can be easily programmed thanks to predefined logic templates.

The trip units are easily interchangeable from the front of the circuit breaker, and all communication units can be installed directly on the terminal box with a few simple operations, making the complex system ready for a new digital experience.





# Product conformity

## Approvals and certification

The SACE Emax 2 circuit breakers and their accessories conform with ANSI C37.13, C37.16, C37.17 and C37.50 standards and are UL 1066 certified.

The UL 1066 certification allows Emax 2 to be used in UL 1558 switchgear, UL 891 switchboards and CSA C22.2 no. 31 switchgear assemblies.

In addition, SACE Emax 2 also consists of a line that is compliant with the international IEC 60947, EN 60947 (harmonized in 30 CENELEC countries), CEI EN 60947 and IEC 61000 Standards, and conforms to EC "Low Voltage Directives" (LVD) and "Electromagnetic Compatibility Directive" (EMC).

The main versions of the IEC devices are approved by the following shipping registers: RINA, Lloyd's Register of Shipping, ABS Germanischer Lloyd, Bureau Veritas, Det Norske Veritas, Russian Maritime Register of Shipping, CCS and NKK.

The SACE Emax 2 IEC line also includes certification by the Russian certification body GOST (Russia Certificate of Conformity) and has achieved China CCC Certification (China Compulsory Certification).

For the types of certified circuit breakers, certified ratings and corresponding validity, please contact ABB.



# SACE Emax 2

## Electrical characteristics

Common data		
Rated maximum voltage	[V]	635
Rated voltage	[V]	600
Test voltage (1min. 50/60 Hz)	[kV]	2.2
Frequency	[Hz]	50 - 60
Number of poles		3- 4
Version	Fixed (F) - Draw out (W)	

ABB SACE Emax 2 for UL1066			
Performance levels			
Currents			[A]
			[A]
			[A]
			[A]
			[A]
Neutral pole current-carrying capacity for 4 pole breker			[%I <sub>u</sub> ]
Interrupting rating	254 V	[kA]	
	508 V	[kA]	
	635 V	[kA]	
Rated short time current			[kA]
Trip times	Break time with fault current < rated short time current		[ms]
	Break time with fault current > rated short time current		[ms]
Overall dimensions	Fixed	H	[in/mm]
		D	[in/mm]
		W 3p	[in/mm]
		W 4p - 4p FS	[in/mm]
	Draw out	H	[in/mm]
		D	[in/mm]
		W 3p	[in/mm]
		W 4p - 4p FS	[in/mm]
Weight	Fixed	3p / 4p / 4p FS	[lbs/Kg]
	Draw out	3p / 4p / 4p FS	[lbs/Kg]

ABB SACE Emax 2 for UL1066			
Mechanical and electrical life with regular ordinary maintenance prescribed by the manufacturer			[I <sub>u</sub> ]
			[Nr.cycles x 1000]
	Frequency		[Cycles/Hour]
Electrical life	508 V		[Nr.cycles x 1000]
	635 V		[Nr.cycles x 1000]
	Frequency		[Cycles/Hour]



E1.2			E2.2			E4.2			E6.2					
B-A	N-A	S-A	B-A	N-A	S-A	H-A	V-A	S-A	H-A	V-A	L-A***	H-A	V-A	L-A***
800	800	250	1600	1600	800	800	250	2500	2500	800	800	4000	4000	4000
1200	1200	400		2000	1200	1200	400	3200	3200	1600	1600	5000	5000	5000
		800			1600	1600	800	3600**	3600**	2000	2000	6000*	6000*	6000*
		1200			2000	2000	1200			2500	2500			
	1600	1250					1600			3200	3200			
		1600					2000			3600**	3600**			
100	100	100	100	100	100	100	100	100	100	100	100	50-100	50-100	50-100
42	50	65	42	50	65	85	100	65	85	100	125	85	100	150
42	50	65	42	50	65	85	100	65	85	100	125	85	100	150
42	42	42	42	50	65	85	85	65	85	100	100	85	100	100
42	50	50	42	50	65	85	85	65	85	100	100	85	100	100
40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
11.65 / 296			14.61/371			14.61/371			14.61/371			14.61/371		
7.20 / 183			10.63/270			10.63/270			10.63/270			10.63/270		
8.27 / 210			10.87/276			15.12/384			30.00/762			30.00/762		
11.02 / 280			14.41/366			20.08/510			34.96/888 - 39.92/1014			34.96/888 - 39.92/1014		
14.33 / 363.5			16.73/425			16.73/425			16.73/425			16.73/425		
11.06 / 281			15.47/393			15.47/393			15.47/393			15.47/393		
10.94 / 278			12.48/317			16.73/425			31.61/803			31.61/803		
13.70 / 348			407/16.02			21.69/551			36.57/929 - 42.09/1069			36.57/929 - 42.09/1069		

\* Only Drawout and 3 poles. Version not yet available, please contact ABB.

\*\* Only Fixed.

\*\*\* Version not yet available, please contact ABB.

E1.2			E2.2			E4.2			E6.2		
< 800	800	1200	< 1600	1600	2000	<2500	2500	3200	3600	4000	5000
20	20	20	25	25	25	20	20	20	15	12	12
60	60	60	60	60	60	60	60	60	60	60	60
8	8	7	15	12	10	10	8	7	5	4	3
8	8	6,5	15	10	8	10	8	7	4	4	2
30	30	30	30	30	30	20	20	20	20	10	10



