



# Fronius **CL**

PV central inverter with  
Fronius MIX™ concept



POWERING YOUR FUTURE



## Modular system. Maximum yield.

The Fronius CL combines high-yield power electronics with the unique, modular system design of up to 15 identical power modules in the MIX™ concept. Maximum yield and the highest stability are the advantages of this sophisticated system. This makes the Fronius CL the optimal central inverter for PV systems of up to several hundred kilowatts. Other pluses include the exact MPP tracking of the module manager, the automatic transformer switching function and much more. This makes the Fronius CL an upscale multi-purpose device that guarantees continual high performance.

## Unique system design with the Fronius MIX™ concept

Up to 15 power modules operate in the Fronius CL accomplishing something great together. This combination of several power modules has many advantages: maximum earnings in partial load ranges, high system stability, long service life and easy servicing.

**Highest partial load efficiency.** Nine, 12 or 15 identical power modules divide up the work in the MIX™ concept. The individual power racks are turned off and on automatically depending on the insolation power. This ensures that the load is optimized and yield is always at maximum – even while raining, when cloudy or at dusk.

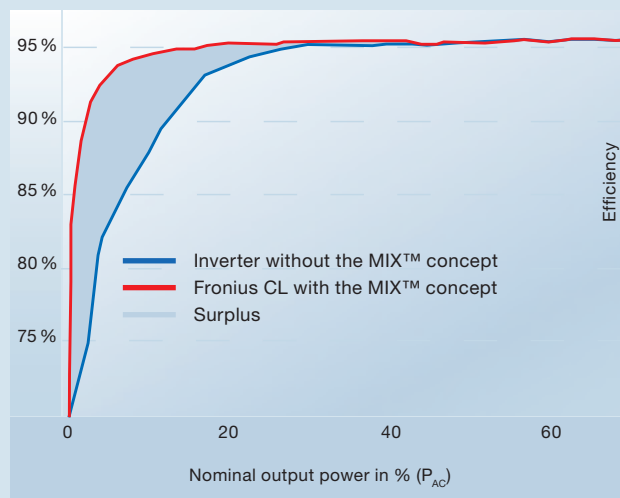
**Unsurpassed reliability.** The Fronius CL creates a redundant system because it integrates several smaller power modules that work together. If one power module should fail, the others simply take up the slack. In comparison: when the power module fails in monolithic systems, the entire system stops operating and this leads to considerable loss of earnings. The Fronius MIX™ concept ensures that the inverter remains in operation even when there is a defect in a power module and this helps to lock in your earnings.

**Long service life.** The control unit automatically calculates which power racks and how many will be turned on and off in partial load operation using the respective operating hours of the power modules. This helps to equalize the work load on the PC boards. This also decreases the operating hours of the individual power modules thus increasing the service life of the inverter.

**Fast service option.** When service is required, power modules can be removed and replaced easily via the plug & play principle and drawer design. This ensures the highest serviceability and the fastest reaction times on the market.



Up to 15 identical power modules in the Fronius CL create a redundant system. A well-thought-out concept for the highest stability.



The Fronius MIX™ concept: Maximum efficiency even during rain, cloudiness or at dusk. The power modules turn off or on depending on the insolation power thus earnings are always at maximum.

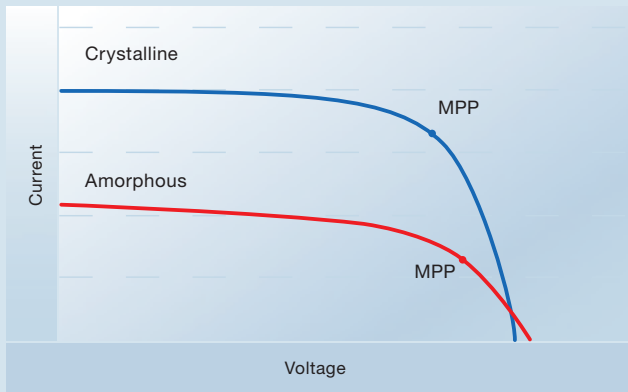


## High-yield power electronics

The Fronius CL was designed for continual high performance. The clever combination of automatic transformer switching, the precise Fronius Module Manager, the innovative ventilation concept and the advantages of the high frequency transformer technology make it one of the highest yield inverters of its class.

**Automatic transformer switching.** The Fronius CL provides constant, high efficiency over the entire input voltage range. This is because Fronius inverters have three efficiency peaks due to automatic transformer switching. In comparison: Devices without transformer switching only have one efficiency peak. The efficiency then decreases steadily with an increasing input voltage.

**Exact MPP tracking.** The Fronius Module Manager always finds the exact maximum power point (MPP). This is true even with the more demanding thin-layer modules. Overall, the Fronius Module Manager is able to achieve an outstanding MPP adaptation efficiency of 99.9%. This ensures that the maximum yield is obtained from every ray of light.

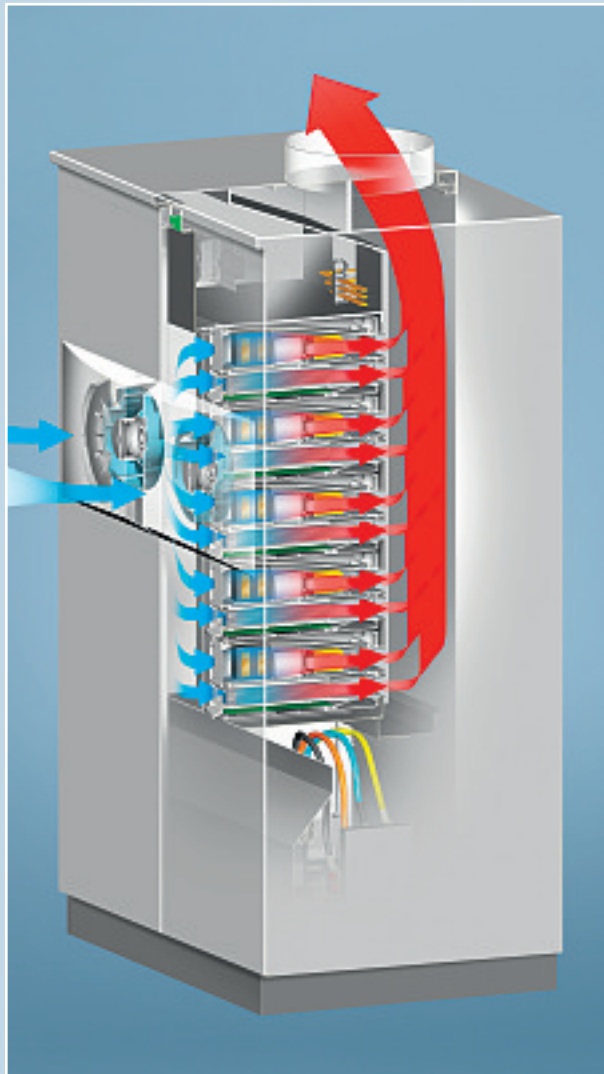


Amorphous (thin-layer) modules have efficiency characteristics that are more even. That's why regular inverters have a difficult time reaching the maximum power point (MPP). The intelligent Module Manager from Fronius always finds the exact MPP.

**High-frequency transformer technology.** High performance with low weight and a compact design: The use of proven high-frequency transformer technology produces excellent performance results. The Fronius CL uses galvanic isolation, which meets the strictest safety standards worldwide.



High performance power racks with uniform high efficiency using automatic transformer switching, precise MPP tracking and an intelligent cooling concept.



**Intelligent cooling.** An innovative ventilation design eliminates dust and moisture from getting into the power module area. The air required for cooling is drawn in by two fans on the front of the device and passed through a closed channel through the individual power racks. The PC boards never come into contact with the outside air. Inside the hermetically sealed power module, a smaller fan ensures uniform cooling. This sophisticated system increases the operational reliability and the service life of the inverter.

## Simple planning, easy installation

The Fronius CL was designed with practicality in mind. It can be used for many different assignments due to its planning flexibility. It is also easy to set up due to numerous design details that make installation and connection as simple as possible.

**Wide input voltage range.** Different module configurations are possible: The wide input voltage range ensures high flexibility for system configuration.

**Integrated grounding option.** The Fronius CL is well-equipped should modules have to be grounded whether positive or negative. Simply remove the interior grounding holder and insert the fuse.

**Optional exhaust air guide.** If the Fronius CL is set up in a closed area, the exhaust air can be channeled out of the space using a connected pipe to prevent extreme heating of the ambient air. An integrated relay contact can also be used to control an external fan that draws the air to the outside.

**Low installation height.** The Fronius CL can also fit into shallow spaces due to its low 183 cm height (with base). This compact design is achieved by its three-row arrangement of power modules in the inverter.

**Low installation weight.** The power racks can simply be removed for installation. This reduces the weight of the Fronius CL and makes the housing easier to move. The racks can then be re-inserted and the inverter can begin operation immediately.



Installation made easy: The power racks can be easily removed for transport. Cables with large cross sections can be easily connected in the spacious connection area.

**Generous connection area.** Sufficient space is available for connections and cabling with large cable cross sections. This makes installation simpler and much easier.

## Extensive system monitoring

System monitoring is vital for inverters of this size. Using the comprehensive Fronius DATCOM system, you can set up a complete monitoring system including extensive data recording, analysis, visualization as well as remote monitoring.

**100 % DATCOM-compatible.** The Fronius CL can utilize all options for professional system monitoring within the comprehensive Fronius DATCOM system. The Fronius Com Card as well as the Signal Card function are already integrated. Other components such as the Datalogger, sensors and much more can be added at any time. Therefore, it can be equipped for any situation.

**Fronius String Control.** The customized solution for string monitoring. The Fronius String Control continually compares the string currents of connected strings with each other. This enables the early detection and localization of problems in the entire system (e.g. gnawing damage to cables from small animals, module failure, etc.).



The Fronius String Control detects errors in the entire system. Gradual reductions in earnings are prevented.

**Integrated Com Card.** The Fronius CL has three DATCOM option slots. One of which comes standard with a Fronius Com Card. Therefore, a professional monitoring system can be installed right away.

**Integrated Interface Card function.** An open data protocol is used to read system data enabling you to easily use third-party components for system monitoring.

**Integrated Signal Card function.** This practical signaling contact can be used for an audiovisual alarm signal, external components (e.g. fan, lights, etc.) or for reporting system status changes, for example.

## Fronius CL Overview

Naturally, all Fronius CL devices have the **CE** mark and meet all required country-specific guidelines and standards. For more information and certificates as well as details regarding system analysis and control using the Fronius DATCOM system, please go to [www.fronius.com](http://www.fronius.com).

INPUT DATA	Fronius CL 36.0	Fronius CL 48.0	Fronius CL 60.0
DC maximum power at $\cos \varphi=1$	38.6 kW	51.4 kW	64.4 kW
Max. input current ( $I_{dc \max}$ )	167.8 A	223.4 A	280.2 A
Max. input voltage ( $U_{dc \max}$ )	600 V		
MPP voltage range ( $U_{mpp \min} - U_{mpp \max}$ )	230 - 500 V		
OUTPUT DATA			
AC nominal output ( $P_{ac,r}$ ) at $\cos \varphi=1$	36 kW	48 kW	60 kW
Max. output power	36 kVA	48 kVA	60 kVA
Max. output current ( $I_{ac \max}$ )	52.2 A	69.6 A	87.0 A
Max. efficiency	95.9 %	95.9 %	95.9 %
Euro. efficiency ( $\eta_{EU}$ )	95.3 %	95.4 %	95.5 %
MPP adaption efficiency	> 99.9 %		
Grid connection	3~NPE 400 V / 230 V		
Frequency ( $f_r$ )	50 Hz / 60 Hz		
Harmonic distortion	< 3 %		
Power factor ( $\cos \varphi_{ac,r}$ )	0.85 - 1 ind. / cap.		
Night consumption	11.4 W	11.6 W	12.2 W
Feed-in starting at	80 W	95 W	120 W
GENERAL DATA			
Dimensions (height x width x depth) including base (100 mm)	1830 x 1105 x 722 mm		
Weight	248 kg	276 kg	303 kg
Degree of protection	IP 20		
Inverter concept	HF transformer		
Cooling	Regulated air cooling		
Installation	Indoor installation		
Ambient temperature range	From -20°C to +50°C		
Permitted humidity	0 % to 95 %		
SAFETY EQUIPMENT			
DC insulation measurement	Warning when $R_{ISO} < 500 \text{ k}\Omega$		
Overload behaviour	Operating point shift, power limiter		
DC disconnect	Integrated		
INTERFACES			
2x RJ45 sockets (RS485)	Solar Net interface, interface protocol		
SPECIAL FEATURES			
Fronius CL devices for Germany are delivered exclusively with a manual AC circuit breaker.			

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