

FRONIUS CL CENTRAL INVERTER

/ The central inverter for long-term peak performance.

/ Fronius
MIX™ concept/ HF transformer
switchover/ Fronius Module
Manager/ PC board
replacement concept

/ Ventilation concept

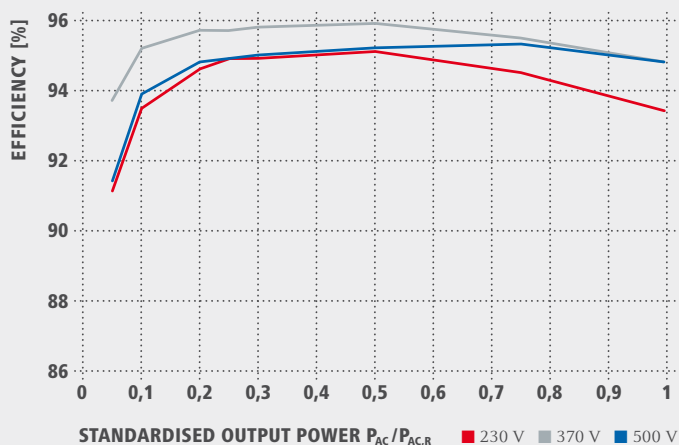
/ Transport
technology

/ The Fronius CL combines efficient power electronics with a unique modular system design of up to 15 identical power stage sets in the Fronius MIX™ concept. This makes the Fronius CL the perfect central inverter for PV systems of up to several hundred kilowatts. Other advantages: precise maximum power point tracking of the Fronius Module Manager, automatic transformer switchover, and much more. The Fronius CL is available in the 36, 48 and 60 kW power categories.

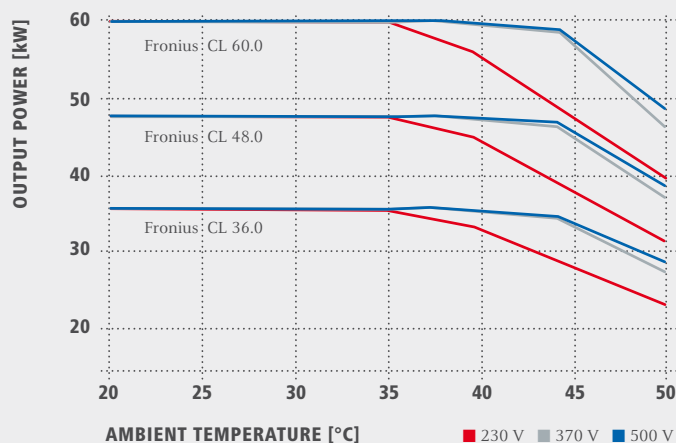
TECHNICAL DATA: FRONIUS CL

INPUT DATA	CL 36.0	CL 48.0	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
Min. input voltage ($U_{dc \min}$)		230 V	
Feed-in start voltage ($U_{dc \text{ start}}$)		260 V	
Nominal input voltage ($U_{dc \text{ r}}$)		370 V	
Max. input voltage ($U_{dc \max}$)		600 V	
MPP voltage range ($U_{mpp \min} - U_{mpp \max}$)		230 V – 500 V	
Number of DC inputs		3	
OUTPUT DATA	CL 36.0	CL 48.0	CL 60.0
AC nominal output ($P_{ac \text{ r}}$)	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
Grid connection ($U_{ac \text{ r}}$)		3-NPE 400 V / 230 V	
Min. output voltage ($U_{ac \min}$)		180 V	
Max. output voltage ($U_{ac \max}$)		270 V	
Frequency (f_r)		50 Hz / 60 Hz	
Frequency range ($f_{\min} - f_{\max}$)		46 Hz – 65 Hz	
Distortion factor		< 3 %	
Power factor ($\cos \varphi_{ac \text{ r}}$)		0.85 – 1 ind. / cap.	
GENERAL DATA	CL 36.0	CL 48.0	CL 60.0
Dimensions (height x width x depth)		1,830 x 1,105 x 722 mm	
Weight	248 kg	276 kg	303 kg
Degree of protection		IP 20	
Protection class		1	
Overvoltage category (DC / AC)		2 / 3	
Night-time consumption	11.4 W	11.6 W	12.2 W
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 %	
DC connection technology		Bolt M10	
AC connection technology		Bolt M10	
Certificates and compliance with standards	VDE V 0126-1-1, ÖVE/ÖNORM E 8001-4-712, UTE C15-712-1, G 59, CER 06-190, Guida per le connessioni alla rete elettrica di ENEL Distribuzione		

FRONIUS CL 60.0 EFFICIENCY CURVE



FRONIUS CL TEMPERATURE DERATING



TECHNICAL DATA: FRONIUS CL

EFFICIENCY	CL 36.0	CL 48.0	CL 60.0
Max. efficiency	95.9 %	95.9 %	95.9 %
European efficiency (η_{EU})	95.3 %	95.4 %	95.5 %
η at 5% $P_{AC,R}^{1)}$	89.6 / 90.8 / 91.4 %	90.5 / 90.9 / 91.7 %	91.1 / 93.7 / 91.4 %
η at 10% $P_{AC,R}^{1)}$	93.3 / 94.4 / 94.1 %	93.9 / 94.7 / 94.1 %	93.5 / 95.2 / 93.9 %
η at 20% $P_{AC,R}^{1)}$	94.4 / 95.3 / 95.0 %	94.7 / 95.5 / 94.8 %	94.6 / 95.7 / 94.8 %
η at 25% $P_{AC,R}^{1)}$	94.8 / 95.5 / 95.1 %	95.0 / 95.7 / 95.2 %	94.9 / 95.7 / 94.9 %
η at 30% $P_{AC,R}^{1)}$	95.0 / 95.7 / 95.1 %	95.1 / 95.7 / 95.3 %	94.9 / 95.8 / 95.0 %
η at 50% $P_{AC,R}^{1)}$	95.1 / 95.9 / 95.3 %	95.2 / 95.9 / 95.4 %	95.1 / 95.9 / 95.2 %
η at 75% $P_{AC,R}^{1)}$	94.4 / 95.4 / 95.3 %	94.4 / 95.5 / 95.3 %	94.5 / 95.5 / 95.3 %
η at 100% $P_{AC,R}^{1)}$	93.3 / 94.8 / 94.9 %	93.4 / 94.8 / 94.8 %	93.4 / 94.8 / 94.8 %
MPP adaptation efficiency	> 99.9 %		

¹⁾ and at $U_{mpp\ min} / U_{dc,r} / U_{mpp\ max}$

PROTECTIVE EQUIPMENT	CL 36.0	CL 48.0	CL 60.0
DC insulation measurement	Warning/shutdown (depending on country setup) at $R_{ISO} < 500\ k\Omega$		
Overload behaviour	Operating point shift, power limitation		
DC circuit breaker	Integrated		

INTERFACES	CL 36.0	CL 48.0	CL 60.0
Two RJ45 sockets (RS422)	Fronius Solar Net interface, interface protocol		
2 signalling outputs	Max. current per output: AC max. 277 V / 10 A, DC max. 24 V / 10 A		

SPECIAL FEATURES	CL 36.0	CL 48.0	CL 60.0
Feed-in from	80 W	95 W	120 W
Fronius CL devices for Germany are only supplied with a manual AC disconnecter.			

/ Battery Charging Systems / Welding Technology / Solar Electronics

WE HAVE THREE DIVISIONS AND ONE PASSION: SHIFTING THE LIMITS.

/ Whether Battery Charging Systems, Welding Technology or Solar Electronics - our goal is clearly defined: to be the technology and quality leader. With around 3,000 employees worldwide, we shift the limits of what's possible - our more than 850 active patents are testimony to this. While others progress step by step, we innovate in leaps and bounds. Further information about all Fronius products and our global sales partners and representatives can be found at www.fronius.com



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Fronius Australia Pty Ltd.
90-92 Lambeck Drive
Tullamarine VIC 3043
Australia
pv-sales-australia@fronius.com
www.fronius.com.au

Fronius UK Limited
Maidstone Road, Kingston
Milton Keynes, MK10 0BD
United Kingdom
pv-sales-uk@fronius.com
www.fronius.co.uk

Fronius International GmbH
Froniusplatz 1
4600 Wels
Austria
pv@fronius.com
www.fronius.com