



TLX Inverter Range

Three phase transformerless inverter range from 6-15 kW

The TLX range includes TLX, TLX+, TLX Pro and TLX Pro+



35 kg

The weight of 6-15 kW

Ensuring easy and troublefree installation of high performance inverters

The TLX inverter series, with efficiency of 98% deliver maximum energy in all conditions Transformer-less design, advanced electronics and optimised internal connections reduce potential energy losses.

Balanced three-phase AC output ensures grid compliance at all times and precise MPP tracking at 99.9% in steady conditions and 99.8% in dynamic conditions enable the inverter to harvest all the energy of the PV modules.

The TLX inverter is designed for high performance. Integrating 1000 V input range, 250-800 V MPP range and multiple DC inputs with each their own individually regulated

MPP tracker, allows for more modules in a series and longer strings, while providing greater flexibility in the PV setup.

The TLX Pro series includes master inverter technology capable of controlling up to 100 inverters from a single inverter.

Likewise, the integrated webserver, which allows you to control, monitor and adjust your PV system from any computer, comes standard on the TLX Pro.

The TLX inverter series includes the Danfoss Smart Technologies: a combination of features, which makes the TLX inverters unique in the market:

EnergySmart™

Excellent MPPT Efficiency, 98 % conversion efficiency, 1000 V_{DC}, AC power burst and an excellent cooling concept provides high yield and earlier return on investment. High voltage input and reduced losses on the DC side. Early start up and late stop of power production result in maximised yield while exact cooling minimizes energy losses.

DesignSmart™

A large number of independently regulated MPP trackers along with 1000 V_{DC} and asymmetrical layout options allows for endless layout possibilities. This huge flexibility makes installations from residential to large scale plants possible.

TrackSmart™

Advanced Digital Tracking algorithms with efficiency of 99.9 % creates conditions for accumulating the most energy possible, regardless of ambient conditions, physical obstacles or inclination challenges.

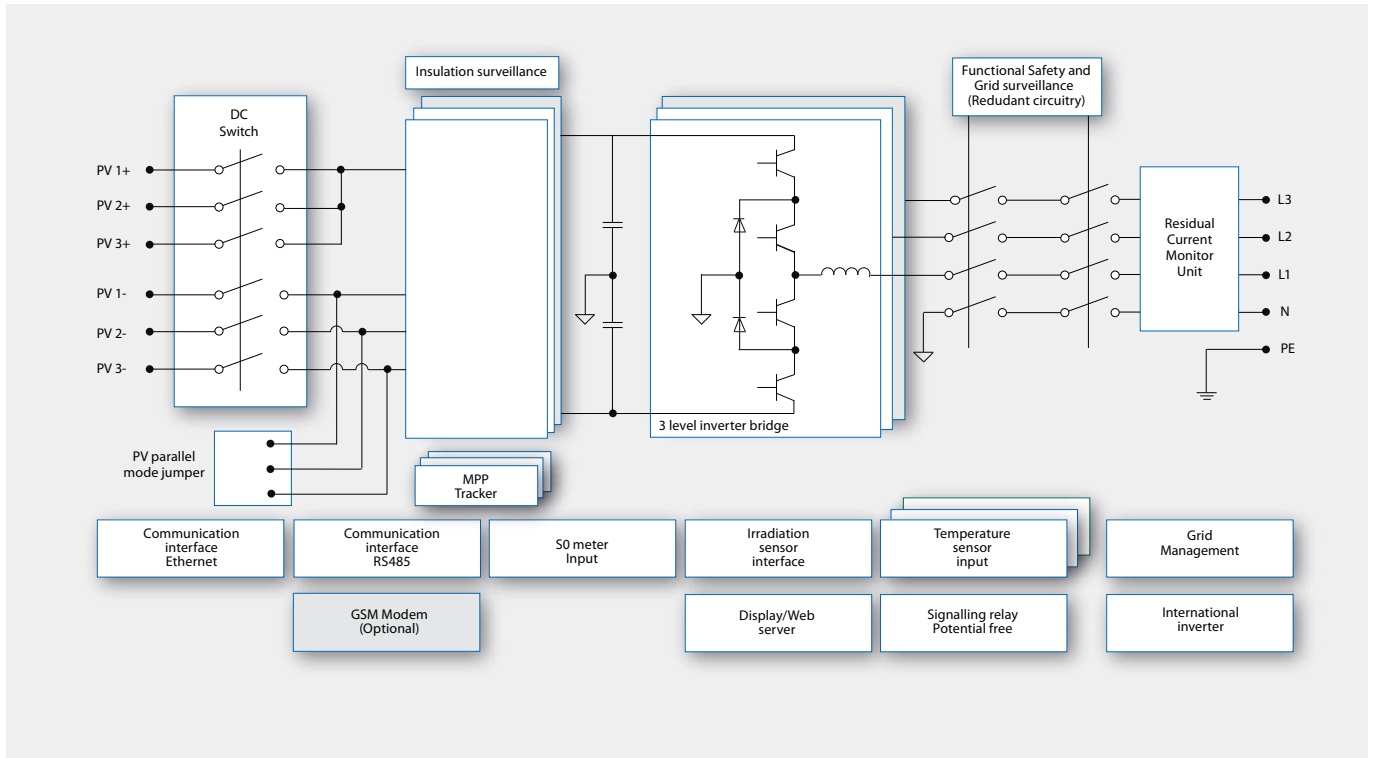
* ControlSmart™

Integrated monitoring and control options through the Master inverter and Web server allows for; management of up to 100 inverters from a single inverter, accumulation of data from all inverters as well as overview of individual inverter parameters, from any computer. Integrated data logging of 34 days detailed and 20 years of accumulated data reduces the need for additional monitoring equipment.

* TLX Pro series only.

Description of inverter

External and internal inverter design



Nomative References	TLX 6 kW	TLX 8 kW	TLX 10 kW	TLX 12.5 kW	TLX 15 kW
Directive LVD			2006/95/EC		
Directive EMC			2004/108/EC		
Safety			IEC 62109-1/IEC 62109-2		
Integrated PV load switch			VDE 0100-712		
EMC immunity			EN 61000-6-1		
			EN 61000-6-2		
EMC emission			EN 61000-6-3		
			EN 61000-6-4		
Utility interference		EN 61000-3-2/-3		EN 61000-3-11/-12	
CE			Yes		
Utility characteristics			IEC 61727		
			EN 50160		
S0 Energy Meter			EN62053-31 Annex D		
Approvals & Certifications	For transformerless inverter				
Germany			VDE 0126-1-1/A1 and VDE AR N 4105 (TLX+, TLX Pro+ only)*		
Greece	Technical requirements for the connection of independent generation to the grid, Public Power Corporation (PPC)				
Italy	-		ENEL Guida Ed. 2.1.		
Spain			RD1663 (2000)		
			RD661 (2007)		
Austria			TOR – Hauptabschnitt D4, TOR – Hauptabschnitt D2		
Belgium			Synergrid C10/11 – revisie 12 mei 2009, Synergrid C10/17- revisie 8 mei 2009		
Czech Republic			Czech Energy Act (Act No. 458/2000), Article 24, Paragraph 10 part I, II, III rev09 2009		
France	UTE NF C 15-712-1 (UNION TECHNIQUE DE L'ELECTRICITE, GUIDE PRATIQUE, Installations photovoltaïques raccordées au réseau public de distribution). NF C 15-100 (Installations électriques à basse tension). Journal Officiel, Décret n° 2008-386 du 23 avril 2008 relatif aux prescriptions techniques générales de conception et de fonctionnement pour le raccordement d'installations de production aux réseaux publics d'électricité				
Germany	-	-	BDEW- Technische Richtlinie Erzeugungsanlagen am Mittelspannungsnetz Ausgabe, Juni 2008 und Ergänzungen von 01/2009, 07/2010, 02/2011		
Spain	REE BOE núm. 254				
Portugal			VDE 0126-1-1, ISO/IEC Guide 67: 2004 - System No.5		
UK			ER G83/1-1 (for 6k, 8k, 10k), ER G59/2-1 (for all models)		

*Deviant from VDE 0126-1-1 section 4.7.1., the isolation resistance measurement limit is set to 200 kΩ, in accordance with authorities

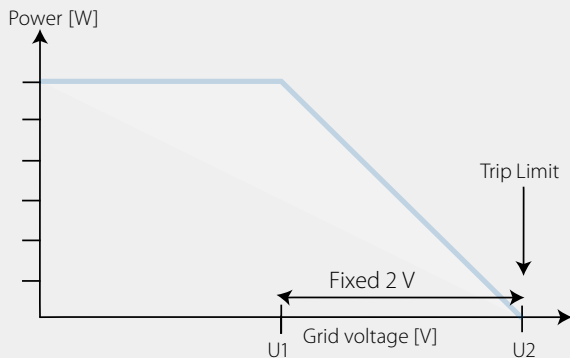
Operating Efficiency

The operating efficiency specified for V_{MPPmax} , $V_{DC,r}$ and V_{MPPmin}

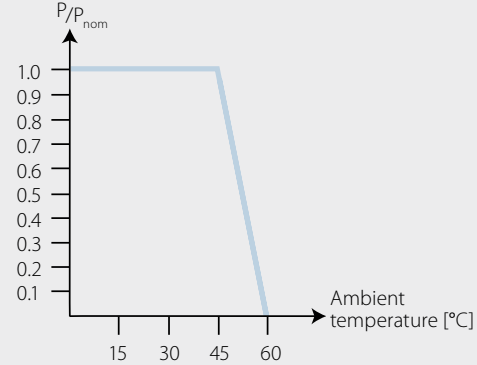
TPPV/UPV	TLX 6 kW			TLX 8 kW			TLX 10 kW			TLX 12.5 kW			TLX 15 kW		
	420 V	700 V	800 V	420 V	700 V	800 V	420 V	700 V	800 V	420 V	700 V	800 V	420 V	700 V	800 V
5%	88,2%	89,6%	87,5%	88,2%	90,9%	88,1%	87,3%	90,4%	89,1%	89,5%	92,2%	91,1%	91,1%	93,4%	92,5%
10%	91,8%	92,8%	91,4%	92,4%	92,8%	92,6%	90,6%	92,9%	92,5%	92,1%	94,1%	93,8%	93,1%	94,9%	94,6%
20%	93,6%	94,4%	94,5%	95,0%	96,5%	95,8%	94,4%	96,0%	95,6%	95,2%	96,6%	96,3%	95,7%	97,0%	96,7%
25%	94,3%	95,1%	95,3%	95,5%	96,9%	96,5%	95,2%	96,6%	96,3%	95,8%	97,1%	96,8%	96,2%	97,4%	97,1%
30%	94,9%	95,8%	96,0%	95,9%	97,2%	96,9%	95,7%	97,0%	96,7%	96,2%	97,4%	97,1%	96,5%	97,6%	97,4%
50%	96,4%	97,6%	97,4%	96,4%	97,7%	97,5%	96,6%	97,7%	97,5%	96,9%	97,9%	97,7%	97,0%	98,0%	97,8%
75%	96,6%	97,8%	97,7%	96,4%	97,8%	97,8%	96,9%	97,8%	97,8%	97,0%	97,8%	97,8%	96,9%	97,8%	97,7%
100%	96,7%	97,8%	97,9%	96,4%	97,8%	97,9%	97,1%	97,9%	97,9%	97,0%	97,8%	97,9%	96,9%	97,7%	97,9%
EU	95,4%	96,5%	96,3%	95,7%	97,0%	96,7%	95,7%	97,0%	96,7%	96,1%	97,3%	97,3%	96,4%	97,4%	97,4%

Derating

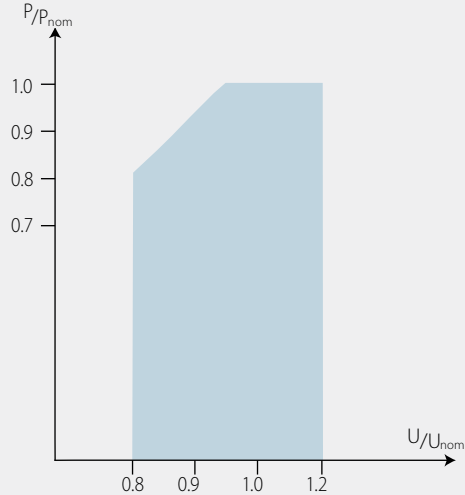
Grid voltage derating



Temperature derating



Current Derating



	TLX 6 kW	TLX 8 kW	TLX 10 kW	TLX 12.5 kW	TLX 15 kW
PV current, per input	12 A (+2%)	12 A (+2%)	12 A (+2%)	12 A (+2%)	12 A (+2%)
Grid current, per phase	9 A (+2%)	12 A (+2%)	15 A (+2%)	19 A (+2%)	22 A (+2%)
Grid power, total	6000 W (+3%)	8000 W (+3%)	10000 W (+3%)	12500 W (+3%)	15000 W (+3%)

To avoid unintentional derating due to measurement inaccuracy, the values in brackets are added to the limits.

Nomenclature ¹⁾	Parameter	TLX Pro 6 k ⁶⁾	TLX Pro 8 k	TLX Pro 10 k	TLX Pro 12.5 k	TLX Pro 15 k
AC						
P_{acr}	Max./Nom. power AC	6000 W	8000 W	10000 W	12500 W	15000 W
	Reactive power range	0-3.6 kVAr	0-4.8 kVAr	0-6.0 kVAr	0-7.5 kVAr	0-9.0 kVAr
V_{acr}	Rated output voltage	3x 230 V				
$V_{ac,min}, V_{ac,max}$	AC voltage range (P-N)	3x 230 V \pm 20%				
	Nominal current AC	3 x 9 A	3 x 12 A	3 x 15 A	3 x 19 A	3 x 22 A
I_{acmax}	Max. current AC	3 x 9 A	3 x 12 A	3 x 15 A	3 x 19 A	3 x 22 A
	AC current distortion (THD%)	< 4%	< 4%	< 5%	< 5%	< 5%
$cos\phi_{i,acr}$	Power factor at 100% load	> 0.99				
	Controlled power factor range	0.8 over-excited 0.8 under-excited				
	"Connecting" power loss	10 W				
	Night-time power loss (off grid)	< 5 W				
f_r	Rated grid frequency	50 Hz				
f_{min}, f_{max}	Grid frequency range	50 \pm 5 Hz				
DC						
	Nominal power DC	6200 W	8250 W	10300 W	12900 W	15500 W
	Max. recommended PV power at STC ²⁾	7100 Wp	9500 Wp	11800 Wp	14700 Wp	17700 Wp
V_{dcr}	Nominal voltage DC	700 V				
V_{mppmin}, V_{mppmax}	MPP voltage-nominal power ³⁾	260 - 800 V	345-800 V	430-800 V	358-800 V	430-800 V
	MPP efficiency	99.9%				
V_{dcmax}	Max. DC voltage	1000 V				
$V_{dcstart}$	Turn on voltage	250 V				
V_{dcmin}	Turn off voltage	250 V				
I_{dcmax}	Max. current DC	2 x 12 A			3 x 12 A	
	Max. short circuit current DC at STC	2 x 12 A			3 x 12 A	
	Min. on grid power	20 W				
Efficiency						
	Max. efficiency	97.8 %	97.9%	98%		
	Euro efficiency	96.5 %	97.0%	97.0%	97.3%	97.4%
Other						
	Dimensions (H, W, D)	700 x 525 x 250 mm				
	Mounting recommendation	Wall bracket				
	Weight	35 kg				
	Acoustic noise level ⁴⁾	56 db(A)				
	MPP tracker	2			3	
	Operation temperature range	-25..60 °C				
	Nom. temperature range	-25..45 °C				
	Storage temperature	-25..60 °C				
	Overload operation	Change of operating point				
	Overvoltage category AC	Class III				
	Overvoltage category DC	Class II				
	PLA ⁵⁾	Included				
	Reactive power	TLX+ and TLX Pro+				
	Relative humidity	95% (non-condensing)				
Functional Safety						
	Safety (protective class)	Class I				
	PELV on the communication and control card	Class II				
	Islanding detection-loss of mains	Three-phase monitoring, ROCOF				
	Voltage magnitude	Included				
	Frequency	Included				
	DC content of AC current	Included				
	Insulation resistance	Included				
	RCMU-Type B	Included				
	Indirect contact protection	Yes (class I, grounded)				
	Short circuit protection	Yes				

¹⁾ According to EN 50524: 2009

²⁾ For fixed systems with semi-optimal conditions

³⁾ At identical input voltages. At unequal input voltages V_{mppmin} can be as low as 250 V depending on total input power.

⁴⁾ SPL (Sound Pressure Level) at 1.5 m.

⁵⁾ Grid Management Box (TLX Pro, TLX Pro+) or 3rd party product

⁶⁾ Only TLX + and TLX Pro + variants

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