Regione Emilia-Romagna
Comune di Fiscaglia (FE)

IMPIANTO AGRIVOLTAICO "FISCAGLIA" ED OPERE CONNESSE

Potenza Impianto 178,12 MWp

Proponente

LIO ENERGY ROSSO S.R.L.
VIA ARRIGO BOITO, 8 - 20121 - MILANO (MI)
P.IVA: 13676640967 – PEC: lioenergyrosso@legalmail.it

Progettazione

AREE TECNICHE S.R.L.
VIA G. FRESCOBALDI 8 - 44121
FERRARA (FE) - P.IVA: 02135640387
Tel.: +39 0532 209155
email: info@areetecniche.it

Specialistica

Coordinamento progettuale

SOLAR IT S.R.L.
VIA ILARIA ALPI 4 - 46100 - MANTOVA (MN) - P.IVA: 02627240209 - PEC: solarit@lamiapec.it
Tel.: +39 0425 1431056 - email: info@solaritglobal.com

Dati documento

SCHEDE TECNICHE

LIVELLO PROGETTO	NOME ELABORATO	FILE NATIVO	DATA
DEFINITIVO	*22-040-PG-D01*	*22-040-PG-D01_0*	*30/04/2025*

Revisioni

REV	DATA	DESCRIZIONE	ESEGUITO	VERIFICATO	APPROVATO
0	*16/04/2025*	*PERMITTING*	*ATs*	*SOL*	*LIO*

ENERGY

MILANO

Via Arrigo Boito, 8
20121, Milano

SCHEDE TECNICHE

INDICE

1 OGGETTO

La Società Proponente LIO ENERGY ROSSO S.R.L., con sede legale in Via Arrigo Boito, 8, Milano (MI), CAP. 20121 ha in progetto lo sviluppo di un impianto agrivoltaico denominato "Fiscaglia" e relative opere di connessione alla RTN della potenza nominale pari a 178,1 MWp nel Comune di Fiscaglia.

Il presente documento illustra la tipologia e le caratteristiche delle apparecchiature prescelte per la realizzazione dell'impianto.

2 SCHEDE TECNICHE

Nel seguito riportiamo le schede tecniche dei componenti principali dell'impianto di chi all'oggetto.

In virtù di una continua evoluzione dei materiali disponibili sul mercato e la sempre crescente rapidità con cui si aggiornano le tecnologie, in fase esecutiva il proponente potrà comunque prevedere materiali equivalenti di costruttori diversi.

3 PANNELLI FV

SUNGI SOLAR

SNGENTERPRISE

Product Information Sheet SNG 740-760 Watt **TOPCon Technology**

BIFACIAL
740-760 Watt

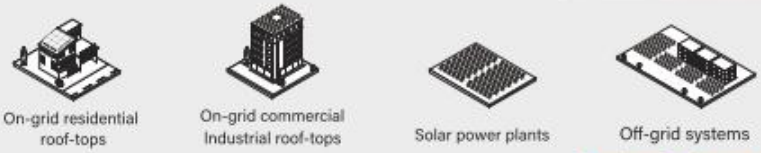
Highest quality with our cells
18 MBB TOPCon Technology

- **30 years** Product Material & Workmanship
- **30 years** Linear Performance Warranty
- **1 %** 1st-year Degradation
- **0.4 %** Annual Degradation

Quality and Safety

- Industry-leading power output warranty
  25 years / 89.4 %
  30 years / 87.4 %
- 30-year warranty on materials & workmanship
- Fire Test: Class1

- **Anti-PID Guarantee**
  Minimizes the risk of degradation caused by PID phenomena by optimizing cell production technology and material control.
- **Multi-busbar Technology**
  Higher performance, higher reliability, and greater (electrical) resilience.



On-grid residential roof-tops | On-grid commercial Industrial roof-tops | Solar power plants | Off-grid systems

Premium Performance Warranty

Complete System and Product Certifications

IEC 61215 (2021), IEC 61730 (2023), IEC 61701, IEC 62716
ISO 9001:2015: Quality Management System
ISO 14001:2015: Environmental Management System
ISO 45001:2018: Occupational Health and Safety Management System
IEC 62941:2019: Quality System for PV Module Manufacturing

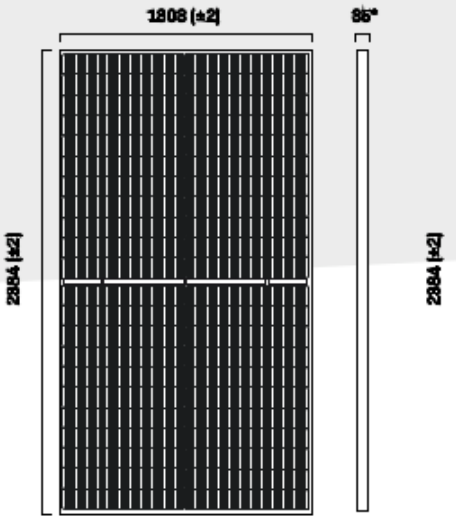
SUNGI SOLAR

SNGENTERPRISE

24.46% *Max Module Efficiency*

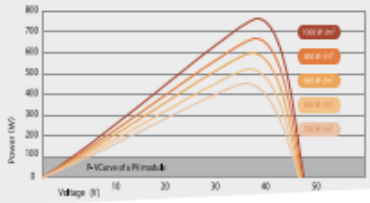
30 Y Warranty *on materials & workmanship*

ENGINEERING DRAWINGS (mm)

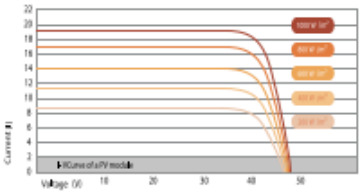


ELECTRICAL PERFORMANCE & TEMPERATURE DEPENDENCE | SNG - 760

Power-Voltage Curves



Current-Voltage Curves



MODULE TYPE	SNG-740 W	SNG-745 W	SNG-750 W	SNG-755 W	SNG-760 W
Testing Conditions	STC[R]/ NMOT[R]	STC[R]/ NMOT[R]	STC[R]/ NMOT[R]	STC[R]/ NMOT[R]	STC[R]/ NMOT[R]
Maximum Power at STC (Pmax)	740 Wp	745 Wp	750 Wp	755 Wp	760 Wp
Maximum Power Voltage (Vmp)	41.60 V / 39.50 V	41.80 V / 39.70 V	42.00 V / 39.90 V	42.20 V / 40.10 V	42.40 V / 40.30 V
Maximum Power Current (Imp)	17.79 A / 14.24 A	17.82 A / 14.27 A	17.86 A / 14.30 A	17.89 A / 14.33 A	17.92 A / 14.36 A
Open-Circuit Voltage (Voc)	49.50 V / 47.00 V	49.70 V / 47.20 V	49.90 V / 47.40 V	50.10 V / 47.60 V	50.30 V / 47.80 V
Short-Circuit Current (Isc)	18.89 A / 15.18 A	18.94 A / 15.21 A	18.99 A / 15.24 A	19.04 A / 15.27 A	19.09 A / 15.30 A
Module Efficiency (%)	23.82 %	23.98 %	24.14 %	24.30 %	24.46 %

BIFACIAL OUTPUT- REARSIDE	SNG-740 W	SNG-745 W	SNG-750 W	SNG-755 W	SNG-760 W
Power gain 5 %	777 Wp	782 Wp	788 Wp	793 Wp	798 Wp
Power gain 10 %	814 Wp	820 Wp	825 Wp	831 Wp	836 Wp
Power gain 15 %	851 Wp	857 Wp	863 Wp	868 Wp	874 Wp

ALL MODULES DATA

Operating Temperature (DC)	- 40 °C to + 85 °C
Maximum System Voltage	1500 VDC
Maximum Series Fuse Rating	30 A
Power Output Tolerance [R]	± 5 %
Temperature Coefficients of Pmax	- 0.29 % / °C
Temperature Coefficients of Voc	- 0.25 % / °C
Temperature Coefficients of Isc	+0.045 % / °C
Nominal Operating Cell Temperature (NOCT)	45 ± 2 °C

Testing Conditions STC[P]/NMOT[P] | Irradiance 1000 W/m / 800 W/m | Module Temperature 25 °C / 20 °C | AM 1.5 Wind Speed 1m/s | Fire Rating Class 1

[R] Measurement Tolerances : Pmax (± 5 %), Isc & Voc (± 5 %)

[P]STC (Standard Testing Condition) : Irradiance : 1000 W/m², Cell Temperature: 25 °C, AM : 1.5

[P]NMOT (Nominal Operating Module Temperature) : Irradiance : 800 W/m², NMOT Ambient Temperature: 20/25 °C, AM : 1.5, Wind Speed : 1 m/s

*or customized

Not applicable for installations in transition 5.0/ feed in tariff for italian market

TECHNICAL SPECIFICATION

Cell type	TOPCon Technology (210x105 mm)
Number of cells	132 (6×22)
Dimensions	2384x1303x35* mm
Weight	38.7 kg
Front Glass	2.0 mm Anti-reflective
Back Glass	2.0 mm tempered glass
Frame	Anodized Aluminum Alloy Silver Frame*
Junction Box	IP68 Rated, 3 diodes
Output Cables	TUV 1x4.0 mm² / UL 12 AWG*
Output Cables Length	1400 mm*
Connectors	MC 4

PACKAGING CONFIGURATION

40' Container

- 31 pcs per pallet
- 18 pallets
- 558 total pcs

sungisolar.com

4 COMBINER BOX

INGECON SUN StringBox

12 / 16 / 18 / 20 / 24 / 32

SIMPLE AND SAFE CONNECTION OF PHOTOVOLTAIC STRINGS, 1500 V

The new INGECON® SUN StringBox is a cost-effective PV string combiner box series designed for central inverter-based PV systems. The INGECON® SUN StringBox features efficient input and output DC wiring with fully rated DC disconnect switches for safe maintenance.

When used in combination with INGECON® SUN series central inverters, the INGECON® SUN StringBox outputs can be monitored by means of the optional DC input groups monitoring kit available for B and C series.

A complete range of equipment for all types of projects
Available in models ranging from 12 to 32 inputs and 1,500 V max. DC voltage, the INGECON® SUN StringBox provide the maximum flexibility and expandability in system design. The compact and rugged IP65 enclosure is designed for installation in outdoor environments, such as roof-mounted systems and large-scale solar farms.

Maximum protection
The INGECON® SUN StringBox is a passive combiner box equipped with touch-safe DC fuse holders, DC fuses, lightning induced DC surge arresters and load disconnector switch.

PROTECTIONS

- Up to 32 pairs of DC fuses.
- Available fuses: 10A, 12A, 15A, 16A, 20A, 25A, 30A, 32A (15A standard).
- Lightning induced DC surge arresters, type 2.
- Manual DC isolating switch.

OPTIONAL ACCESSORIES

- Lightning induced DC surge arresters, type 1+2.
- Pole mounting kit.
- PV connectors.

MAIN FEATURES

- Built to minimize system costs by providing the maximum flexibility.
- Available in 12, 16, 18, 20, 24, 32 inputs configurations.
- Rated for 1,500 Vdc maximum voltage
- Simplifies input and output wiring.
- Capability to connect up to 2 DC output cables per polarity (only for 12 and 16 inputs).
- IP65 protection rating.
- Maximum protection to corrosion and pollution thanks to the isolating polyester enclosure reinforced with fiberglass.

www.ingeteam.com
solar.energy@ingeteam.com

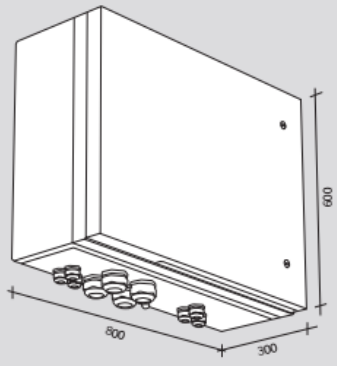
Ingeteam

INGECON SUN StringBox

	1,500 V			
	StringBox 12	**StringBox 12B**	**StringBox 16**	**StringBox 16B**
Input				
Maximum number of input strings	12 / 24[1]	12 / 24[1]	16 / 32[1]	16 / 32[1]
Maximum current per input (A)	12 / 24	12 / 24	12 / 24	12 / 24
Number of protection fuses	12	24	16	32
Type of fuses	gPV fuses, 10 x 85 mm, 30 kA			
Available fuses	10 A, 12 A, 15 A, 16 A, 20 A, 25 A, 30 A, 32 A (15 A / 30 A standard)			
Maximum DC voltage	1,500 Vdc			
Cable inlet	M40 cable glands (n.4 cables entry diameter: 6 to 10 mm for each cable gland)			
Inlet connections	Direct connection to fuse holders or distribution bar, wiring gauge 1.5 to 16 mm²			
Output				
Rated total current (A)[2]	144 / 288	144 / 288	192 / 384	192 / 384
Cable outlet	Up to 2 pairs of M50 cable glands (cable diameter: 27 to 35 mm)			
Outlet connections	Direct connection on copper plates, wiring gauge up to 2 x 240 mm² per pole			
DC switch disconnect rating (A)	315 / 400	315 / 400	315 / 400	315 / 400
SPD				
Type	Type 1 (optional: Type 1+2)			
Grounding connection	M20 cable gland (cable diameter: 7 to 13 mm, wiring gauge 2.5 to 35 mm²)			
General Information				
Enclosure type	Outdoor use, insulating cabinet (polyester reinforced with fiberglass)			
Protection rating	IP65			
Impact strength	IK10			
Operating temperature range	-20 °C to +55 °C			
Relative humidity (non-condensing)	0 to 95%			
Maximum altitude[3]	2,000 m a.s.l.			
DC switch handle	Internal, lockable in open position			
Consumption (W)	0 W			
Size (mm)	800 x 600 x 300 (W x H x D)			
Weight (kg)	35	36	36	38
Marking	CE			
Electrical installations	IEC 60364-7-712			
LV Switchgear standards	IEC 61439-1, IEC 61439-2, AS/NZS 61439-2, AS/NZS 5033			
Electric shock protection	Class II equipment			

Notes: [1] With external over-molding in line fuses and branch connectors [2] Over 50 °C ambient temperature, the current will be reduced at the rate of 3.5% every °C up to 55°C [3] Please contact Ingeteam for altitudes higher than 2,000 m.

Size (mm)



12
35 kg.

12B / 16
36 kg.

16B
38 kg.

5 INVERTER FV

SG3125/3400HV-MV-30

Turnkey Station for 1500 Vdc System MV Transformer Integrated

NEW

HIGH YIELD

- Advanced three-level technology, max. inverter efficiency 99%
- Effective cooling, full power operation at 50 ℃

SMART O&M

- Integrated zone monitoring and MV parameters monitoring function for onlione analysis and trouble shooting
- Modular design, easy for maintenance
- Convenient external touch screen

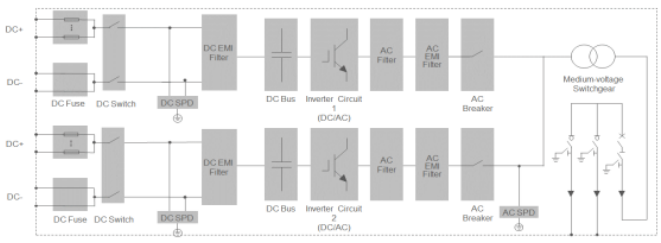
SAVED INVESTMENT

- Low transportation and installation cost due to 20-foot container design
- DC 1500V system, low system cost
- Integrated MV transformer, switchgear, and LV auxiliary power supply
- Q at night function optional

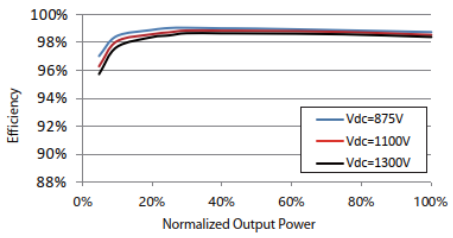
GRID SUPPORT

- Compliance with standards:IEC 62271-202, IEC 62271-200, IEC 60076
- Low/High voltage ride through (L/HVRT)
- Active & reactive power control and power ramp rate control

CIRCUIT DIAGRAM



EFFICIENCY CURVE



SUNGROW
Clean power for all

Type designation	SG3125HV-MV-30	SG3400HV-MV-30
Input (DC)		
Max. PV input voltage	1500 V	
Min. PV input voltage / Startup input voltage	875 V / 915 V	
MPP voltage range	875 – 1300 V	
No. of independent MPP inputs	2	
No. of DC inputs	16 / 18 / 22 / 24 / 28 (max. 24 for floating system)	
Max. PV input current	3997 A	
Max. DC short-circuit current	10000 A	
PV array configuration	Negative grounding or floating	
Output (AC)		
AC output power	3125 kVA @ 50 °C / 3437 kVA @ 45 °C	3437 kVA @ 45 °C
Max. inverter output current	3308 A	
AC voltage range	20 kV – 35 kV	
Nominal grid frequency / Grid frequency range	50 Hz / 45 – 55 Hz, 60 Hz / 55 – 65 Hz	
Harmonic (THD)	< 3 % (at nominal power)	
DC current injection	< 0.5 % In	
Power factor at nominal power / Adjustable power factor	> 0.99 / 0.8 leading – 0.8 lagging	
Feed-in phases / AC connection	3 / 3-PE	
Efficiency		
Inverter max. efficiency	99.0%	
Inverter Euro. efficiency	98.7%	
Transformer		
Transformer rated power	3125 kVA	3437 kVA
Transformer max. power	3437 kVA	
LV / MV volatage	0.6 kV / (20 – 35) kV	
Trnsformer vector	Dy11	
Transformer cooling type	ONAN (Oil-natural, air-natural)	
Oil type	Mineral oil (PCB free) or degradable oil on request	
Protection & Function		
DC input protection	Load break switch + fuse	
Inverter output protection	Circuit breaker	
AC MV output protection	Circuit breaker	
Surge protection	DC Type I + II / AC Type II	
Grid monitoring / Ground fault monitoring	Yes / Yes	
Insulation monitoring	Yes	
Overheat protection	Yes	
Q at night function	Optional	
General Data		
Dimensions (W*H*D)	6058 * 2896 * 2438 mm	
Weight	15 T	
Degree of protection	Inverter: IP65 / Others: IP54	
Auxiliary power supply	5 kVA (optional: max. 40 kVA)	
Operating ambient temperature range	-35 to 60 °C (> 50 °C derating)	-35 to 60 °C (> 45 °C derating)
Allowable relative humidity range	0 – 100 %	
Cooling method	Temperature controlled forced air cooling	
Max. operating altitude	1000 m (standard) / > 1000 m (optional)	
Display	Touch screen	
Communication	Standard: RS485, Ethernet; Optional: optical fiber	
Compliance	CE, IEC 62109, IEC 61727, IEC 62116, IEC 62271-202, IEC 62271-200, IEC 60076	
Grid support	Q at night (Optional), L/HVRT, active & reactive power control and power ramp rate control	

6 TRACKER

ADAPTED TO **XXL MODULES**

IN-HOUSE **MANUFACTURING**
* providing local content if required

BIFACIAL OPTIMIZED

TERRAIN RESPONSE

PV CLEANER TESTED
Certified by module manufacturer

MADE WITH **MAGNELIS®**
* Optional

General specifications

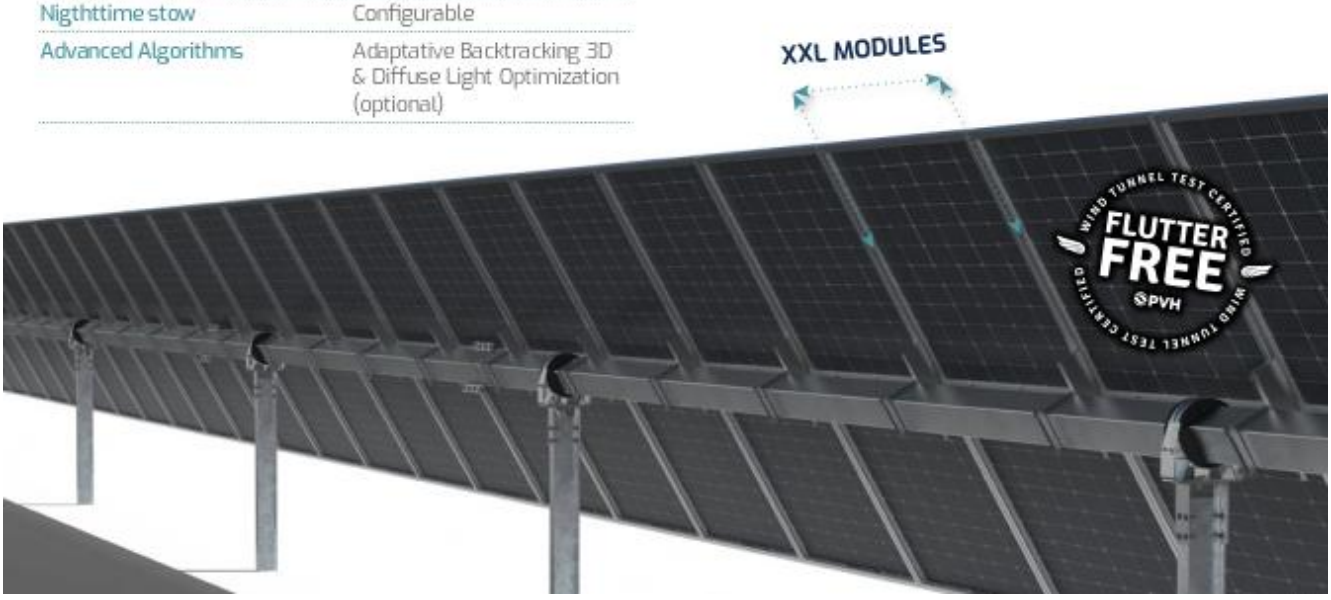
Tracker	Independent-row, horizontal single-axis
Maximum length	100 m.
Maximum width	2.5 m.
Module configuration	1 module in portrait
Rotational range	E-O: +/- 60º
Motor per MWp	Depending on the size, the type of the module and the number of modules per string. 1 motor per row. (Maximum 100 meters lenght)
Ground cover ratio	30-50%
Modules supported	All market available modules
Slope tolerance	N-S: up to 23.5%
	E-W: unlimited
Module attachment	By bolts and nuts, rivet or clamps for frameless modules
Allowable wind load	Tailored to site specific conditions
Wind alarm	Controlled by ultrasonic anemometer
Prepared for XXL modules	

Communications & Control

Solar tracking method	Astronomical algorithm
Control System	Central control unit connected to plant SCADA
	Redundant wireless gateways to guarantee communication
	Self-powered DC Motor Drive Box with auxiliary panel
SCADA interface	Modbus TCP or OPC-UA
Communication	Wireless (LoRa)
Nigthttime stow	Configurable
Advanced Algorithms	Adaptative Backtracking 3D & Diffuse Light Optimization (optional)

Installation & Services

On-site training and commissioning	
Warranty	Structure: 10 years
	Electromechanical components: 5 years
PV Cleaner	Optional
Certifications	UL 3703, IEC 62817 on going



7 QUADRI MT – CABINE DI CAMPO (CC-X)

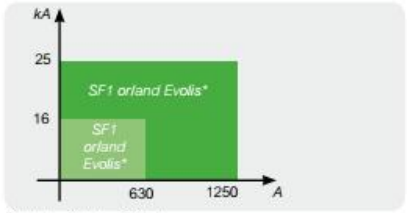
SM6 — A truly professional **solution**!

Schneider Electric has developed protection, monitoring and control solutions specifically dedicated to Medium Voltage networks for over 40 years.

SM6 switchgear has been specifically designed on the basis of that extensive experience.

It also incorporates some very new solutions, giving the best in terms of continuity of service and operators' safety.

High-performance breaking devices



(*) Not available at 36 kV.

A comprehensive solution

SM6 switchgear is fully compatible with

- PowerMeter metering units.
- Easergy P3 relay and Easergy Sepam multi-function protection relays
  - Protection
  - Measurements and diagnosis.
- VIP protection self powered relay for protection.
  SM6 swithchboards can thus be easily integrated into any monitoring
  and control system.
  - Local & remote indication and operation.

Enclosures able to withstand internal arcing

Internal Arc Classification: A-FL and A-FLR.

- 3-sides internal arc protection IAC: A-FL, 12.5 kA 1 s, 16 kA 1 s and 20 kA 1s for SM6-24 and 16 kA 1 s for SM6-36.
- 4-sides internal arc protection IAC: A-FLR, 12.5 kA 1s, 16 kA 1 s and 20 kA 1 s for SM6-24.
- Choice of exhaust:
  - downwards exhaust
  - upwards exhaust for SM6-24.

General characteristics

Main characteristics

The hereunder values are for working temperatures from -5°C up to +40°C and for a setting up at an altitude below 1000 m.

Electrical characteristics

Rated voltage	Ur	kV		7.2	12	17.5	24	36
Insulation level								
Insulation	Ud	50/60 Hz, 1 min (kV rms)		20	28	38	50	70
Isolation	Ud	50/60 Hz, 1 min (kV rms)		23	32	45	60	80
Insulation	Up	1.2/50 µs (kV peak)		60	75	95	125	170
Isolation	Up	1.2/50 µs (kV peak)		70	85	110	145	195
Breaking capacity								
Transformer off load		A		16				
Cables off load		A		31.5				50
Rated current	Ir	A		400 - 630 -1250				630-1250
Short-time withstand current	Ik/tk (1)	kA/1 s	25	630 - 1250				1250
			20 (2)	630 - 1250				
			16	630 - 1250				
			12.5	400 - 630 - 1250				630-1250
Making capacity (50 Hz)	Ima	kA	62.5	630		NA		
			50	630				
			40	630				
			31.25	400 - 630				630
Maximum breaking capacity (Isc)								
Units IM, IMC, IMB, IMM		A		630 - 800 (3)				630
NSM-cables, NSM-busbars		A		630 - 800 (3)				NA
QM, QMC, QMB		kA		25		20		20
PM		kA		25				20
CVM		kA		6.3	NA			
CVM with fuses		kA		25	NA			
SF6 circuit breaker range				7.2	12	17.5	24	36
DM1-A, DM1-D, DM1-W		kA	25	630-1250				1250
			20	630-1250				
DM1-S, DM1-M		kA	25	630				NA
DM1-Z			25	1250				NA
DM2		kA	20	630				
			25	630				1250
Vacuum circuit breaker range				7.2	12	17.5	24	36
DMV-A, DMV-D		kA	25	630-1250			NA	
DMVL-A		kA	20	630				NA
DMVL-D		kA	25	630				NA

NA: Non Available
(1) 3 phases
(2) In 20 kA/3 s for SM6-24 only, consult us
(3) In 800 A, consult us.

8 QUADRI MT – CABINA DI RICEVIMENTO(CR) E SSE

imequadri duestelle spa

ime

Quadri Blindati di Media Tensione isolati in aria con tenuta d'arco interno classe LSC2B-PM IAC AFLR

Air insulated Medium Voltage Metal Clad Switchboards with internal arc proof LSC2B-PM IAC AFLR class

Normoclad

Vn = 12÷36 kV
In = max 4000 A
Ik = max 50 kA

50° 1962 - 2012 ime

MILANO

Via Arrigo Boito, 8
20121, Milano

Caratteristiche generali

Generalità
I quadri blindati Normoclad di media tensione isolati in aria (denominati blindati secondo la precedente norma 6029a), appartengono rispettivamente alle categorie LSC2B – PM la versione base, e LSC2B – PM IAC AFLR la versione a tenuta d'arco interno **sino a 50 kA per 0,25"** o fino a 40 kA per 1" (secondo la nuova norma 62271-200).

Norme di riferimento
Il quadro e le apparecchiature in esso contenute sono conformi alle leggi antinfortunistiche italiane DL 81/2008, testo unico sulla salute e sicurezza sul lavoro e alle seguenti norme italiane ed internazionali:

	CEI EN/IEC
Quadro	62271-1 / 62271-200
Interruttori	62271-100
Gas SF_6	60376
Sezionatori di terra	62271-102
Contattori	62271-106
Interruttori di manovra / Sezionatori	62271-103
Fusibili	60282-1

Prove sismiche
Il quadro è dotato di Rapporto di Prova redatto dal CESI Nr. B50023608 comprovante il superamento dei seguenti test:
• "high level performance test",
• accelerazione di picco 1,0 g per gli assi x e y e 0,8 g per asse z.
Conforme alle Norme: IEEE 693-2005, IEC 60068-2-57,
IEC 62271-210.

Sicurezza per il personale
La sicurezza per il personale è garantita dall'attuazione delle seguenti misure:
- messa a terra di tutta la struttura e dei componenti estraibili,
- continuità dei circuiti di protezione,
- otturatori metallici azionati automaticamente durante le manovre di inserzione e disinserzione di interruttori, contattori, TV.

Gradi di protezione
Secondo norme Italiane CEI EN 60529 ed internazionali IEC 60259:
- standard IP2X a portelle aperte,
- standard IP3X a portelle chiuse.
Gradi di protezione maggiori vanno concordati con Imequadri Duestelle.

Caratteristiche
L'installazione del quadro necessita di opere civili molto semplici.
Il quadro, in determinate versioni, può essere addossato a parete.
In questo caso, l'accesso alle derivazioni per la connessione dei cavi di potenza avviene dal fronte del quadro.

Esecuzioni
Per interno, per esterno, per climi tropicali, a tenuta d'arco interno.

Standardizzazione e flessibilità
Normalizzazione delle strutture, delle unità funzionali, dei componenti, degli schemi, delle dimensioni;
Facilità di composizione degli elementi base e di adattamento alle esigenze di installazione;
Realizzazione di qualsiasi schema di impianto e facilità di collegamento.

Affidabilità e manutenzione
- Studio di soluzioni adeguate all'uso,
- struttura robusta atta a sopportare il corto circuito,
- manovrabilità dal fronte quadro,
- possibilità di manutenzione senza togliere tensione al quadro,
- immediatezza dei controlli in esercizio, istruzioni per l'esercizio e la manutenzione.

General characteristics

General data
The medium voltage metal clad air insulated Normoclad switchboards (named metal clad according to the 6029a previous standard), belong to LSC2B – PM category, whereas the internal arcing proof version, belongs to the PM IAC AFLR category, ***up to 50 kA for 0,25 sec.*** *or up to 40 kA for 1 sec. (according to the new standard62271-200).*

Standard references
The switchboard and relevant equipments comply with the Italian "Accident prevention regulations" DL 81/2008, Health and Safety at work regulation, and with the following National and International standards:

	CEI EN/IEC
Switchboard	*62271-1 / 62271-200*
Circuit breakers	*62271-100*
SF_6 gas	*60376*
Earth switches	*62271-102*
Contactors	*62271-106*
Load break switches / Disconnectors	*62271-103*
Fuses	*60282-1*

Seismic tests
The switchboard has the Seismic Test Report, No. B50023608 issued by CESI for:
• *"high level performance test"*
• *"peak accelerations 1,0 g for x and y directions and 0,8 g for z direction.*
As per Standards: IEEE 693-2005, IEC 60068-2-57, IEC 62271-210.

Personnel safety
Personnel safety is guaranteed by the following measures:
- whole structure earthed and earthed removable units,
- continuity of protection circuits,
- metallic shutters are automatically actuated during connections and disconnections of circuit-breakers, contactors, voltage transformers.

Protection class
According to Italian standards CEI EN 60529 and International standards IEC 60529:
- standard version with open doors: IP2X,
- standard version with closed doors: IP3X.
Higher classes of protection are to be agreed upon with Imequadri Duestelle.

Characteristics
The installation of the switchboard needs very easy civil works performance. The switchboard, in specific ranges, can be placed against the wall. Access to shunts for power cables connections, in this case, comes from the front side.

Ranges
For indoor, for outdoor, for tropical climate, arc-proof version.

Standardization and flexibility
Frames, functional units, components, layouts and dimensions are Standardized;
Basic units are easy to be matched and are suitable for any kind of installation;
Execution of any electrical layout and easy connection.

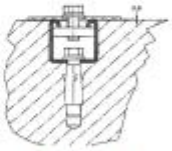
Reliability and maintenance
- Study of proper solutions for use,
- strong structure able to withstand short-circuit,
- easy operation from the front side of the switchboard,
- possibility of maintenance, keeping voltage in the switchboard,
- immediate checks during operation, instructions for use and maintenance.

Locale
Il quadro dovrà essere installato in locali che garantiscano le condizioni ambientali e di esercizio previste dalla norma IEC 62271-200 (ex CEI 17/6 – IEC 298).
Per la versione arco interno, secondo le norme IEC/EN 62271-200, l'altezza dei locali nei quali è installato il quadro, deve essere pari all'altezza del quadro + 600mm.
In caso di installazioni particolari sono disponibili soluzioni alternative.

Posizionamento
Il quadro Normoclad è predisposto per l'arrivo cavi di potenza ed ausiliari, dal basso, o a richiesta dall'alto.
Il piano d'appoggio dovrà essere perfettamente livellato, con una tolleranza di planarità massima accettabile di 2 x 1000 e preparato conformemente ai disegni Imequadri Duestelle relativi alle fondazioni

Sistema di fissaggio

Fissaggio con viti a pavimento

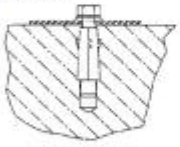


Fissaggio con ferri

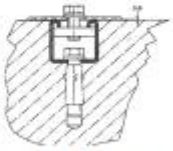
Room
The switchboard must be installed in rooms that guarantee the environmental and operating conditions required by the IEC 62271-200 standard (ex CEI 17/6 - IEC 298).
For the internal arc version, according to IEC / EN 62271-200 standards, the height of the rooms in which the switchboard is installed must be equal to its height + 600mm.
In case of particular installations alternative solutions are available.

Placement
The Normoclad is designed for incoming power and auxiliary cables, from below, or on request from above.
The floor surface must be perfectly leveled, with a maximum acceptable flatness tolerance of 2 x 1000 and prepared in accordance with the Imequadri Duestelle drawings relating to the foundations.

Fixing system



Fixing with screw anchors



Fixing with structural irons

Condizioni di servizio
Le caratteristiche nominali del quadro sono garantite alle seguenti condizioni ambientali, in presenza di atmosfera normale non corrosiva e non contaminante:

temperatura ambiente minima	- 5° C
temperatura ambiente massima	+ 40° C
umidità relativa massima	95 %
altitudine massima s.l.m.	1000 m.

Condizioni diverse o particolari di installazione, quali ad esempio forte inquinamento dell'aria dovuto a polvere, fumi, particelle corrosive o radioattive, vapori, sali e/o l'esposizione ad intensi campi elettrici e/o il pericolo di esplosioni, incendi, terremoti, devono essere concordate con Imequadri Duestelle S.p.A.

Working conditions
The rated characteristics of the switchboard are guaranteed at standard environmental conditions, not corrosive and not contaminant atmosphere, as follows:

min. environment temperature	*- 5° C*
max. environment temperature	*+ 40° C*
max. average humidity	*95 %*
max height a.s.l.	*1000 m.*

Particular or different conditions of installation, as for example heavy air pollution due to dust, smoke, corrosive and radio-active particles, steams, salt and/or exposure to long lasting electric or magnetic fields and/or danger from blasts, fires and earthquakes, are to be agreed with Imequadri Duestelle S.p.A.

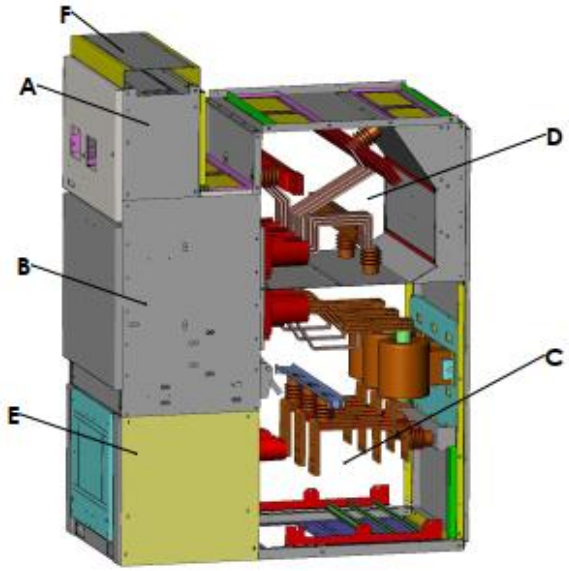
Sistema qualità
Il sistema di qualità Imequadri Duestelle è conforme alla norma ISO 9001:2015 ed è certificato CSQ/IQNET (International Quality System Assessment and Certification Network).

Quality system
Imequadri Duestelle quality system complies with ISO 9001:2015 standard and it is certified CSQ/IQNET (International Quality System Assessment and Certification Network).

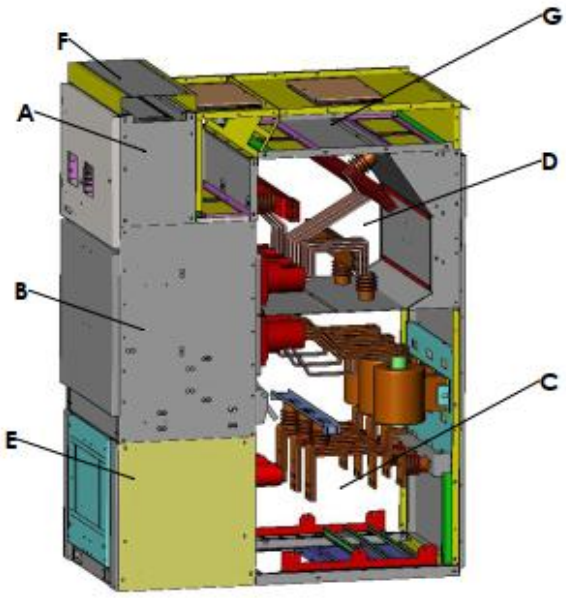
Gestione ambientale
I quadri Normoclad sono costruiti con processi, trattamenti, materiali e componenti che non comportano rischi di inquinamento per l'ambiente.
Il sistema di gestione ambientale di Imequadri Duestelle è conforme alla norma ISO 14001:2015 ed è certificato CSQ/IQNET.

Environmental management
Normoclad switchboards are manufactured with procedures, finishing processes and components, involving no risk of pollution to the environment. Imequadri Duestelle's Environmental Management System complies with ISO 14001:2015 standards and is certified by CSQ/IQNET independent authority

Standard



Arco interno/*Internal arc*



Caratteristiche elettriche / *Electrical characteristics*

Tipo di quadro	Tensione nominale	Tensione di tenuta a 50Hz 1 min.	Tensione di tenuta a impulso	Corrente nominale sbarre omnibus fino a	Corrente di breve durata fino a	Corrente di picco nominale fino a
Type of switchboard	*Rated voltage*	*Test voltage at 50Hz 1 min.*	*Impulse withstand voltage*	*Omnibus busbars rated current up to*	*Short-time current up to*	*Peak current up to*
	Ur (kV)	Ud (l min) (kV)	Up (kV)	Ir (A)	Ik (kA) 1"	Ip (kA)
Normoclad 12	12	28	75	3150 - 4000*	50	125
Normoclad 17,5	17,5	38	95	3150 - 4000*	40 x 3* - 50	100/125
Normoclad 24	24	50	125	2000 - 2500*	31,5	80
Normoclad 36	36	70	170	2000 - 2500*	25	63

* ventilazione forzata / *forced ventilation*

Particolare cella TV—zona E / *Particular of VT cubicle—E zone*

Cella TV in posizione di sezionato.
VT cubicle in disconnected position.

TV in posizione di estratto.
VT draw-out position.

MILANO

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Composizione dello scomparto base

I quadri di distribuzione a componenti normalizzati NORMOCLAD possono contenere:

- interruttori in esafluoruro di zolfo
- interruttori sottovuoto
- contattori sottovuoto.

A - Cella strumenti
Nella cella strumenti, posta sopra la cella interruttore, può essere contenuta tutta l'apparecchiature di bassa tensione normalmente prevista. Qualora ciò non fosse possibile, esiste una versione maggiorata (+150 mm.) della cella strumenti.

B - Cella interruttore
La cella è costituita dal contenitore che accoglie l'interruttore estraibile. Il sezionamento dell'interruttore è effettuato a porta chiusa.

C - Cella linea
La cella linea può contenere:
- sezionatore di terra,
- trasformatore di corrente a mattonella e/o toroidale,
- terminali per cavi,
- divisori di tensione o altri componenti a richiesta,
- TV nella versione fissa.

D - Cella sbarre
Contiene sbarre normalizzate.

E - Cella TV estraibili
La cella TV è installata normalmente sotto la cella interruttore ed ha le seguenti caratteristiche:
- I TV ad un polo primario con fusibile sono montati su carrello estraibile all'interno della cella.
- Il sezionamento dei TV avviene mediante maniglia di comando esterna alla cella e realizza l'automatico sezionamento dei secondari dei TV.
- Con la traslazione del carrello TV si ottiene automaticamente l'azionamento dell'otturatore metallico.
- I fusibili possono essere sostituiti aprendo la portella, dopo aver sezionato ed estratto i TV dalla cella.
- La sostituzione dei TV può essere effettuata solo a carrello estratto dalla cella.

F - Canaletta interconnessioni
Sul tetto dello scomparto, lato anteriore, è possibile prevedere, a richiesta, una canaletta con altezza di 150 mm (aggiuntiva a quella interna sempre esistente) per l'alloggiamento delle connessioni ausiliarie tra i vari scomparti e verso l'impianto esterno.
Tale soluzione è alternativa alla versione maggiorata della cella strumenti.

G - Versione arco interno: sfogo del gas
Nella versione ad arco interno, in caso di sovra-pressioni provocate da eventuali guasti, uno sfogo convoglia i gas incandescenti verso appositi filtri, per impedire danni agli operatori ed alle apparecchiature.

Composition of basic compartment

The NORMOCLAD distribution switchboards with standardized units can contain:

- *Sulfur Hexafluoride circuit-breakers*
- *vacuum circuit-breakers*
- *vacuum contactors.*

A - Low voltage box
The LV box, placed on top of the circuit-breaker's cubicle, usually contains the whole low voltage equipment. In case of needs, it is possible to have an oversized version of the instruments cubicle (+150 mm.)

B - Circuit breaker cubicle
The cubicle is made of a power box with the withdrawable circuit-breaker. Circuit-breaker disconnecting is performed with closed door.

C - Feeder cubicle
The feeder cubicle may contain:
- *earth switch,*
- *block and/or ring current transformer,*
- *cable terminals,*
- *voltage indicators or other components on request,*
- *VT in the fixed version.*

D - Busbars cubicle
It contains standardized busbars.

E - Removable VT cubicle
The VT cubicle is usually installed under the circuit-breaker's cubicle with the following features:
- *Single primary pole VTs with incorporated fuse are installed in a removable trolley inside the cubicle.*
- *The VT disconnection is carried out by an operating handle out of the cubicle, causing an automatic disconnection of VT's secondaries.*
- *The motion of the VT trolley leads to the automatic work-in of the metallic shutter.*
- *Fuses can be replaced by opening the door, after disconnection and removal of the VT trolley out of the cubicle.*
- *The VTs replacement may be carried out only after the trolley is drawn out of the cubicle.*

F - Interconnections duct
On the roof of the compartment, on the front side of the unit, it is possible to have, upon request, a 150 mm height wiring duct (in addition to the standard one, placed inside), in order to locate the auxiliary connections among the units and towards the external plant.
This solution is an alternative to the oversized version of the instrument cubicle.

G - Internal arc version: gas outlet
In the internal arc version, in case of overpressure caused by possible faults, a vent conveys the incandescent gases to suitable filters, to prevent damage to the operators and to the equipment.