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System Solutions for Welding Equipment

Light Industrial

REV0721

Welders share similar products with drives, HVAC, conveyors, fans, and hoists

HVACs/Chillers

Soft Starters

Fans

Variable Frequency Drives

Welders

Electric hoist

Industrial Pumps

Compressors

Conveyors

Common welding types and applications

MIG/MAG
Metal Inert Gas/Metal Active Gas

- Used in high-production operations
- Requires clean surfaces and windless conditions

MMA
Manual Metal Arc

- Rugged welding for thicker metals
- Provides high-quality welds and can be used outdoors and on painted or rusted surfaces

TIG/WIG
Tungsten Inert Gas/Wolfram Inert Gas

- Precision welding for a diverse range and thin metals
- Can provide small welds

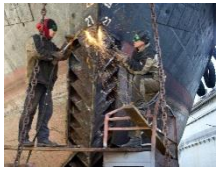
Applications

Aerospace

Automotive

Building Construction

Industrial



Marine

Mining

Transportation

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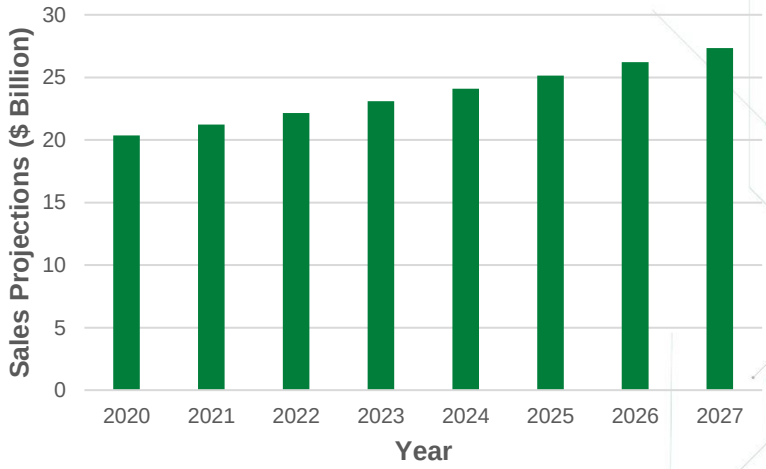
Welding market overview

Market Trends
The global welding market size was USD 20 billion in 2020 and is projected to reach USD 27 billion by 2027
The arc welding segment accounted for around 35.4% of the global welding market in 2020
The Asia Pacific welding market was valued at USD 7 billion in 2020
Availability of equipment on a rental basis contributes to the market demand
Wireless interface control enables flexibility, fuel savings, lower maintenance, and safety
Several countries in Europe have levied stringent energy efficiency regulations
Skilled labor shortages has increased the demand for robotic welding
OEMs for high end welding equipment offers five-year warranties
Lighter weight and smaller footprint for ease of mobility in beneficial industries

Global welding market to grow at CAGR−4.3%



Source: Fortune Business, Grand View Research

Littelfuse solutions for welding equipment

1 Ground fault protection

- Industrial GFCI

2 AC input protection

- AC Fuse
- MOV

3 Input rectifier circuit

- Rectifier
- Gate Driver
- MOSFET/IGBT
- TVS Diode
- Temp Sensor

4 Output converter

- Fast Recovery Diode

5 Display and controls

- TVS Diode Array
- MLV

6 Wireless interface

- TVS Diode Array
- Polymer ESD

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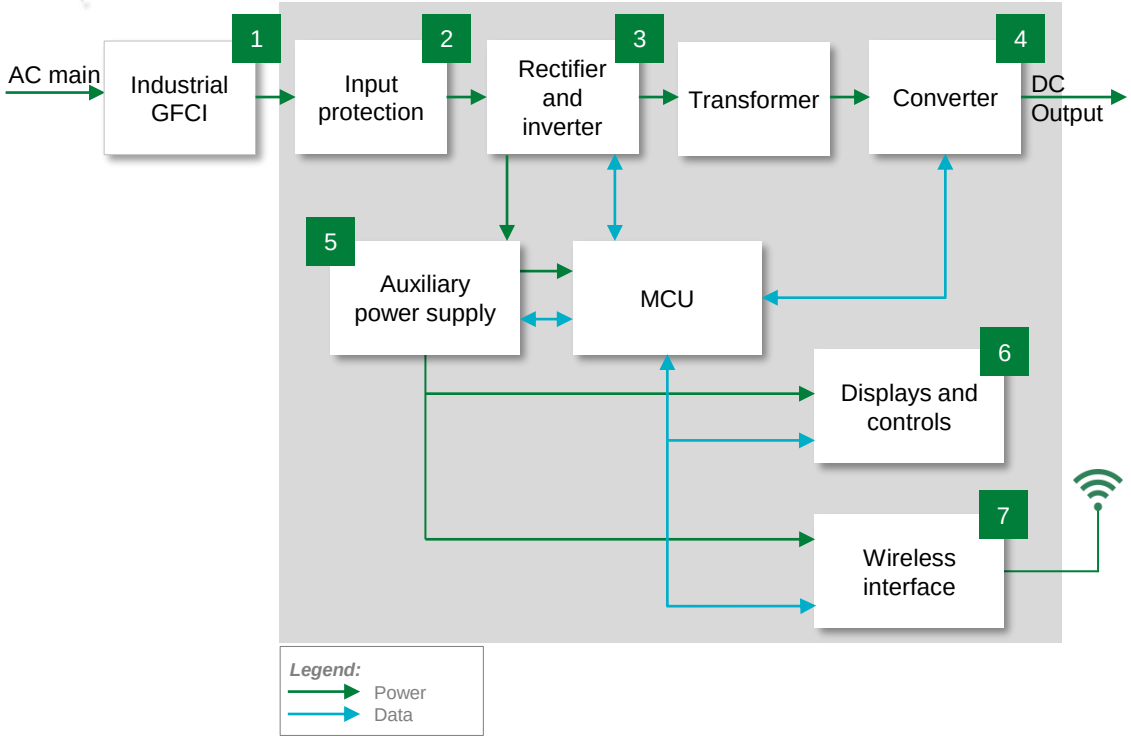
TVS: Transient-Voltage Suppression
MOV: Metal Oxide Varistor
MLV: Multilayer Varistor

GFCI: Ground-Fault Circuit Interrupters
ESD: Electrostatic Discharge

Click on the product series in the table below for more info

Mid to low power welding inverter block diagram



	Technology	Product series
1	Industrial GFCI	SB6100
2	MOV	TMOV, LA, C-III, UltraMOV
	Fuses and fuse clips	L50S, 3AG, 5x20 mm Fuse, Clips
3	Rectifier Discrete	DSP, DSI
	Rectifier Module	VUO, MDMA, MDD
	Gate Driver	IXD_6xx
	MOSFET	X2-Class
	IGBT Discrete	XPT™ (600V-1200V)
	TVS Diode	SMBJ, SMF4L, TPSMB
	TVS Diode	1.5SMC, P6SMB
	NTC	USUR1000, SM
4	FRED Diodes	DSEI, DSEP, DPG
5	Fuse	TR5, TE5, Nano²®
	TVS Diode	P6KE, P6SMB, 1.5SMB
	Gate Driver	IX4351NE, IXD_6xx
	SiC/Si MOSFET	LSIC1MO170E1000, High Voltage Series
6	TVS Diode Array	SP1001, SP1003, SP1006
	MLV	MLA
	Hall Effect Sensor	55300, 55250
7	TVS diode array	SP3401
	Polymer ESD	XGD

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Benefits of Littelfuse components recommended for mid to low power welding inverter

Click on the product series in the table below for more info

	Technology	Function in Application	Series	Benefits	Features
1	Industrial GFCI	Interrupts circuit when ground fault detected	SB6100	Protects personnel from electrical shock	Humidity, corrosion, and dust immunity
2	MOV	Protects equipment from voltage surges	TMOV, LA, C-III, UltraMOV	Reduces qualification time by compliance with UL/IEC safe standards.	High energy absorption capabilities
	Fuses and Fuse Clips	Protects equipment and users from hazards due to overcurrent equipment fault	L50S, 3AG, 5x20 mm Fuse, Clips	Package flexibility to best meet manufacturing needs	Available in cartridge and axial lead with various forming dimensions
3	Rectifier Discrete	Main rectification	DSP, DSI	For single or three-phase bridge configurations	Low forward drop and leakage current
	Rectifier Module	Main rectification	VUO, MDMA, MDD	For three-phase bridge configurations	Low forward drop and leakage current
	Gate Driver	Efficient switching of MOSFET or IGBT	IXD_6xx	Flexible packaging for manufacturability	Wide operating voltage range from 4.5 V to 35 V
	MOSFET	Inverts DC to AC voltage	X2-Class	Low gate charge and avalanche rated	Low package inductance
	IGBT Discrete	Inverts DC to AC voltage	XPT™ (600V-1200V)	Options to match the switching speed	Positive thermal coefficient
	TVS Diode	Protects against IGBT gate overvoltage	SMBJ, SMF4L, TPSMB	Enables compact design; improves system reliability	600 W peak pulse power capability; excellent clamping capability; small footprint
	TVS Diode	Protects against collector to emitter overvoltage	1.5SMC, P6SMB	Excellent clamping capability; fast response time	Meets IEC standards for ESD protection
	NTC	Semiconductor Temperature Measurement	USUR1000, SM	Rapid thermal response and long-term reliability	SM NTC is hermetically sealed; suitable for operation up to 220 °C
4	FRED Diodes	Rectify output to DC	DSEI, DSEP, DPG	Low losses and soft recovery	DCB isolated
5	Fuse	Fast-acting fuse for overcurrent protection	TR5, TE5, Nano²®	Reduces PCB space requirements	Vibration resistant
	TVS Diode	Protects against voltage transients	P6KE, P6SMB, 1.5SMB	Improves reliability by protecting components from transients from power lines	600 W peak pulse capability and glass-passivated chip junction
	SiC MOSFET	Power supply PFC	IX4351NE, IXD_6xx	Efficient and optimized for high-frequency applications	Extremely low gate charge and output capacitance
	Gate Driver	Efficient switching of MOSFET or IGBT	LSIC1MO170E1000, High Voltage Series	Flexible packaging for manufacturability	Wide operating voltage from 4.5 V to 35 V
6	TVS Diode Array	ESD protection of electronics	SP1001, SP1003, SP1006	Small form factor for compact designs	High ESD withstanding capability
	MLV	ESD protection of electronics	MLA	Increased reliability	Operating temperature range of -40 to 125 °C
	Hall Effect Sensor	Detects dial position	55300, 55250	Unaffected by harsh environments or contamination	Analog output
7	TVS diode array	ESD protection of wireless communication	SP3401	Ability to protect high speed data lines	Low capacitance of .35 pF and low leakage of 1 nA
	Polymer ESD	ESD protection of wireless communication	XGD	Protection without signal distortion	Extremely low capacitance and small size

Safety standards for welding equipment

Standard	Title	General Scope	Region
IEC 60974-1	Arc welding equipment, Part 1: Welding Power Sources	Power sources for arc welding designed for INDUSTRIAL AND PROFESSIONAL USE and supplied by a voltage not exceeding 1000 V.	Global
IEC 60974-6	Arc Welding Equipment, Part 6: Limited-Duty Equipment	Specifies safety and performance requirements applicable to limited-duty arc welding and cutting power sources, intended to be connected to single-phase low voltage in non-industrial settings.	Global
UL 551	Safety Transformer Type Arc Welding Machines	Limited-duty welding and cutting power sources, products covered by these requirements include only 600 V or less in non-industrial setting	United States
CSA C22.2 No. 60	Arc Welding Equipment	Arc Welding Equipment for voltages up to and including 600 V, intended for use in non-hazardous locations in accordance with the Canadian Electrical Code	Canada

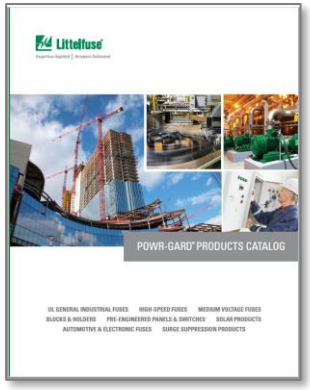
Additional information can be found on Littelfuse.com

Explore the world of Littelfuse with the electronics eCatalogs (http://electronicscatalogs.littelfuse.com/)

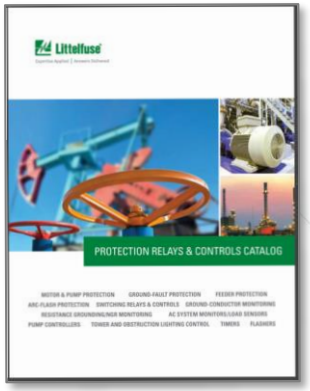
Power Semiconductor Catalog

Circuit Protection Catalog

Industrial Fuses Catalog



Power Relay & Control Catalog



Click on images to open the catalogs

Sensor Selection Guide

Integrated Circuits Catalog

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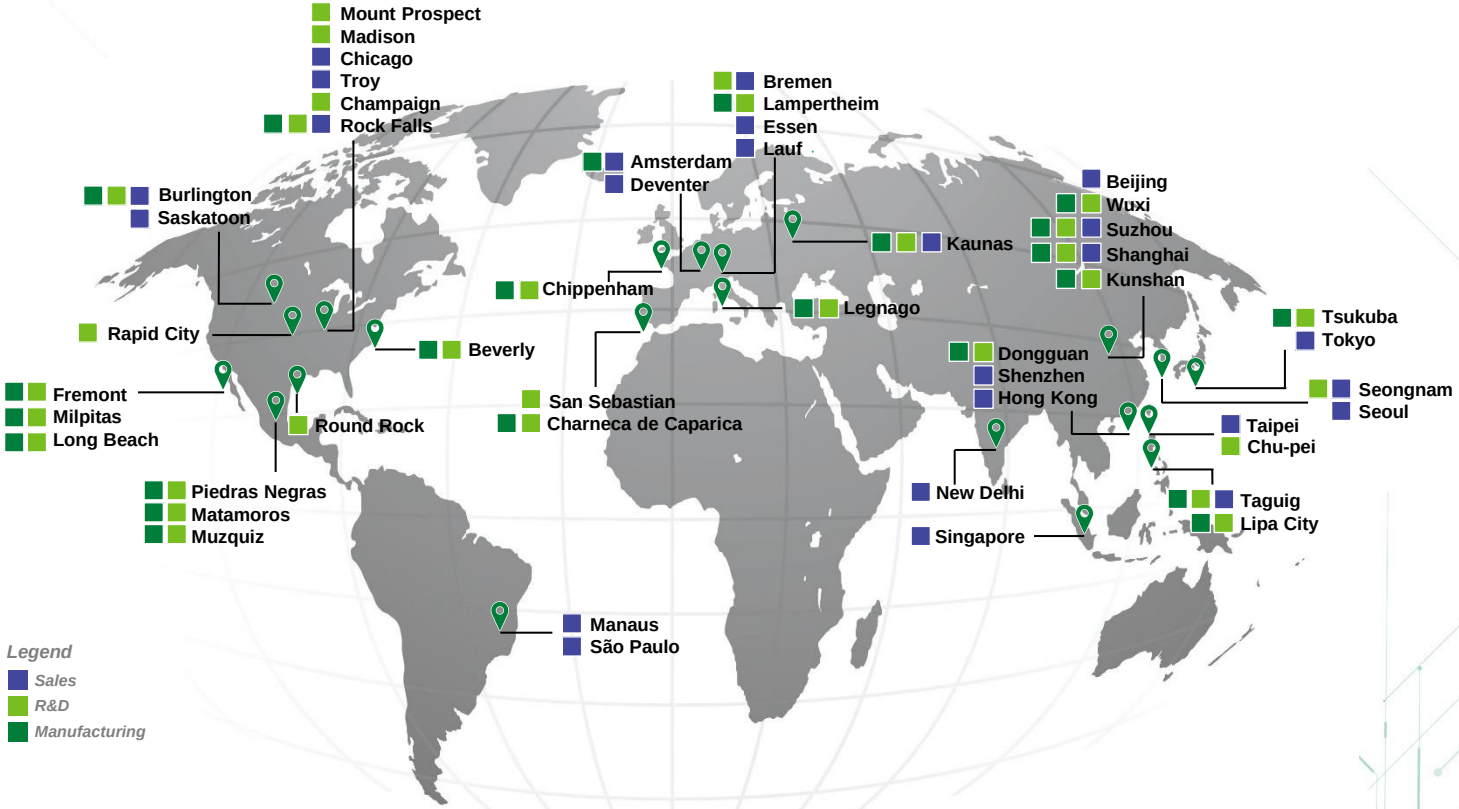
Local resources supporting our global customers



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Partner for tomorrow’s electronic systems

BROAD PRODUCT PORTFOLIO

An industrial technology manufacturing company empowering a sustainable, connected, and safer world

APPLICATION EXPERTISE

Our engineers partner directly with customers to help speed up product design and meet their unique needs

GLOBAL CUSTOMER SERVICE

Our global customer service team is with you to anticipate your needs and ensure a seamless experience

COMPLIANCE AND REGULATORY EXPERTISE

To help customers in the design process to account for the requirements set by global regulatory authorities

TESTING CAPABILITIES

To help customers get products to the market faster, we offer certification testing to global regulatory standards

GLOBAL MANUFACTURING

High-volume manufacturing that is committed to the highest quality standards

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IXYS

A Littelfuse Technology

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