

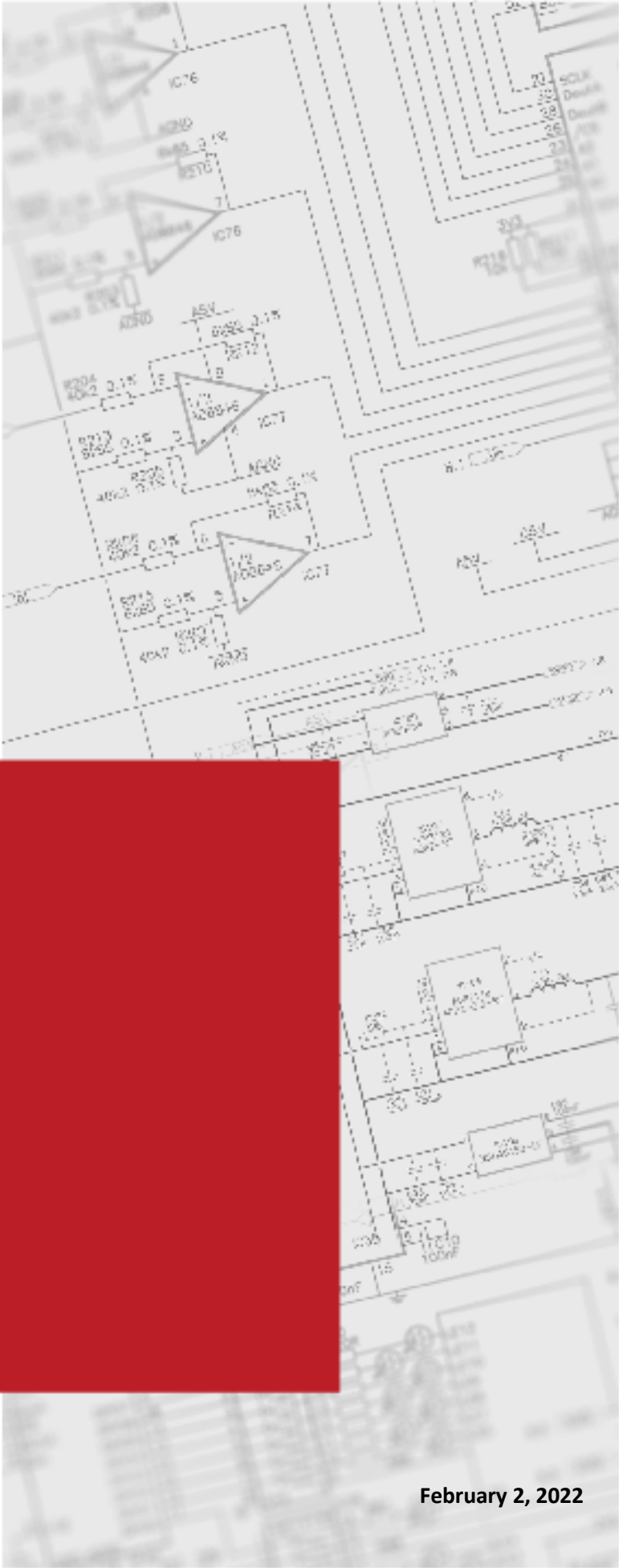
The logo for ENTRON, featuring the word "ENTRON" in a bold, black, sans-serif font. A thick red horizontal bar is positioned above the letters "E" and "N". A small "TM" trademark symbol is located to the right of the word.

Data Sheet

**TD90900-9L**

Product Model

**iPAK 6000AW**

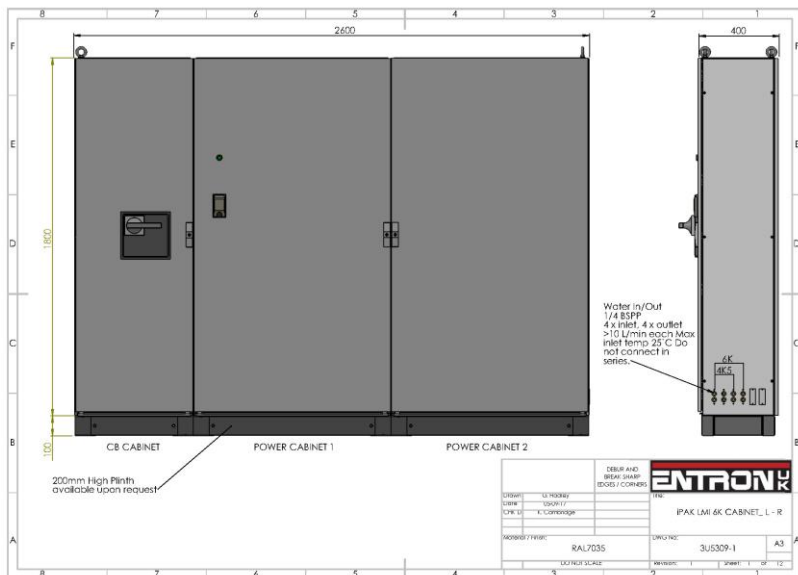
A detailed schematic diagram of a printed circuit board (PCB) is shown in the background, tilted at an angle. The diagram includes various electronic components such as integrated circuits (ICs), resistors, and capacitors, connected by a network of traces. Labels like "IC76", "ASV", and "R204" are visible. The schematic is rendered in a light gray color, providing a technical backdrop for the document.

February 2, 2022

# 1 iPAK 6000AW water cooled resistance welding inverter

## Typical Configuration

The 6000-amp High Current inverter is suitable for the following resistance welding applications: - Grating & Cross wire welding, Large annular ring projection welds e.g., Spuds including Industrial heat treating of metal parts.



Complete engineered welding control in self-contained easy to install cabinet, including safety screens, circuit breaker with door interlocking, power supplies and earth leakage protection.

iPAK 6000AW with Typical Suitable Transformer/Rectifier (Averaging Time 2 Seconds)				
Transformer type	TDC-6007	TDC-6007	TDC-5614	TDC-5614
kVA	600 kVA	600 kVA	1000 kVA	1000 kVA
Transformer primary V	650 volts	650 volts	650 volts	650 volts
Secondary Voltage	13.0 volts	16.2 volts	13.0 volts	17.1 volts
Turns Ratio	50:1	40:1	50:1	38:1
Sec. Current @ 3%	172,000 Amps (D)	150,738 Amps (D)	300,000 Amps (C)	171,000 Amps (C)
Sec. Current @ 10%	103,203 Amps (T)	82,563 Amps (T)	172,050 Amps (T)	130,724 Amps (T)
Sec. Current @ 20%	72,976 Amps (T)	58,381 Amps (T)	121,629 Amps (T)	92,436 Amps (T)
Sec. Current @ 50%	46,154 Amps (T)	36,923 Amps (T)	76,923 Amps (T)	58,462 Amps (T)
Sec. Current @ 100%	32,636 Amps (T)	26,109 Amps (T)	54,394 Amps (T)	41,339 Amps (T)
3 phase voltage	480 V max	480 V max	480 V max	480 V max

C=Limited by the inverter  
 T=Limited by transformer kVA  
 D=Limited by secondary diodes

### Important note:



The current values shown in the above tables take no account of the secondary resistance of the machine, which in most circumstances will have a significant effect on the maximum current available from the system. The figures given are only intended as a guide and to demonstrate the limiting factors.

General Power Specification	
Maximum output power @ 20% Duty-cycle @ 2 seconds averaging time	3,900 kVA @ 480 V line voltage
Maximum line input voltage	480 V ac +10%-20% @ 50/60 Hz
Maximum output current – Limited electronically	6,000 Amps
Maximum Continuous output current	2,683 Amps
Maximum line input current per phase	3,464 Amps
Continuous equivalent rms line current per phase (6,000A@20% duty)	1,549 Amps
Power Factor	Leading
Current regulation and feedback	Primary and secondary
Current regulation accuracy	±2 %
Current regulation repeatability	±1%
Inverter switching frequency	1 kHz
Maximum averaging time	2 seconds
Water flow rate	40 litres per minute (10 ltr/module)
Maximum inlet water temperature	25 degrees centigrade

## 2 Installation of water-cooled iPAK AW inverter modules to qualify for warranty

These notes are provided to assist customers who are installing inverter module into their own equipment. Failure to follow these rules will render the warranty void.

1. The inverter must be fitted into a customer cabinet which is sealed against ingress of dust.
2. There must be a free air space around all sides of the inverter module of at least four inches or 100mm.
3. The cabinet internal ambient temperature must not rise above 104 degrees Fahrenheit or 40 degrees Centigrade when under normal operating conditions.
4. All entry and exit conduits must be sealed with appropriate bulkhead fittings or glands.
5. All unused holes must be sealed.
6. The inverter must be supplied with three phase AC via an earth leakage circuit breaker (ELCB or GFI), suitably rated for the inverter (please see BF ENTRON Data sheet), with thermal and magnetic trips. This is required to provide protection for the inverter in the event of a device failure.
7. Maximum load/transformer primary current must not exceed the inverter rated current at the machine maximum duty cycle specified over the averaging time of two seconds (see BF ENTRON graph).
8. Duty cycle limits must not be exceeded beyond those specified in the BFE data sheet.

9.

Water flow must be at least the following:	
iPAK 150AW	1 gal/min or 5 litres/min
iPAK 360AW	1 gal/min or 5 litres/min
iPAK 600AW	1.5 gal/min or 7.5 litres/min
iPAK 1000AW	2 gal/min or 10 litres/min
iPAK 1500AW	2 gal/min or 10 litres/min
iPAK 3000AW	4 gal/min or 20 litres/min
iPAK 4500AW	6 gal/min or 30 litres/min
iPAK 6000AW	8 gal/min or 40 litres/min

10. A water management system must be used which is independent of both the machine and the welding transformer cooling systems.
11. The water management system must have the following components in each flow path:
  - I. A manual flow regulator or constant flow valve.
  - II. A programmable flow switch which is monitored by the welding control or line PLC.
  - III. A shut off valve.
  - IV. The water flow must drain to atmosphere.
12. Inlet water temperature must not exceed 77 degrees Fahrenheit or 25 degrees Centigrade.
13. The water temperature must not be low enough to cause the formation of condensation inside the inverter.
14. Water savers may be used, but should be used on the water outlet of the inverter. Water flow should be started at least half a second before a weld commences and the water must remain flowing for at least one minute after the weld has finished.

If the above conditions cannot be met BFE can supply a self-contained cabinet with earth leakage circuit breaker.

**Important Notes – Warranty Exclusions:**

- a. Excessive dust or moisture contamination may render the warranty void.
- b. Excessive internal cabinet temperatures may cause the inverter to be damaged and the warranty will be void.
- c. Evidence of significant inverter damage as a result of unprotected flash over as a result of no ELCB (GFI) being fitted will render the warranty void.

**Suggested Minimum Installation Data for iPAK 6000AW:****Important Note:**

All the calculations for cable sizing assume that the inverter will be used at maximum permissible current and maximum permissible duty cycle, but within the inverter specification.

**WARNING!****WARNING!**

The calculations given below are intended as a guide, and should therefore be checked by a professional electrical engineer to ensure that local installation regulations are met.

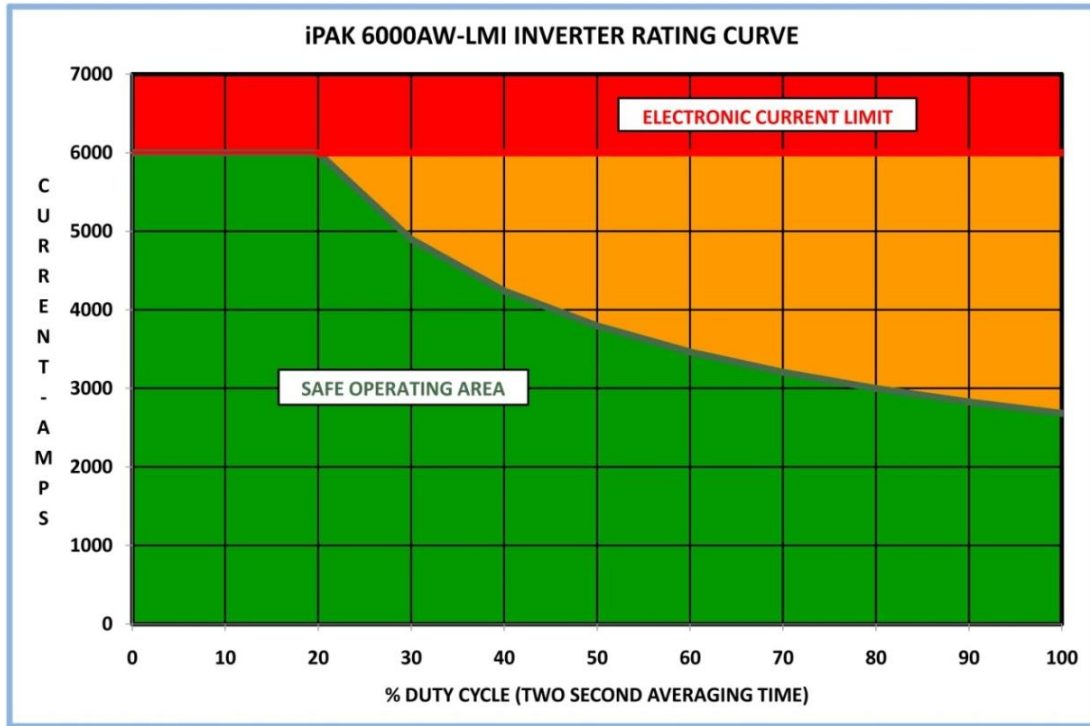
**Assumptions for three phase supply feed:**

Ambient temperature	= 30°C (86°F)
Cable Insulation	= Butyl
Conductor temperature	= 85°C (185°F)
Maximum volts drop at full load	= 5% of nominal supply voltage.
Continuous current rating for cable sizing	= 1,549 Amps (thermal equivalent current)
Current Rating for volts drop	= 3,464 Amps
Recommended fusing	= 1,800 Amps HRC
Recommended thermal/magnetic circuit breaker	= 1,600 Amps
Minimum cable size for 10 metre feed cable	= 3 x 185 sq. mm (3 x 365 kMCM) (flat spaced)
Volts drop over 10 metres of cable @ 3,464 Amps	= 2.54 volts/10 metre length of run

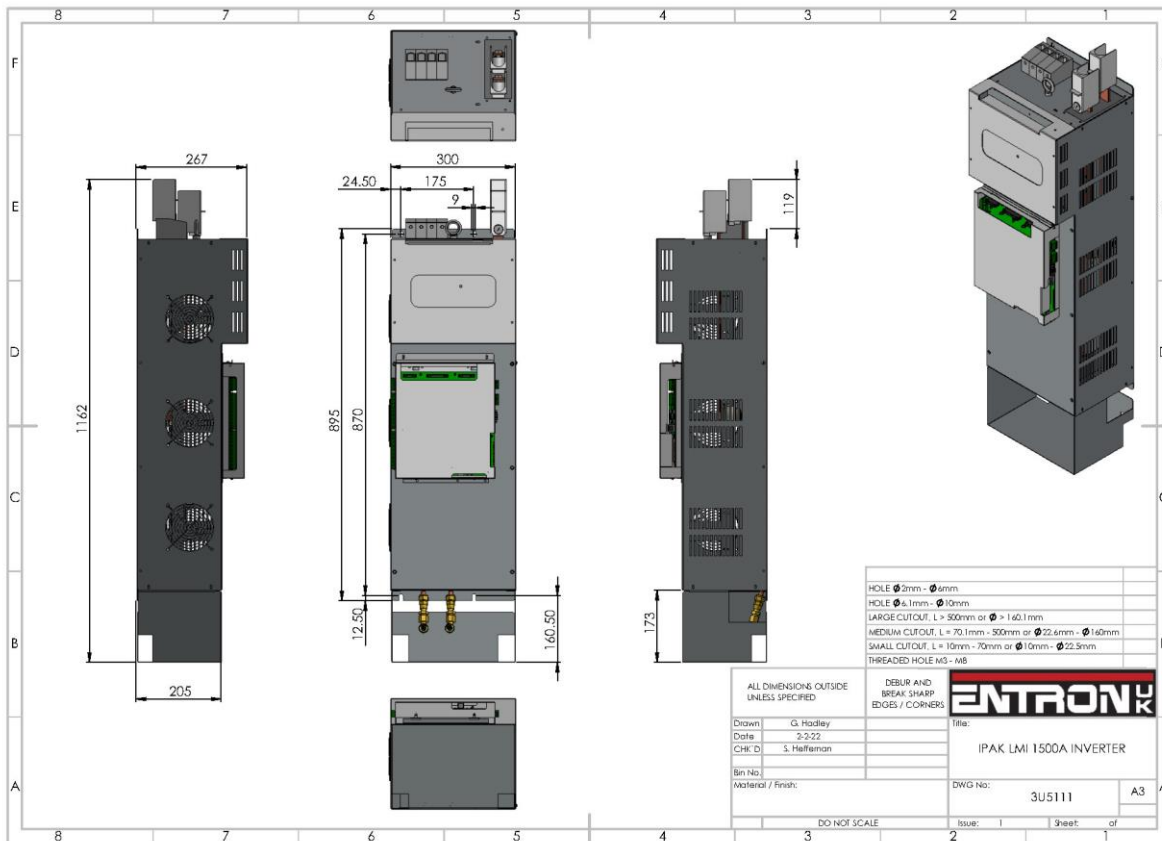
**Assumptions for Welding transformer feed:**

Ambient temperature	= 30°C (86°F)
Cable Insulation	= Butyl
Conductor temperature	= 85°C (185°F)
Maximum volts drop at full load	= 5% of nominal supply voltage.
Continuous current rating for cable sizing	= 2,683 Amps (thermal equivalent current)
Current Rating for volts drop	= 6,000 Amps
Minimum cable size for 10 metre feed cable	= 3 x 400 sq. mm (3 x 789 kMCM) (flat spaced)
Volts drop over 10 metres of cable @ 6,000 Amps	= 2.20 volts/10 metre length of run

Rating Curve:



Outline Drawings – Inverter Modules (4 modules used per Inverter):



## 3 Technical Support

### 3.1.1 Internet

The latest version of the documentation and other helpful resources in the ENTRON Document Library page found in the Resource section of the ENTRON website: <https://www.entroncontrols.com>

### 3.1.2 Documentation Request

Documentation, user instructions and technical information can be requested by emailing ENTRON Controls at [customerservice@entroncontrols.com](mailto:customerservice@entroncontrols.com) or [support@bfentron.co.uk](mailto:support@bfentron.co.uk)

Please include your name and email

### 3.1.3 Service and Technical Support

For service and technical support, we request that customers fill out the Technical Support Form found on our website at link below:

NOTICE



TECHNICAL SUPPORT FORM LINK

<https://www.entroncontrols.com/resources/technical-support.html>

After the web form has been completed, your case will be assigned to one of our technical specialists who will contact you directly.

and service sites is shown in the table below. Please contact the site for your specific region.

Manufacturing Site	Country	Phone	Email	Regions Supported
ENTRON UK	England	+44-1384-455401	support@bfentron.co.uk	Europe, Asia, Africa, Rest of World
ENTRON US	USA	+1-864-416-0190	tech.support@entroncontrols.com	USA, Canada
ENTRON MX	Mexico	+52-844-415-9081	soporte@entronmx.com	Mexico, Central America