



## iPAK 360AW water cooled resistance welding inverter.

### Typical Configurations:



Modular construction ready to be integrated into your existing or custom cabinet.

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



| iPAK 360AW with typical suitable transformer/rectifier (Averaging Time 2 Seconds) |                 |                 |                 |
|---|-----------------|-----------------|-----------------|
| Transformer type  | TDC-6322        | TDC-5583        | TDC-5610        |
| kVA   | 72 kVA          | 100 kVA         | 135 kVA         |
| Transformer primary V   | 650 volts       | 650 volts       | 650 volts       |
| Secondary Voltage   | 7.0 volts       | 9.0 volts       | 9.0 volts       |
| Turns Ratio   | 92:1            | 72:1            | 72:1            |
| Sec. Current @ 3%   | 26,000 Amps (D) | 25,620 Amps (C) | 25,620 Amps (C) |
| Sec. Current @ 10%  | 18,500 Amps (D) | 18,500 Amps (D) | 24,500 Amps (D) |
| Sec. Current @ 20%  | 14,700 Amps (D) | 14,700 Amps (D) | 19,600 Amps (D) |
| Sec. Current @ 50%  | 10,191 Amps (T) | 11,000 Amps (D) | 14,954 Amps (T) |
| Sec. Current @ 100%   | 7,206 Amps (T)  | 7,833 Amps (T)  | 10,574 Amps (T) |
| 3 phase voltage   | 480v max        | 480v max        | 480v 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 | 234 kVA @ 480 V line voltage |
| Maximum line input voltage                                       | 480 V ac +10%-20% @ 50/60 Hz |
| Maximum output current – Limited electronically                  | 360 Amps                     |
| Maximum Continuous output current                                | 160 Amps                     |
| Maximum line input current per phase                             | 207 Amps                     |
| Continuous equivalent rms line current per phase (360A@20%DC)    | 93 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  | 5 litres per minute          |
| Maximum inlet water temperature                                  | 30 degrees centigrade        |

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

These notes are provided to assist customers who are installing inverter modules 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:
  - I. iPAK 150AW 1 gal/min or 5 litres/min
  - II. iPAK 360AW 1 gal/min or 5 litres/min
  - III. iPAK 600AW 1.5 gal/min or 7.5 litres/min
  - IV. iPAK 1000AW 2 gal/min or 10 litres/min
  - V. iPAK 1500AW 2 gal/min or 10 litres/min
  - VI. iPAK 3000AW 4 gal/min or 20 litres/min
  - VII. iPAK 4500AW 6 gal/min or 30 litres/min
  - VIII. 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**

- 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 360AW:****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**

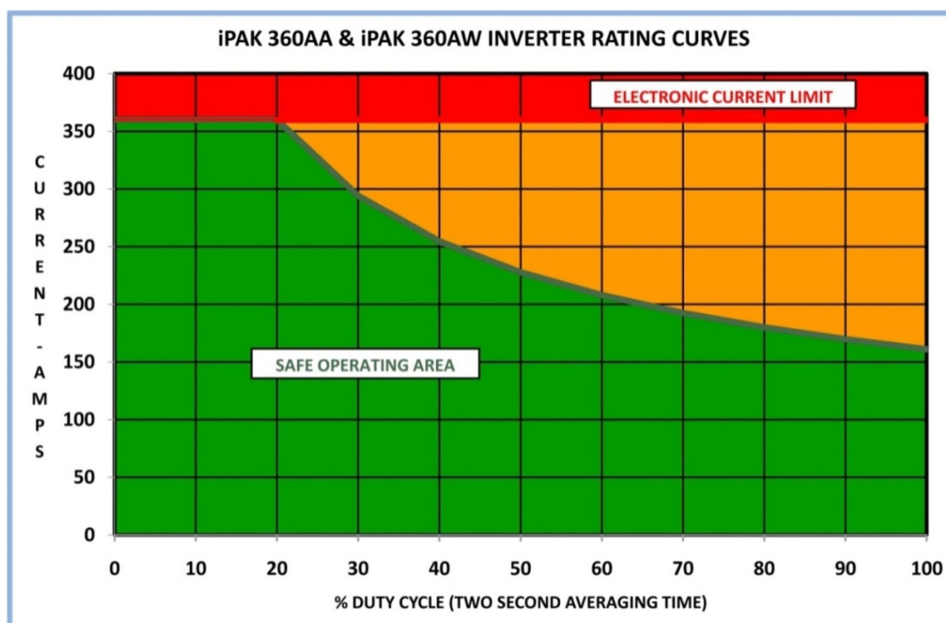
The calculations given below are intended as a guide, and should therefore be checked by a professional electrical engineer to ensure that local installation regulations are met.

**Assumptions for three phase supply feed:**

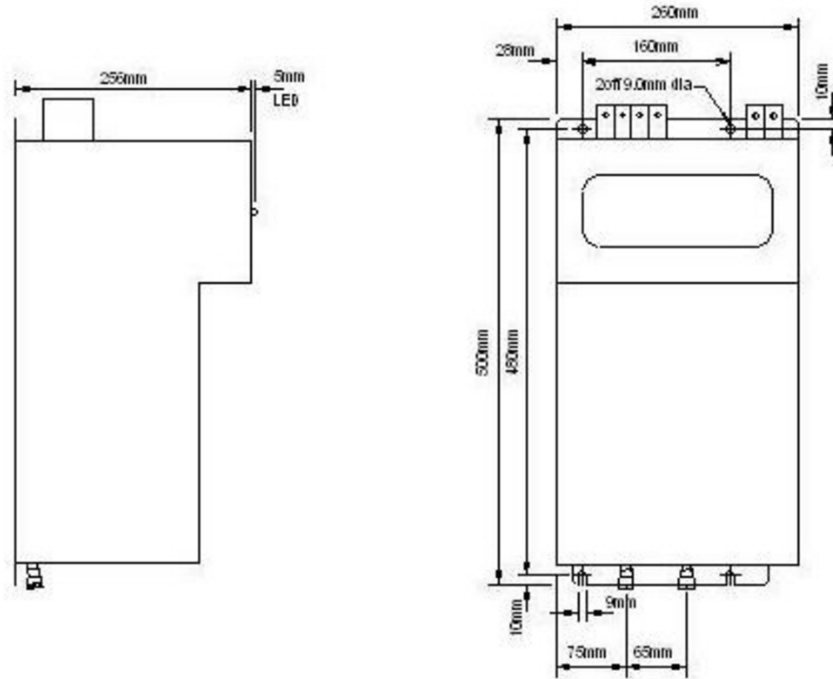
|   |  |
|---|--|
| Ambient temperature                           | = 30°C (86°F)                          |
| Cable Insulation                              | = Butyl                                |
| Conductor temperature                         | = 85°C (185°F)                         |
| Maximum volts drop at full load               | = 5% of nominal supply voltage.        |
| Continuous current rating for cable sizing    | = 93 Amps (thermal equivalent current) |
| Current rating for volts drop                 | = 208 Amps                             |
| Recommended fusing                            | = 125 Amps HRC                         |
| Recommended thermal/magnetic circuit breaker  | = 100 Amps                             |
| Minimum cable size for 10 metre feed cable    | = 25 sq. mm (49 kMCM) (Trefoil)        |
| Volts drop over 10 metres of cable @ 208 Amps | = 1.49 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    | = 161 Amps (thermal equivalent current) |
| Current Rating for volts drop                 | = 360 Amps                              |
| Minimum cable size for 10 metre feed cable    | = 35 sq. mm (138 kMCM) (Trefoil)        |
| Volts drop over 10 metres of cable @ 360 Amps | = 4.14 volts/10 metre length of run     |

**Rating Curve**

Outline Drawing – Inverter Module:



Outline Drawings – Standard Case:-

