XPR460 – Plasma Cutting System
Electromagnetic Field (EMF) Measurements

Introduction
Electric and magnetic fields are often referred to as “electromagnetic fields,” or EMF. The EMF generated by Hypertherm plasma arc cutting equipment is not significant when operated and installed according to Hypertherm’s instructions to minimize EMF.

How Do I Minimize EMF Exposure?
Failure to follow these instructions will increase EMF:

- cut with the lowest current setting necessary for the application and quality of the cut.
- never coil a torch cable or work lead around your body.
- do not place your body between the torch cable and work lead.
- route cables together on the same side of your body.
- route the torch cable and work lead close together. if possible, secure them together with tape or cable ties.
- connect the work cable to the workpiece as close to the cutting zone as practical.
- keep the cutting power source and cables as far away from you as practical.

European EMF Directive (2013/35/EU amending 2008/46/EC & 2004/40/EC)
The European Commission published Directive 2013/35/EU on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents such as electromagnetic fields (EMF). The new feature of the EMF Directive effective July 2016 is the requirement that employers must assess the risk separately for each workplace. Risk assessment of electromagnetic fields in the workplace (including measurements or calculations, if necessary) should be carried out. Where applicable, special attention shall be paid to workers at particular risks (pregnant, living with implanted medical devices. The employer shall consider updating the risk assessment and the prevention measures if workers report transient symptoms in relation to their sensory/neural system. Health surveillance shall be carried out by the employer and the findings preserved.

Hypertherm EMF measurements
Measurements were taken per EN50444 figure A.1 and IEC 62822-2 figures 7, 11, and 15 as shown below.

The highest field strength is usually to be expected at close distance to the welding cable, torch or electrode holder. For measurement the point of investigation (POI) for maximum exposure evaluation due to cables should be at the centre of a quarter circle with a radius r = 20 cm, see Figure A.1.

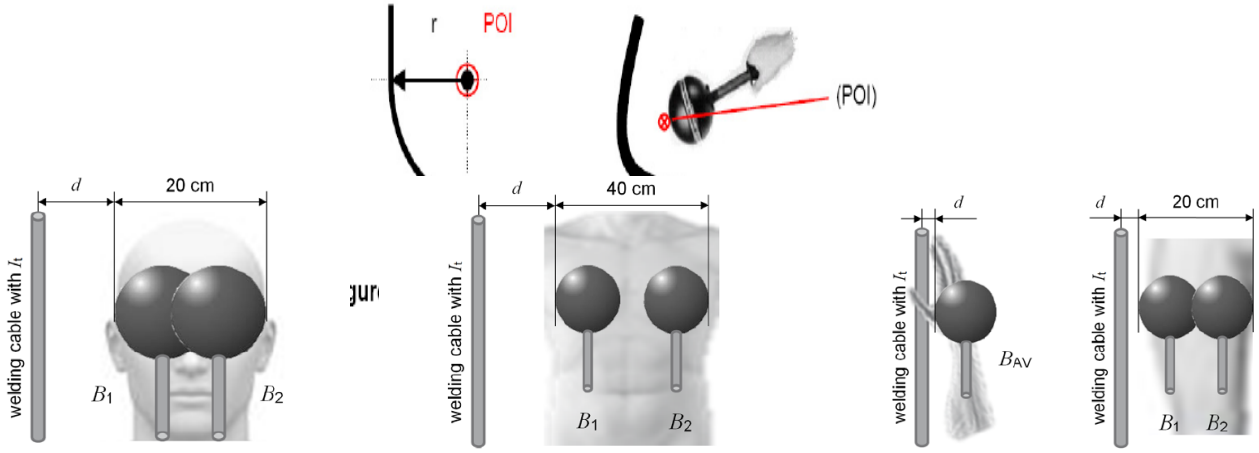


Figure 7 – Field measurement at head position

Figure 11 – Field measurement at trunk position

Figure 15 – Field measurement at limb positions, hand and thigh

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Power Source Model	Meter Used	Range	Ambient (uT)	IEC 622822-2 Hand/ Thigh (uT)		IEC 62822-2 Head (uT)		IEC 62822-2 Trunk (uT)		EN50444 20cm (uT)	Date Measurement Taken
				B1	B2	B1	B2	B1	B2		
				3cm	23cm	10cm	30cm	10cm	50cm		
XPR460	Narda ELT-400	1Hz - 400KHz	7.792	34.8	9.68	12.32	9.16	12.32	8.86	10.92	30-Jul-24
	Narda ELT-400	30Hz - 400KHz	1.392	22.13	7.452	9.572	6.774	9.572	6.657	7.958	30-Jul-24
	Omega HHG-23	DC	130	2410	550	970	470	970	360	670	29-Aug-24

The average field levels shown in the table below were calculated using the values in the table above with the following equation:

$$Bavg = \frac{B1 + B2}{2}$$

Note: A single measurement for the Hand value was made and not calculated

Power Source Model	Meter Used	Range	Ambient (uT)	IEC 622822-2 Hand/ Thigh (uT)		IEC 62822-2 Head (uT)	IEC 62822-2 Trunk (uT)	EN50444 20cm (uT)	Date Measurement Taken
				Hand	Thigh				
XPR460	Narda ELT-400	1Hz - 400KHz	7.792	34.8	22.24	10.74	10.59	10.92	30-Jul-24
	Narda ELT-400	30Hz - 400KHz	1.392	22.13	14.791	8.173	8.1145	7.958	30-Jul-24
	Omega HHG-23	DC	130	2410	1480	720	665	670	29-Aug-24

Notes:

1. The above data was measured for reference only in Hypertherm's R&D lab environment over multiple days with other equipment running in the lab.
2. The positioning of the measurement equipment used results in variation of measurements.
3. The AC component was measured with the Narda ELT-400 and the DC component was measured with the Omega HHG-23.
4. Non-thermal effects due to electric fields per IEC 62822-1:2016 4.3 complies because the welding equipment is designed in accordance with IEC 60974-1.

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5. There are no contact currents per IEC 62822-1:2016 4.4
6. Non-thermal effects of output current ripple per IEC 62822-1:2016 4.5 is exempt because the ripple current for the above products is less the 100A peak to peak.
7. Thermal effects per IEC 62822-1:2016 4.6 are exempt because the ripple current for the above products is less than 300A peak to peak.

Revision	Date	Section	History Change
1	8-November-2016	-	Initial Release
2	14-November-2016	Table	Add frequency unit “Hz” after 1 and 30