

	Date: June 2023		Technical Information
	HFC12000zXX-YY (Three Phase)		Edition: 1.4
Ballast for 12000W Discharge lamps	Datasheets:	11 Pages	Status: Valid

Please read this information carefully, before installing and operating the power supply!

Electronic Ballast Types:

HFC12000z12-10, HFC12000z16-14, HFC12000z22-18



Ushio Lamps:

Features :

- Power Supply for Gas discharge-Arc-Lamps, medium pressure
- Lamp power of up to 12000W with different versions for target lamp
- Qualified for industrial applications
- Enclosed in metal housing
- Isolated control interface to control system (24V control voltage to be supplied externally)
- Thermal Design with integrated fans
- μ P controlled, Digital Power Management with high output stability over lamp lifetime
- Output short circuit protected
- Short-to ground protection due to isolated output
- Output to PE short circuit detection and protection
- Shut off function for lamp fail parameter
- Status identification by LED
- Active Line over voltage protection

Electrical Data

All values are valid at $25 \pm 5^{\circ}\text{C}$, unless otherwise noted

Input Data

Nominal Operation	Symbol	Unit	Nominal	Tolerances	Remarks
Input voltage L1, L2, L3	U	V AC	430	380 – 480	
System wattage	P_{LI}	kW	4 - 14	<15	
Input current	$I_{L1,2,3}$	A	9 - 35	<38	
Line frequency	f-in	Hz	50/60	47 – 63	Three Phase
Line Power factor	PFC	1	0.82		

Other Operation Data	Symbol	Unit	Nominal	Tolerances	Remarks
System wattage during ignition	P_{Iign}	W		<1000	
System wattage standby-operation	P_{LIstby}	W	4	<20	

Lamp Output Data

Ignition	Symbol	Unit	Nominal	Tolerances	Remarks
Ignition voltage	U_{Iign}	kV _{peak}	7	+/-15%	Resonant Ignition
Ignition time automatic restart counter	$t_{Iign\ on}$	ms	800ms 2 attempts	+100ms, -600ms --	Depends on Cable-length

Run-up Operation	Symbol	Unit	Nominal	Tolerances	Remarks
Run-up Current (z12-10)	I_{max}	A	20	+/- 1	Lamp Inrush current is the same as max. Lamp operating current.
Run-up Current (z16-14)			16	+/- 0.8	
Run-up Current (z22-18)			11	+/- 0.6	

Nominal Operation (Ver) *	Symbol	Unit	Nominal	max.:	Tolerances	Remarks
Lamp Voltage (z12-10)	U_{La}	V	(550–820)	1050V	+/-20%	Full power is reachable within voltage range shown in brackets
Lamp Voltage (z16-14)			(725–1100)	1350V		
Lamp Voltage (z22-18)			(1000–1500)	1800V		
Lamp wattage	P_{La}	W	12000		+/-10%	
Lamp current (z12-10)	I_{La}	A	5.0 - 20		+/-10%	
Lamp current (z16-14)			4.0 - 16			
Lamp current (z22-18)			2.8 - 11			
HF-Ripple of output power	$\Delta P_{La,rip} / P_{La}$	%	100 (30kHz-200kHz)			HF-operation mode
300Hz Ripple		%	< 12% RMS			
Open circuit voltage	U_{ocv_RMS}	V	7KVpp		+/-15%	Resonant

LIFETIME DATA

All values for $U = 430\text{ V}_{rms}$

Temperature at test point = 70°C

	Symbol	Unit	Nominal	Tolerances	Remarks
ballast lifetime	t_{Life}	h		> 20000	acc. To MIL HDBK for nominal operation

MISCELLANEOUS DATA

Nominal Operation	Symbol	Unit	Nominal	Tolerances	Remarks
Power losses at 430V	P_v	W	480		At 12000W out V lamp
efficiency at 430V	η	1	0.96	0.94 – 0.98	Depends on output current
Ambient temperature	T_A	°C	+ 25	-20 – +50	Non condensating
Maximum temperature at internal test point	T_c	°C	+ 80		Test point see drawing
Internal temp. warning threshold	$T_{c\text{-warning}}$	°C	+ 80	+75 – +85	
Internal temp. switch off temperature at Slaves	$T_{c\text{-off}}$	°C	+ 90	+85 – +95	At heatsink, no derating till switch off
Standby Mode		Symbol	Unit	Nomina	Remarks
24V minimum shut-off time for restart and reset failure modes:		T_{reset}	sec	10	Standby mode is present when the lamp doesn't light 1. when lamp outputs is/are shorted to earth 2. when line overvoltage is detected 3. when temperature alarm is detected

Geometry and Weight	Symbol	Unit	Nominal	Tolerances	Remarks
Length	l	mm	212 – 270 (42TE)		See dwg.
Width	w	mm	302		See dwg.
Height	h	mm	270 (6HE)		see dwg.
Housing			Value without Frontterminal		Aluminium 19" metal housing with mounted fans and terminals
Weight	W_B	Kg	8,85		

Wiring length	Symbol	Unit	Nominal	Tolerances	Remarks
Between ballast and lamp	L_{bl}	m		30 max.	Shielded cable, see below
Required Cable			Maximum reactive capacity of 3000pF per wire, = 1500pF in whole, as output load		PTFE High Voltage Cable Specs on request

Cooling method	Symbol	Unit	Nominal	Remarks
Airflow		meter per second	Built-in fan's	Sufficient intake air must be available, air circulation to be avoided

Plugs and Cables	Manufacturer / Type	Remarks /Header / Cable
Ballast mains and lamp terminal	Phoenix Contact Terminal Block Type: UT6	sufficient mm ² -wire diameter
Control Interface terminal	Sub-D-15 Male	

Identifiers	Description of LEDs	Remarks
1 st LED (green)	Power on	
2 nd LED (green)	Lamp lit	
3 rd LED (red)	Mains fail	
4 th LED (red)	Lamp fail	
5 th LED (red)	Temperature warning, internal heat sink >80°C	
6 th LED (red)	Temperature alarm, internal heat sink >90°C	Reset by 24V off
Failure Mode Truthtable		Description of LEDs
3 rd LED to 6 th = on	Lamp wire to PE Failure	Reset by 24V off
5 th LED and 6 th = on	Temp-switch Slaveboards opened	Reset by 24V off
2 nd LED and 3 rd = on	Mains Overvoltage	Reset by 24V off

PIN Assignment and Fuse

Status	Signal	Description		
Power Terminal	L1	Three-Phase AC-In 380V-480V		
	L2			
	L3			
	PE	Safety Ground (Protected Earth)		
	Lamp1	High voltage connector to lamp, symmetrical output		
	Lamp2	High voltage connector to lamp, symmetrical output		
Control Terminal Optoisolated	1	Output	Mains Fail (same as LED), low active (***)	
	2	Output	Lamp On (same as LED), low active (***)	
	3	Output	Power On (Same as LED), low active (***)	
	4	External 24V	GND (-) alternative to pin 12	
	5	Input	Power Setting (0-10V), see Figure 3 for details (**)	
	6	Output	Fan Fail (no Led), low active (***)	
	7	Nc	Not connected	
	8	External +24V	24V/500mA-external input voltage (+) (input),(<0.6A)	
	9	Output	Temperature Alarm (same as LED), low active (***)	
	10	Output	Temperature Warning (Same as LED), low active (***)	
	11	Output	UV-Lamp Fail (same as LED), low active (***)	
	12	External 24V	GND (-) alternative to pin 4	
	13	Output	Lamp Voltage (0-10V) (*)	
	14	Output	Lamp Current (0-10V) (*)	
	15	Input	Lamp Enable (>10V=On) (**)	
Fuse	3x Internal F 10A L 500V	CAUTION! For Continued Protection Against Risk of Fire, Replace Only with Same Type and Rating of Fuse! Not replaced by Customer!		

*) The output is scaled to the maximum current of 20A = 10V and maximum voltage of 1800V = 10V

**) The internal resistance of the control voltage driver should be less than 500Ohm to avoid mis-settings

***)Output capability of Open Collector: low = 50mA, high = 4mA (short to Gnd), internal pullup resistor to 24V is 5K6, Output is **not** short circuit protected to +24V! For Relais drive an external diode is required!

Standards & Regulations	
Safety and performance Certifications	Unit is constructed and built following CE regulations
EMI and RFI – (Radio Frequency Interferences) (Funkentstörung)	According to EN 55022 Group 1, class A, tested only in application with applicable wiring precautions
RoHS-conformity	RoHS-conform
Underwriters Laboratories	Not yet evaluated but UL-recognized material used

Enviromental Requirements	Ambient conditions	Remarks
Storage Temperature Range	-20°C - +50°C	
Operating Temperature Range	-20°C - +50°C	Sufficient air intake without heat circulation
Humidity Range	20% - 95% non condensing	
Altitude operating	0 Ft. to 30000 Ft.	
Altitude not operating	0 Ft. to 30000 Ft.	
Vibration operating	G _{rms} , 5 Hz to 500 Hz random 10min x y z axis	Not tested
Vibration not operating	G _{rms} , 5 Hz to 500 Hz random 10min x y z axis	Not tested
Shock operating	G _{rms} , ½ sine wave, 11ms x y z axis	Not tested
Shock not operating	G _{rms} , ½ sine wave, 11ms x y z axis	Not tested

Subject to possible editorial changes!

Failure Signals and Display:

The Front panel has 6 LED's to indicate the operational condition:

- | | |
|------------------|---------|
| 1. Power on | (green) |
| 2. Lamp on | (green) |
| 3. Mains fail | (red) |
| 4. UV-Lamp fail | (red) |
| 5. Temp. Warning | (red) |
| 6. Temp. Alarm | (red) |

The normal kind of displaying is a **continues** light "on" or "off", for easy static detecting by a control system.

There is only one exception: If the temp-switch is open, LED5 -Temp.warning is blinking together with continous light at LED6. This is necessary to differ between Temp -Sensor and -Switch.

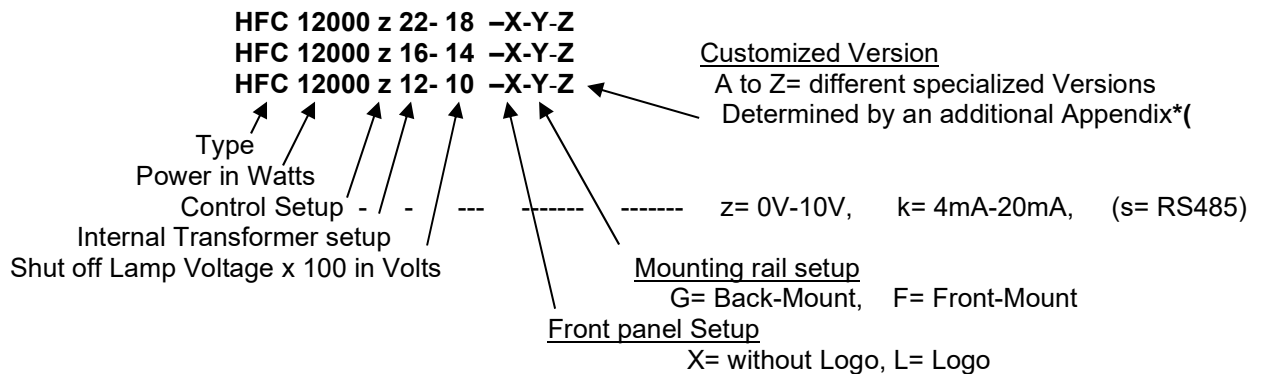
There are major failure signals which can only be resetted by switch **off and on** the 24V external power! These signals force the Power Supply to switch off the lamp immediately!

This is necessary for the following displays:

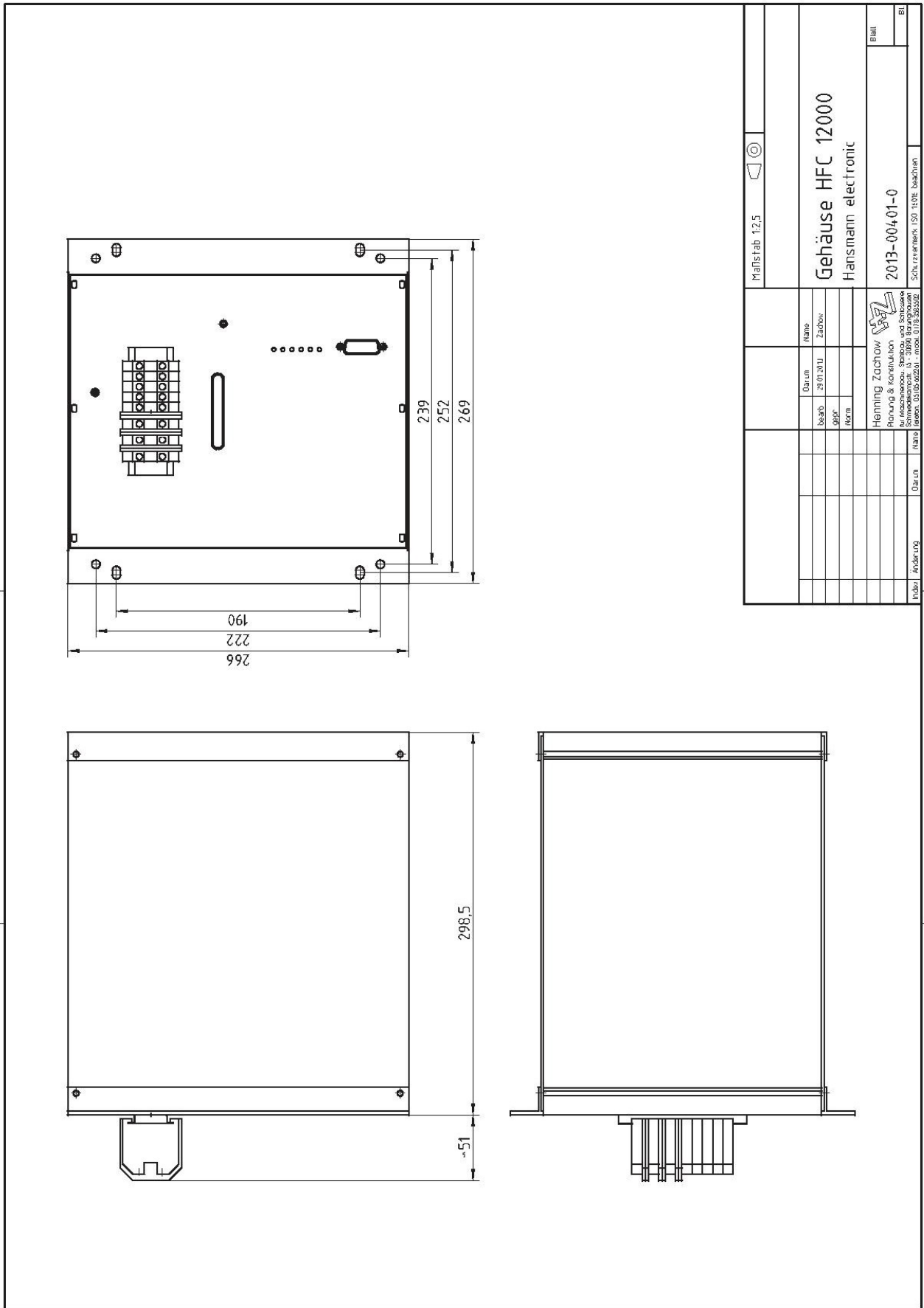
- Lamp wires has unsymmetrical load or shorted to PE: indicated by LED3, LED4, LED5, LED6 are continously on.
- Line Overvoltage detected: LED2 and LED3 are continously on.
- LED6 is continously on, forced by increasing operational temperature above 80°C or broken or shorted wires or not applied Sensor-Plug!

Ordering Information:

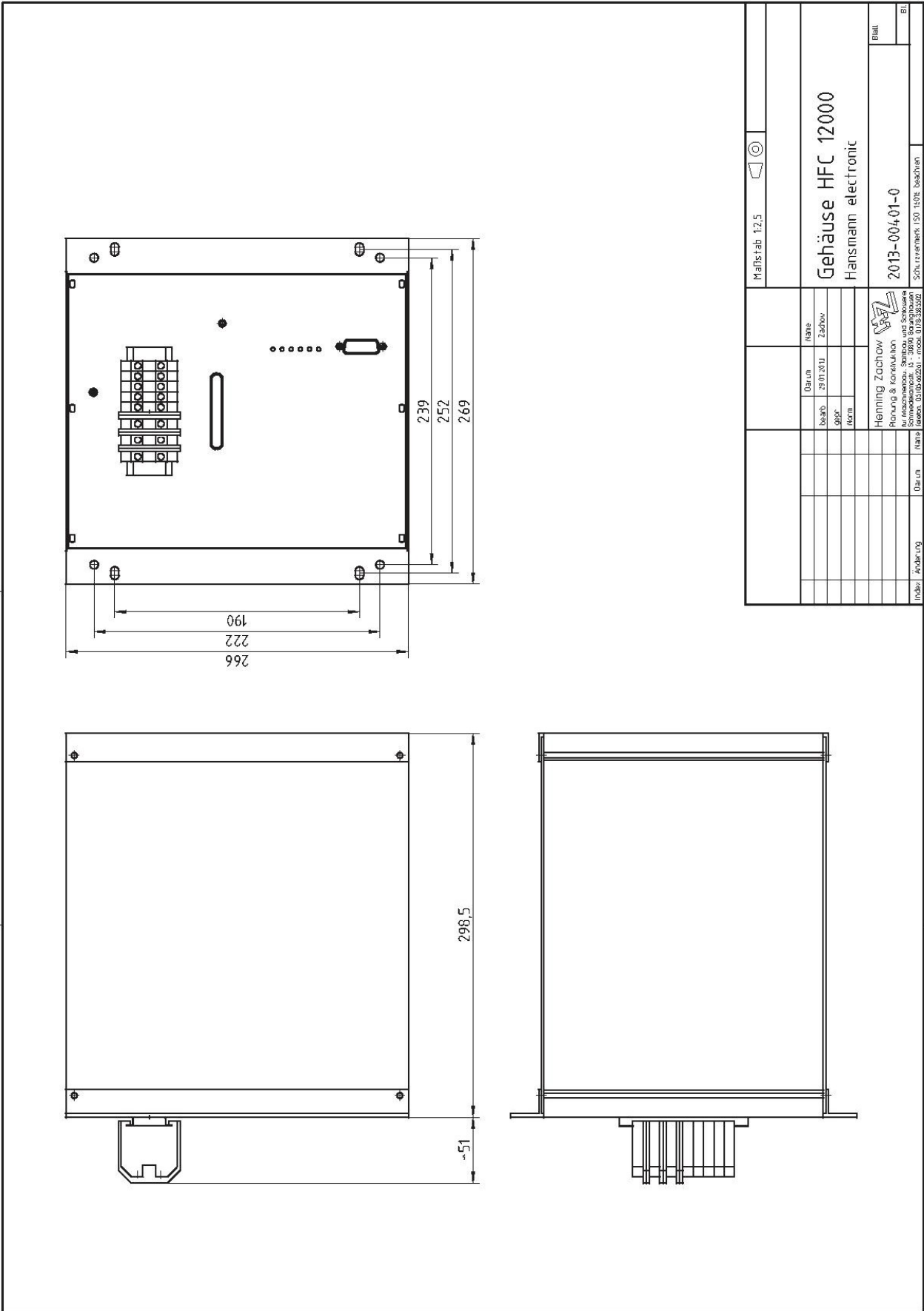
Basic Types:



- *(
- N= normal version
 - M= vibration protected
 - A= vibration protected and additional holes at front panel, see **fig.1**
 - H= **Hyundai-vibration-verschiebung-Klemmblock HFC8000 s 22-12-X-F-H**



Maßstab 1:2,5			
Gehäuse HFC 12000 Hansmann electronic			
Darun bearb. gepr. Norm		Name Zachow	
Henning Zachow Planung & Konstruktion für Maschinenbau, Stahlbau und Schweißtechnik Hansmann electronic GmbH Industriestraße 10 01109 Berlin			
Index / Änderung		Darun / Name	
2013-004-01-0		Blatt	
Schutzmerk 130 11911 beachten			
Bl.			



Additional holes at front panel

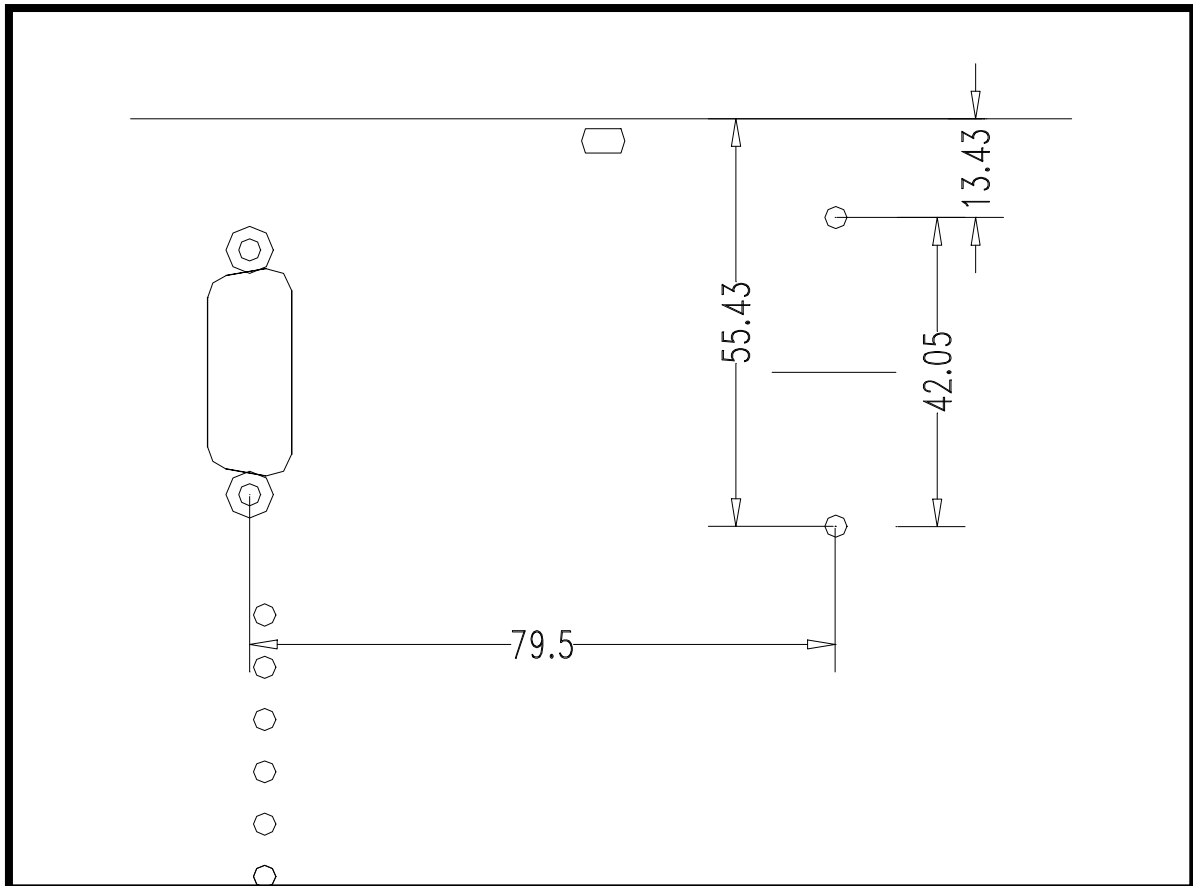


fig. 1

Additional hints for use and safety:

1. Safety (only at output)

Because of instant strike, the output voltage to the lamp can reach values of up to +/-5000 Volts! Please ensure minimum 10mm clearance between all lamp terminals to PE, to prevent arc to ground situation!! Primary wiring has to meet national requirements for electrical safety!

2. Fuse and Safety

CAUTION! For Continued Protection Against Risk of Fire, Replace Only with same Type and Rating of Fuse! Three fuses are placed internally!

- End -