

## Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

<b>Manufacturer</b>	<b>LST GmbH, Lloyd Systemtechnik</b>
<b>Address</b>	Kirchweg 214, Bremen, 28199, Germany
<b>Type</b>	Control Units
<b>Description</b>	Digital excitation system for synchronous machines Optional function: Redundancy Reactive load sharing Harmonic Analyzer  refer to the Appendix for details
<b>Trade Name</b>	IREG
<b>Application</b>	Marine, offshore and industrial applications for use in environmental categories ENV1, ENV2 and ENV3 as defined in Lloyd's Register's Type Approval System, Test Specification Number 1 - December 2021.
<b>Specified Standard</b>	Manufacturer's specification IACS requirements E10 (1991/ Rev. 8 - Feb 2021)



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## Type Approval Certificate

### Ratings

Nominal supply Voltage: 24 VDC  
Voltage control accuracy:  $\leq 0.2\%$   
Voltage control range: 0.7 – 1.2 UGN  
Main sequence execution: 100 Hz  
Current control execution: 1 kHz

### Other Conditions

Type Approval does not eliminate the need for normal inspection and survey procedures required by the Rules and Regulations.  
If the specified standards are amended during the validity of this certificate, the product is to be re- approved prior to it being supplied to vessels to which the amended standards apply.

This certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid Certificate.

The Design Appraisal Document HPC2162066-22/HN/JK and its supplementary Type Approval Terms and Conditions form part of this Certificate.

## Appendix

### PLACE OF PRODUCTION

ITS -Industrial Turbine Services GmbH  
 Fabrikplatz 1  
 4662 Steyrermuhl  
 Austria

### TYPES

I (1)	A (2)	-A (3)	-P (4)	N (5)	-I (6)	O (7)	RNNA [(8)]	[IIIIIOON] (9)	-N (10)	N (11)
(1)	I=IREG (no options)									
(2)	A=AVR (no options)									
(3)	Form factor:						A=19" B=Long panel C=Half panel			
(4)	Optional bus interface:						P=Profibus M=Modbus N=None			
(5)	Optional synchronization function:						S=Synchronization C=Synchronization check N=None			
(6)	IO-Slot 1(no options):						I=Digital inputs (DI_24)			
(7)	IO-Slot 2(two options):						O=Digital outputs (DO_24) R=Relay outputs (DO_SR)			
(8)	10-Slot 3-6 (five options):						I=Digital inputs (DI_24) O=Digital outputs (DO_24) R=Relay outputs (DO_SR) A=Analog board (ABRD) N=None			
(9)	Analog board type of each channel:						I=Analog input O=Analog Output T=Thermocouple P=PT100/1000 C=Counter N=None			

**TYPES (continued)**

- |      |                                |                              |
|------|--------------------------------|------------------------------|
| (10) | Power system stabilizer (PSS): | A=PSS2A<br>B=PSS2B<br>N=None |
| (11) | Diode monitoring:              | D=Diode monitoring<br>N=None |