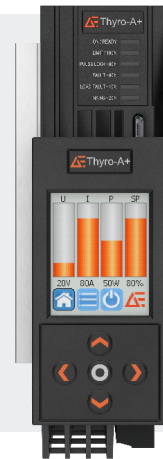


THYRO-A+

DIGITAL SCR POWER CONTROLLER
UP TO 280 AMPS



New modular SCR power controllers with optional display and increased measuring accuracy for heating elements, resistive loads and transformer loads in heating, melting, drying and forming applications.

PRODUCT HIGHLIGHTS

- Comprehensive operating and control modes to save system costs for resistive and transformer loads
- Optional display or Thyro-Tool Pro software to easily visualize, commission or set parameters. (No potentiometer adjustments are needed.)
- High efficiency, wear-free design with integrated phase angle and full wave switch mode
- Increase performance control accuracy to maximize end process repeatability
- Easy fieldbus integration with optional BasicBus Module and available Anybus® interfaces
- Performance range with rated currents from 16 A up to 280 A and rated voltages from 230 V up to 500 V

TYPICAL APPLICATIONS

- Transformer loads, resistive loads and heating elements in electric furnaces used for glass, metals and ceramics manufacture
- Heat tracing for piping and process elements in chemical, petrochemical and oil processing
- Extruder and plastic press heating, IR drying and automotive applications

AT A GLANCE

Phase Type

1, 2, and 3-phase power controller

Accuracy

V-control: Better than $\pm 1.5\%$

I-Control: $\pm 1.5\%$

AC Input Line Voltage Rating

230 V to 500 V [-57% to +10%]

Other available on request

AC Current Rating

16 to 280 A

Other available on request

Control Modes

Full wave switch (TAKT)

Phase-angle firing (VAR)

Quick TAKT Mode (QTM)

Combination of TAKT/VAR (VT)

SWITCH Mode

Communications

Ethernet/IP®, EtherCAT®,

Profibus®, Profinet®,

Modbus TCP/IP®, DeviceNET™

PRODUCT SPECIFICATIONS

Thyro-A+ Model		
Thyro-A+ 1A	Thyro-A+ 2A	Thyro-A+ 3A
1-phase version, for 1-phase load between 2-phases or for 1-phase connected to the neutral phase	2-phase version for 3-phase load in cost saving 3-phase circuit	3-phase version, for 3-phase load
Operating Modes: TAKT, VAR, QTM, VT, SWITCH	Operating Mode: TAKT, SWITCH	Operating Modes: TAKT, VAR, SWITCH
Thyro-A+ Series		
Control Accuracy	±1.5% Voltage (at rated voltage) and ±1.5% Current	
Load Types	Resistive loads	
	Transformer loads	
	Loads with large R_{warm}/R_{cold} up to factor 6	
Operating Modes	TAKT (full wave switch): Full frequency package control	
	VAR (phase-angle firing): Firing of each sinus half-wave	
	QTM (half wave frequency package control): Quick operating mode for ohmic load without a transformer	
	VT: Combination of operating modes VAR and TAKT (on request)	
	SWITCH: Soft-Start, Soft-Down	
Model ...F...		
Functional Features	Forced ventilation	
Model ...H RL4		
Set Points	Two freely configurable analog set points between 0 (4) mA to 20 mA; 0 (1) V to 5V; 0 (2) V to 10V	
	One bus set point configurable via BasicBusModule	
	One motor potentiometer set point configurable via Multi-I/O	
	All setpoints can also be configured via Thyro-Tool Pro.	
Control Types	$V_{eff} / V_{eff}^2 / I_{eff} / I_{eff}^2$	
Limitations	RMS Voltage and current limitation; Peak current limitation	
Load Circuit / Self-Monitoring	Provided and can be set automatically using the Teach-In feature	
Operation / Fault Indicators	Via LED bar chart, error messages, or status messages via freely configurable Multi i/O interface, freely configurable relay	
Fuse	Integrated semiconductor fuse	
Operational Display	Via optional Thyro-A+ display	
	LEDs and relay output (exchanger, indications adjustable)	
Model ...H RLP4 (additional to H RL4 features)		
Control Types	$V_{eff} / V_{eff}^2 / I_{eff} / I_{eff}^2 / P$	
Limitations	Additional effective power limitation	

ELECTRICAL SPECIFICATIONS

Rated Connection Voltage	230 to 500 V types: -57% to +10%
Frequency	For all types from 45 to 65 Hz
Control Voltage	AC / DC 24 V ($\pm 10\%$) [REQUIRED]

Environmental Specifications

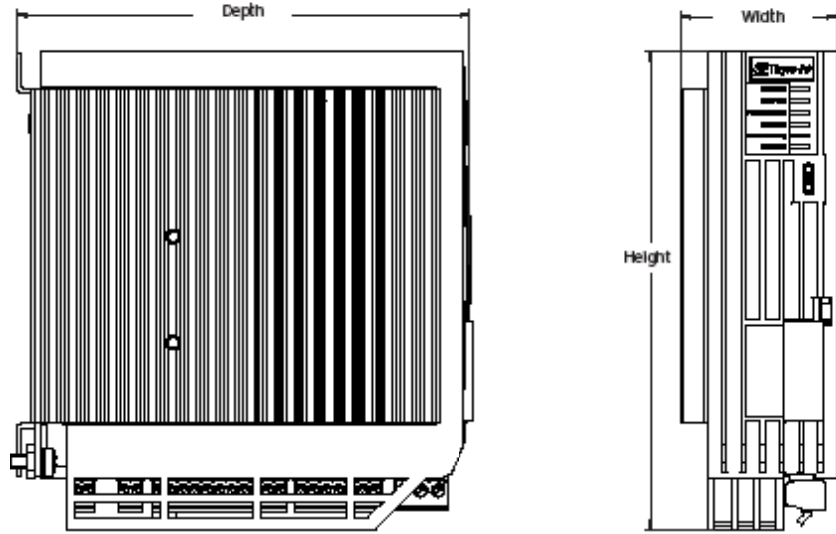
Ambient Temperature	Up to 35°C (95°F) by external fan cooling (for HF types, with integrated fan) with rated current
	Up to 45°C (113°F) by passive convection cooling with rated current
	At higher temperatures, operation is permissible with reduced current limits.
	Max 40°C (104°F) for UL applications
Storage Temperature	-25 to +55°C (-13 to 131°F)
Humidity	DIN EN 50178 Tab. 7
Site Altitude	Up to 1000 m (3281') above sea level at nominal load; above 1000 m (3281') on request

Regulatory Approvals

Certifications	CE marked for EU LV Directive 2014/35/EU & 2004/108/EC
	UL Certified, UL 508A (in preparation)

MECHANICAL SPECIFICATIONS

Thyro-A+ 1A, 2A and 3A
230 V and 500 V Type Voltage



Thyro-A+ 1A Dimensions									
Type Current (A)	Width		Height		Depth		Weight		
	mm	in	mm	in	mm	in	kg	lb	
16,30	45	1.8	136	5.4	129	5.1	0.7	1.5	
45,60	52	2.0	203	8.0	184	7.3	1.7	3.7	
100	75	3.0	203	8.0	193	7.6	1.7	3.7	
130,170	125	4.9	320	12.6	241	9.5	4	8.8	
280	125	4.9	370	14.6	241	9.5	5	11	
Thyro-A+ 2A Dimensions									
Type Current (A)	Width		Height		Depth		Weight		
	mm	in	mm	in	mm	in	kg	lb	
16,30	89	3.5	136	5.4	129	5.1	1.4	3.1	
45,60	104	4.1	136	5.4	184	7.3	3.4	7.5	
100	150	5.9	203	8.0	193	7.6	3.8	8.4	
130,170	250	9.8	320	12.6	241	9.5	8	17.6	
280	250	9.8	393	15.5	241	9.5	11	24.3	
Thyro-A+ 3A Dimensions									
Type Current (A)	Width		Height		Depth		Weight		
	mm	in	mm	in	mm	in	kg	lb	
16,30	135	3.5	136	5.4	129	5.1	2.1	4.6	
45,60	156	6.1	203	8.0	184	7.3	5.1	11.2	
100	255	8.9	203	8.0	193	7.6	5.7	12.5	
130,170	375	14.8	320	12.6	241	9.5	12	26.5	
280	375	14.8	393	15.5	241	9.5	15	33.1	

INTERFACE

Status LEDs	Multiple color status LEDs for parameters:
	ON / READY
	LIMIT
	PULSE LOCK
	FAULT
	Load Output (%)
Control Interface	Micro-USB connector for Thyro-Tool Pro PC software connection
Integrated Fieldbus	RS485 interface can be used for the display or as a Modbus RTU connection

STANDARD OPTIONS

Options	
Thyro-A+ Display	Display and menu for Thyro-A+ configuration with optional SD memory card and process data recorder
Thyro-Tool Pro PC software	PC software for commissioning, visualization, configuration, and trending
BasicBusModule with Anybus Digital Interface Card	Ethernet/IP®, EtherCAT® Profibus®, Profinet®, Modbus TCP/IP®, DeviceNET™

Thyro-A+ Display

With an integrated process data recorder, the optional Thyro-A+ display enables intuitive operation of the SCR power controller.



Features	
Multiple display modes	Bar chart
	Actual values (numerical)
Optional SD card to load or save data and parameter settings	
Long-term data recording of process parameters, as well as status messages	
EasyStart feature for easy Thyro-A+ commissioning	

ACCESSORIES

Options	
DIN-rail Adapter	For Thyro-A+ modules in one- and two-phase configuration up to 60 A
Assembly Frame Kit	Frame kit for front door assembly of the Thyro-A+ display

ORDERING INFORMATION

Model	Description
Thyro-A+	Modular Digital SCR Power Controller

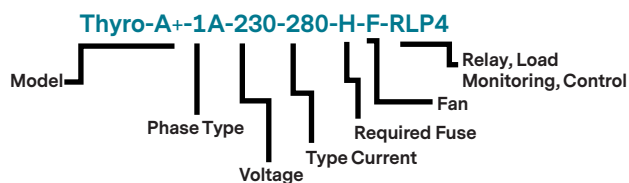
Code	Phase Type
1A	One-phase power controller for one-phase operation
2A	Two-phase power section used with a three-phase load in three-phase economic circuit (not for phase-angle firing VAR)
3A	Three-phase power controller for three-phase operation

Code	AC Input Line Voltage
230	Type Voltage 230 V
500	Type Voltage 500 V

Code	Type Current, TC	Apparent Power [kVA]		
		1A	2A	3A
Available with Phase Type Option 1A and 230 V Type Voltage				
16	TC = 16 A	4		
30	TC = 30 A	7		
45	TC = 45 A	10		
60	TC = 60 A	14		
100	TC = 100 A	23		
130	TC = 130 A	30		
170	TC = 170 A	39		
280	TC = 280 A	64		
Available with all Phase Type Options and 400 V Type Voltage				
16	TC = 16 A	6	11	11
30	TC = 30 A	12	21	21
45	TC = 45 A	18	31	31
60	TC = 60 A	24	42	42
100	TC = 100 A	40	69	69
130	TC = 130 A	52	90	90
170	TC = 170 A	68	118	118
280	TC = 280 A	112	194	194
Available with all Phase Type Options and 500 V Type Voltage				
16	TC = 16 A	8	14	14
30	TC = 30 A	15	26	26
45	TC = 45 A	23	39	39
60	TC = 60 A	30	52	52
100	TC = 100 A	50	87	87
130	TC = 130 A	65	112	112
170	TC = 170 A	85	147	147
280	TC = 280 A	140	242	242

ORDERING INFORMATION (CONTINUED)

Code	Description
Code	Integrated Semiconductor Fuse
H	Integrated semiconductor fuse [REQUIRED]
Code	Forced Air Cooling Via Integrated Fan
F	With Fan >= 280A
Code	Relay, Load Monitoring, Control
R	Signaling relay
L	Load monitoring
P	With power measurement and control
4	Upgraded Thyro-A+ series





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ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

AE's power solutions enable customer innovation in complex semiconductor and industrial thin film plasma manufacturing processes, demanding high and low voltage applications, and temperature-critical thermal processes.

With deep applications know-how and responsive service and support across the globe, AE builds collaborative partnerships to meet rapid technological developments, propel growth for its customers and power the future of technology.

PRECISION | POWER | PERFORMANCE

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