THYRO-A

DIGITAL SCR POWER CONTROLLER
8 TO 1500 A

Striking the perfect balance between price and performance, the Thyro-A® is an outstanding industry proven SCR power controller that is ideal for a wide range of general heating applications.

PRODUCT HIGHLIGHTS

- Flexible application design with wide range of operating voltages and current ranges
- Low THD (total harmonic distortion) for improved power utilization
- Full digital communication protocol suite
- Compact footprint for space savings and simplified installation
- Precise regulation of power, including load management for optimal control and energy consumption
- Customizable faults, alarms, status, limits, set points for easy integration to existing control systems
- Optimized load control with five control types and three operating modes for process efficiency
- Integrated voltage and current measurement reduces costs and eliminates need for external components or monitoring hardware

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

±3% Voltage
±1.5% Current

AC Input Line Voltage Rating

230V to 500V [-57% to +10%]
or 230V to 500V [-15% to +10%]
depending on configuration

Type Current Range

8 to 1500 A

Control Modes

Zero Cross Firing (TAKT)
Phase-Angle Firing (VAR)
Quick TAKT Mode (QTM)
Combination TAKT/VAR Mode (VT)

Communications

Ethernet/IP®, Profibus®, Profinet®, Modbus RTU®, Modbus TCP/IP®, DeviceNET™

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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	Operating Mode: TAKT	Operating Modes: TAKT, VAR
Thyro-A Series		
Control Accuracy	±3% Voltage and ±1.5% Current	
Load Types	Ohmic loads and transformer loads (Limit of 3 x I_{nom})	
	Transformer loads	
Mains Load Optimization	Internal mains load optimization for the operating modes QTM and TAKT	
	Interface for external mains load optimization available, e.g. Thyro-Power Manager, dASM bus module	
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)	
Model ...F...		
Functional Features	Forced ventilation	
Model ...H 3		
Set Points	2 set point inputs, secured (SELV, PELV) from the mains	
	Input of analog set point, signal intervals: 0(4)-20 mA, 0(1)-5 V, 0(2)-10 V	
	Control input for switch operation mode - dual point. Control is possible (U_{On} = 3 to 24 V) digital set point is provided by the process computer or bus system	
Control Types	V_{eff} / V^2_{eff}	
Model ...H RL3 (additional to H 3 features)		
Control Types	V_{eff} / V^2_{eff} / I_{eff} / I^2_{eff}	
Load Monitoring	Via an adjustable response threshold	
Limitations	Current limitation I_{eff} / $\hat{I}$ VAR current peak limitation to $\hat{I}$ = 3 x I_{nom}	
Relay Output	Exchanger, max. contact load 250 V, 6 A, 180 W, 1500 VA	
Analog Output	Signal level 0(2)-10 V / 0(4)-20 mA, max. compliance voltage 10 V. Can also be used as adjustment aid	
External Supply	24 V DC/AC, connected upon demand	
Load Types	Ohmic load employed at R_{warm}/R_{cold} ratio of up to 6 (only deployed for H RL3 and H RLP3)	
Operational Display	Via LEDs and relay output (exchanger, indications adjustable)	
Model ...H RLP3 (additional to H RL3 features)		
Control Types	V_{eff} / V^2_{eff} / I_{eff} / I^2_{eff} / P	

ELECTRICAL SPECIFICATIONS

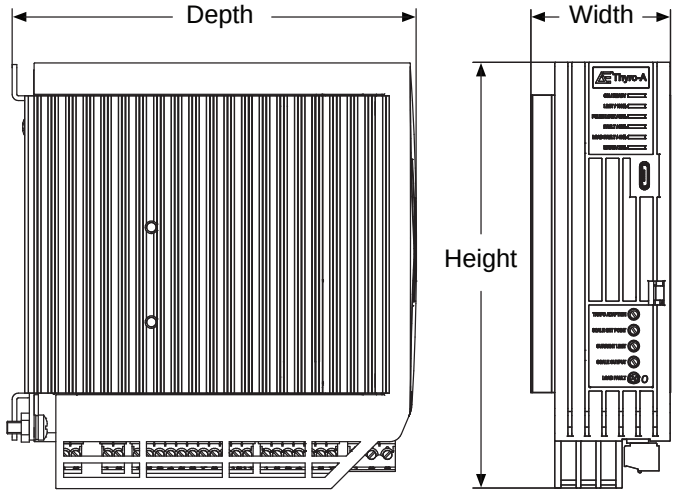
Rated Voltages	...H 3	...H RL3 and H RLP3
	230 V -15% +10%	230 V-15% +10%, 230 V -57% combined with 24 V input
	400 V -15% +10%	400 V-15% +10%, 400 V -57% combined with 24 V input
	500 V -15% +10%	500 V -15% +10%, 500 V -57% combined with 24 V input
Frequency	For all types from 47 to 63 Hz	

Environmental Specifications	
Ambient Temperature	Up to 35°C (95°F) by external fan cooling (for F 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	5% to 95% relative humidity
Site Altitude	Up to 2000 m (6562') above sea level

Regulatory Approvals	
Certifications	CE conformity
	UL Certified, UL 508A (100 kA short circuit test), accredited 8 to 350 A
	Canadian National Standard C22.2 No. 14
	ISO 9001 Quality Standards

MECHANICAL SPECIFICATIONS

Thyro-A 1A H 3/H RL3/H RLP3

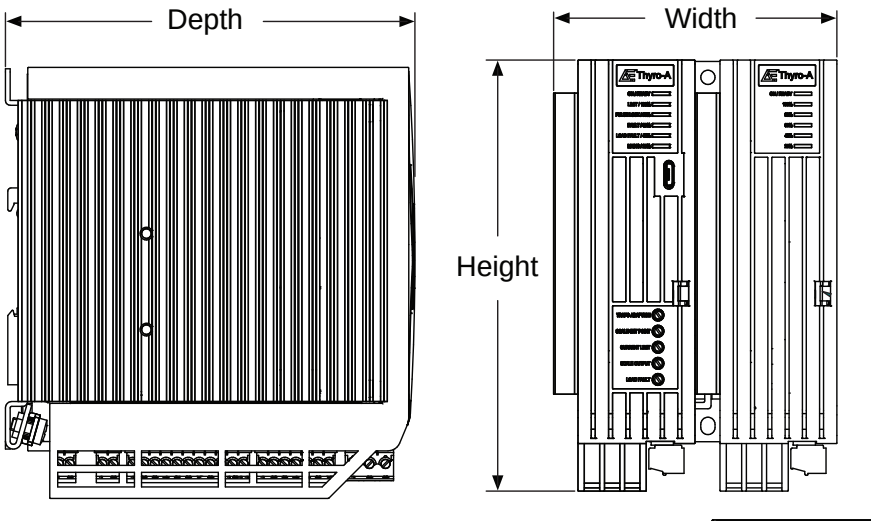


Design may change when using a fan and/or rated current > 350 A

Dimensions								
Type Current (A)	Width		Height		Depth		Weight	
	mm	in	mm	in	mm	in	kg	lb
8	45	1.8	136	5.4	129	5.1	0.7	1.5
16	45	1.8	136	5.4	129	5.1	0.7	1.5
30	45	1.8	136	5.4	129	5.1	0.7	1.5
45	52	2.0	203	8.0	184	7.2	1.7	3.8
60	52	2.0	203	8.0	184	7.2	1.7	3.8
100	75	3.0	203	8.0	193	7.6	1.9	4.2
130	125	4.9	320	12.6	241	9.5	4	8.8
170	125	4.9	320	12.6	241	9.5	4	8.8
280	125	4.9	370	14.6	241	9.5	5	11.0
350	125	4.9	400	15.8	261	10.3	8.4	18.5
495	112	4.4	414	16.3	345	13.6	15	33.1
650	112	4.4	414	16.3	345	13.6	15	33.1
1000	239	9.4	729	28.7	516	20.3	35	77.2
1400	239	9.4	729	28.7	516	20.3	35	77.2
1500	239	9.4	729	28.7	516	20.3	35	77.2

MECHANICAL SPECIFICATIONS (CONTINUED)

Thyro-A 2A H 3/H RL3/H RLP3

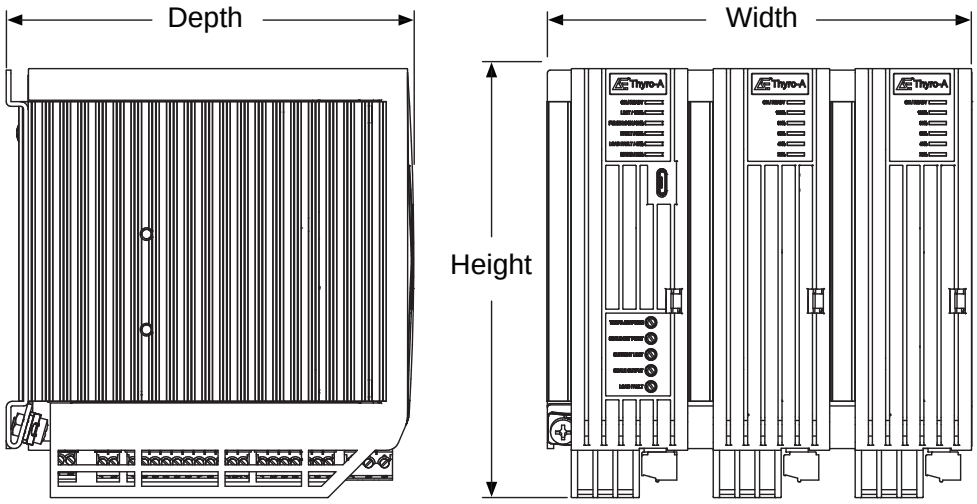


Design may change when using a fan and/or rated current > 350 A

Dimensions								
Type Current (A)	Width		Height		Depth		Weight	
	mm	in	mm	in	mm	in	kg	lb
8	89	3.5	136	5.4	129	5.1	1.4	3.1
16	89	3.5	136	5.4	129	5.1	1.4	3.1
30	89	3.5	136	5.4	129	5.1	1.4	3.1
45	104	4.1	203	8.0	184	7.2	3.4	7.5
60	104	4.1	203	8.0	184	7.2	3.4	7.5
100	150	5.9	203	8.0	193	7.6	3.8	8.4
130	250	9.8	320	12.6	241	9.5	8.0	17.6
170	250	9.8	320	12.6	241	9.5	8.0	17.6
280	250	9.8	393	15.5	241	9.5	11.0	24.3
350	250	9.8	430	16.9	261	10.3	16.7	36.9
495	194	7.6	380	15.0	345	13.6	22	48.5
650	194	7.6	380	15.0	345	13.6	22	48.5
1000	417	16.4	685	27.0	516	20.3	54	119.0
1400	417	16.4	685	27.0	516	20.3	54	119.0
1500	417	16.4	685	27.0	516	20.3	54	119.0

MECHANICAL SPECIFICATIONS (CONTINUED)

Thyro-A 3A H 3/H RL3/H RLP3



Design may change when using a fan and/or rated current > 350 A

Dimensions								
Type Current (A)	Width		Height		Depth		Weight	
	mm	in	mm	in	mm	in	kg	lb
8	135	5.3	136	5.4	129	5.1	2.1	4.6
16	135	5.3	136	5.4	129	5.1	2.1	4.6
30	135	5.3	136	5.4	129	5.1	2.1	4.6
45	156	6.1	203	8.0	184	7.2	5.1	11.2
60	156	6.1	203	8.0	184	7.2	5.1	11.2
100	225	8.9	203	8.0	193	7.6	5.7	12.5
130	375	14.8	320	12.6	241	9.5	12.0	26.5
170	375	14.8	320	12.6	241	9.5	12.0	26.5
280	375	14.8	393	15.5	241	9.5	15.0	33.1
350	375	14.8	430	16.9	261	10.3	25.5	56.2
495	276	10.9	380	15.0	345	13.6	30.0	66.1
650	276	10.9	380	15.0	345	13.6	30.0	66.1
1000	583	23.0	685	27.0	516	20.3	74.0	163.1
1400	583	23.0	685	27.0	516	20.3	74.0	163.1
1500	583	23.0	685	27.0	516	20.3	74.0	163.1

INTERFACE

Status LEDs	Multiple color status LEDs for parameters:
	ON / READY
	LIMIT / 100%
	PULSE LOCK / 80%
	FAULT / 60%
	LOAD FAULT / 40%
	MAINS / 20%
Control Interface	Micro-USB connector for Thyro-Tool Pro PC software connection
Analog and Digital Interface Card	One digital input
	One analog output
	One analog input
10-pin DIP Switch	Multiple device configuration DIP switches for parameters:
	Operating Mode
	Control Mode
	Setpoint Input
	Analog Output
Front Panel Potentiometers	Five externally accessible multi-turn potentiometers to configure parameters:
	First Half-wave Phase Angle (Transformer applications)
	Scale Setpoint
	Current Limit
	Scale Output
	Load Monitoring

STANDARD OPTIONS

Options	
USB to Micro-USB cable	For connection to Thyro Tool Pro software visualization and commissioning
Thyro-Tool Pro PC software	PC software for commissioning, visualization, configuration, and trending
dASM Interface Module	Digital and dynamic working mains load optimization
Communications bus module	Optional bus module for Profibus® DPV1, Modbus® RTU, DeviceNet™, Profinet®, Modbus® TCP, Ethernet/IP®

ORDERING INFORMATION

Model	Description
Thyro-A	Modular Digital SCR Power Controller with current range to 1500 Amps, ±3% Voltage or Current Accuracy

Code	Phase Type
1A	Single phase power controller for single phase operation
2A	Two phase power controller for three phase economic circuits (economic three phase circuit)
3A	Three phase power controller for three phase operation

Code	AC Input Line Voltage
230	Type Voltage 230 V : 'H3' type: 230 V -57% to +10% [99 V to 253 V] OR 'H RL3' / 'H RLP3' type: 230 V -15% to +10% [1]
400	Type Voltage 400 V : 'H3' type: 400 V -57% to +10% [172 V to 440 V] OR 'H RL3' / 'H RLP3' type: 400 V -15% to +10% [1]
500	Type Voltage 500 V : 'H3' type: 500 V -57% to +10% [215 V to 550 V] OR 'H RL3' / 'H RLP3' type: 500 V -15% to +10% [1]

Code	Type Current, TC	Apparent Power [kVA]		
Available only with Phase Type Option 1A and 230 V Type Voltage		1A	2A	3A
8	TC = 8 A	3.2		
16	TC = 16 A	3.7		
30	TC = 30 A	6.9		
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		
350	TC = 350 A	80		
Available with all Phase Type Options and 400 V Type Voltage		1A	2A	3A
8	TC = 8 A	3.2	6	6
16	TC = 16 A	6.4	11	11
30	TC = 30 A	12	21	21
45	TC = 45 A	18	31	31
60	TC = 60 A	24	41	41
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
350	TC = 350 A	140	242	242
495	TC = 495 A	198	353	353
650	TC = 650 A	260	450	450
1000	TC = 1000 A	400	693	693
1500	TC = 1500 A	600	1039	1039

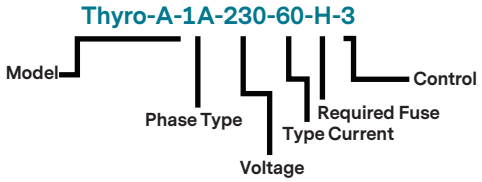
ORDERING INFORMATION (CONTINUED)

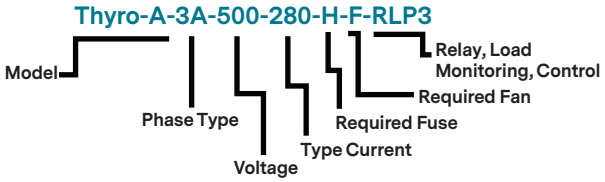
Code	Type Current, TC	Apparent Power [kVA]		
Available with all Phase Type Options and 500 V Type Voltage		1A	2A	3A
16	TC = 16 A	8	14	14
30	TC = 30 A	15	26	26
45	TC = 45 A	22	39	39
60	TC = 60 A	30	52	52
100	TC = 100 A	50	86	86
130	TC = 130 A	65	112	112
170	TC = 170 A	85	147	147
230	TC = 230 A	115	199	199
280	TC = 280 A	140	242	242
350	TC = 350 A	175	303	303
495	TC = 495 A	247	429	429
650	TC = 650 A	325	563	563
1000	TC = 1000 A	500	866	866
1400	TC = 1400 A	700	1212	1212
Code	**Integrated Semiconductor Fuse**			
H	Integrated semiconductor fuse [REQUIRED]			
Code	**Forced Air Cooling Via Integrated Fan[1]**			
F	230 VAC forced air cooling via integrated fan [REQUIRED]			
Code	**Relay, Load Monitoring, Control**			
3	Standard V, V^2 control modes			
RL3	24V DC/AC power supply, signaling relay, load monitoring, analog output, current limit, V, V^2, I, I^2 control modes			
RLP3	24V DC/AC power supply, signaling relay, load monitoring, analog output, current limit, V, V^2, I, I^2, P control modes			
Code	**Additional Options[2]**			
C09	PCB conformal coating			
C10	115 VAC forced air cooling via integrated fan[1]			

1 Not available with TC options < 230 A

2 Choose as many as required.

3 Note that AC Input Line Voltage range for 'H RL3' and 'H RLP3' types is -57% to +10% when an auxiliary 24 V





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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