

THYRO-A®DIGITAL THYRISTOR SCR POWER CONTROLLERS
8 TO 1500 A





Thyro-A®

Digital Thyristor SCR Power Controllers

With high-capacity digital technology, the communicationenabled Thyro-A® SCR power controller enables precise energy delivery at a high level of availability.

WIDE PERFORMANCE SCOPE

With highly flexible interfacing for the load and power supply side, Thyro-A* modules precisely and reliably control power in an expanded range of applications.

For standard processes, adjustments can be made on the unit itself, which eases handling and speeds commissioning. Interfacing at the automation level enables expanded functionality. All measurement, status, and set point communications may be processed via SPS or the process computer. Stand-alone operations or direct combination with process controls are also possible.

APPLICATIONS

Automotive (paint drying equipment)

Chemical (pipe trace heaters, pre-heating equipment)

Furnace construction (industrial, diffusion, drying ovens)

Glass (plate glass equipment, feeders, finishing equipment)

Machine building (extruders, plastic presses)

Packaging (shrink tunnels)

Printing machines (IR drying)

INTEGRATION WITH AUTOMATION SYSTEMS

- > Serial design system interface for connection to an optional bus module (PROFIBUS® DPV1, Modbus® RTU, DeviceNet™, CANopen®, PROFINET®, Modbus® TCP, EtherNet/IP®)
- Interface option for connection to Thyro-Tool PC software
- Secure separation of control and power units

ANALOG CONTROL

- Analog set point 0(4)...20 mA; 0...5 V, 0...10 V
- Adjustable control characteristic
- Activation with dual point controller:
 - OFF = 0...3 V
 - ON = 3...24 V

LOAD SIDE

- Power semiconductor with
 - High resistance against short-circuit currents
 - High blocking voltage of power semiconductors
- > For ohmic loads as well as transformer loads
- Suitable for transformer-type loads due to an integrated soft-start, phase-angle firing of the 1st half-wave and channel separation
- Optimized load control due to the implementation of up to:
 - Five control types
 - Three operating modes

MAINS LOAD OPTIMIZATION

- dASM bus module: digital and dynamic operating mains load optimization of up to eight Thyro-A and Thyro-AX SCR power controllers
- > Internal mains load optimization
- Thyro-Power Manager

FEATURES

- Wear-free operations
- > Precise, reliable performance
- Easy handling
- Compact package
- DIN rail mounting (up to 60 A; for 1- and 2-phase devices)
- Integrated protection against contact

- Rated voltages up to 600 V
- » Rated currents up to 1500 A
- 1-, 2- and 3-phase versions (2-phase version for 3-phase load without deploying the neutral conductor)
- Integrated semiconductor fuses
- LED status and level indication
- USB interface



SUMMARY SPECIFICATIONS

Operating Modes Full frequency package control	THYRO-A SERIES									
VAR (phase-angle firing) Firing of each sinus half-wave Quick operating mode for ohmic load without a transformer VT Combination of operating modes VAR and TAKT (on request) Thyro-A 1A 1-phase version, for 1-phase load between 2-phases or for 1-phase connected to the neutral phase; operating modes: TAKT, VAR, CMM, VT 2A 2-phase version for 3-phase load in cost saving 3-phase circuit; operating modes: TAKT 3A 3-phase version, for 5-phase load; operating modes: TAKT operating modes: TAKT 3A 8-phase version, for 5-phase load; operating modes: TAKT operating modes: TAKT 3A 8-phase version, for 5-phase load; operating modes: TAKT operating modes: TAKT, VAR Rated VoltageH 3 230 230 230 230 300 V -57% +10% 230 300 V -57% combined with 24 V input 400 400 400 V -15% +10% 500 500 V -57% combined with 24 V input 500 600 600 V -15% +10% 600 60	Operating Modes									
Quick operating mode for ohmic load without a transformer VT Combination of operating modes VAR and TAKT (on request) Thyro-A 1A	TAKT (full wave switch)	Full frequency package control								
VT Thyro-A 1A 1-phase version, for 1-phase load between 2-phases or for 1-phase connected to the neutral phase; operating modes: TAKT, VAR, QTM, VT 2A 2-phase version, for 3-phase load; operating modes: TAKT operating modes: TAKT, VAR 3A 3-phase version, for 3-phase load; operating modes: TAKT operating modes: TAKT, VAR Rated VoltageH 3 230 230 V -57% +10% 400 400 V -57% +10% 230 230 V -57% +10% 230 230 V -57% +10% 230 400 V -57% +10% 230 400 V -15% +10% 230 500 V -15% combined with 24 V input 500 500 V -15% +10% 600 V -57% combined with 24 V input 500 600 V -57% combined with 24 V input 500 800 V -57% com	VAR (phase-angle firing)	Firing of each sinus half-wave	Firing of each sinus half-wave							
Thyro-A 1A 1. phase version, for 1-phase load between 2-phases or for 1-phase connected to the neutral phase; operating modes: TAKT, VAR, QTM, VT 2A 2-phase version for 3-phase load in cost saving 3-phase circuit; operating mode: TAKT 3A 3-phase version, for 3-phase load; operating modes: TAKT operating modes: TAKT, VAR Rated VoltageH 3 230 230 V -57% +10% 400 400 V -57% +10% 250 500 V -57% +10% 230 230 V -15% +10% 240 400 V -57% combined with 24 V input 400 400 400 V -15% +10% 500 V -15% +10% 500 V -57% combined with 24 V input 500 500 V -15% +10% 500 V -57% combined with 24 V input 600 500 V -15% +10% 500 V -57% combined with 24 V input 500 500 V -15% +10% 500 V -57% combined with 24 V input 500 500 V -15% +10% 500 V -57% combined with 24 V input 500 100 V -15% +10% 100 V -57% combined with 24 V input 500 100 V -15% +10% 100 V -57% combined with 24 V input 500 100 V -15% +10% 100 V -57% combined with 24 V input 100 V -57% combi	QTM (half wave frequency package control)	Quick operating mode for ohmic	Quick operating mode for ohmic load without a transformer							
1-phase version, for 1-phase load between 2-phases or for 1-phase connected to the neutral phase; operating modes: TAKT, VAR, QTM, VT 2A 2-phase version for 3-phase load in cost saving 3-phase circuit; operating modes: TAKT 3A 3-phase version, for 3-phase load; operating modes: TAKT operating modes: TAKT, VAR Rated VoltageH 3230 250 V -57% +10%400 400 V -57% +10%500 500 V -57% +10% Rated VoltageH RL3 und H RLP3230 23 V +55% 00% 230 V +57% combined with 24 V input400 400 V -15% +10% 400 V -57% combined with 24 V input500 500 V -15% +10% 500 V -57% combined with 24 V input500 500 V -15% +10% 500 V -57% combined with 24 V input500 500 V -15% +10% 500 V -57% combined with 24 V input500 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -15% +10% 500 V -57% combined with 24 V input600 500 V -5	VT	Combination of operating modes	s VAR and TAKT (on request)							
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3-phase version, for 3-phase load; operating modes: TAKT operating modes: TAKT, VAR	1A									
Rated VoltageH 3	2A	2-phase version for 3-phase load	l in cost saving 3-phase circuit; operating mode: TAKT							
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Rated VoltageH RL3 und H RLP3230 230 V -15% +10% 230 V -57% combined with 24 V input400 400 V -15% +10% 500 V -57% combined with 24 V input500 500 V -15% +10% 500 V -57% combined with 24 V input500 Network Frequency For all types from 47 to 63 Hz Rated Current7xxx 8A, 16 A, 30 A, 45 A, 60 A, 100 A, 130 A, 170 A, 280 A, 350 A, 495 A, 650 A, 1000 A, 1400 A, 1500 A Load Types Types Ohmic loads employed at R/Rratio 6:1 Limitation of on 3 x I Transformer loads Network Load Interface for external network load optimization for the operating modes QTM and TAKT Interface for external network load optimization available, e.g. Thyro-Power Manager, dASM bus module Functional FeaturesF Forced ventilation Set point inputs 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_n = 3 to 24 V) digital set point is provided by the process computer or bus system	400	400 V -57% +10%								
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600 600 V -15% +10% 600 V -57% combined with 24 V input For all types from 47 to 63 Hz Rated Current ** * 8A, 16 A, 30 A, 45 A, 60 A, 100 A, 130 A, 170 A, 280 A, 350 A, 495 A, 650 A, 1000 A, 1400 A, 1500 A Load Types 7ypes Ohmic loads employed at R/R	400	400 V -15% +10%	400 V -57% combined with 24 V input							
Network Frequency For all types from 47 to 63 Hz	500	500 V -15% +10%	500 V -57% combined with 24 V input							
Rated Current xxx 8A, 16 A, 30 A, 45 A, 60 A, 100 A, 130 A, 170 A, 280 A, 350 A, 495 A, 650 A, 1000 A, 1400 A, 1500 A Load Types Types Ohmic loads employed at R warm / R coad ratio 6:1 Limitation of on 3 x I nom Transformer loads Network Load Internal network load optimization for the operating modes QTM and TAKT Interface for external network load optimization available, e.g. Thyro-Power Manager, dASM bus module Functional FeaturesF Forced ventilation Set point inputs 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	600	600 V -15% +10%	600 V -57% combined with 24 V input							
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F Forced ventilation 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			ad optimization available, e.g. Thyro-Power Manager, dASM							
H 3 Set point inputs 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	Functional Features									
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	F	Forced ventilation								
Input of analog set point, signal intervals: $0(4)-20~\text{mA}, 0(1)-5~\text{V}, 0(2)-10~\text{V}$ 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	H 3	Set point inputs	2 set point inputs, secured (SELV, PELV) from the mains							
Control is possible (U_{on} = 3 to 24 V) digital set point is provided by the process computer or bus system			Input of analog set point, signal intervals:							
Control types V_{eff}/V_{eff}^2			Control is possible ($U_{on} = 3$ to 24 V) digital set point is							
		Control types	$V_{\rm eff} / V_{\rm eff}^2$							

POWER SUPPLY SIDE

- \rightarrow Power supply voltage range of up to 0.43 x U_{nom}
- > Frequency 47 to 63 Hz
- Internal network load optimization in TAKT and QTM operating modes
- Optional external network load optimization with Thyro-Power Manager

CERTIFICATES

- Quality standard in accordance with ISO 9001
- Approval in accordance with UL 508
- S.C.C.R. according to UL 508 A (100 kA short-circuit test), accredited 8 to 350 A
- > Canadian National Standard C22.2 No. 14
- CE conformity



H RL3 (additional toH 3 features)	Control ty	pes	$V_{\rm eff}/V_{\rm eff}^2/I_{\rm eff}/I_{\rm eff}^2$					
	Load mon	itoring	Via an adjustable response threshold					
	Limitation	S	Current limitation I $_{\rm eff}$ / $\hat{\rm l}$ VAR current peak limitation to $\hat{\rm l}$ = 3 x I $_{\rm nom}$					
	Relay outp	out	Exchanger, max. contact load 250 V, 6 A, 180 W, 1500 VA					
	Analog ou	tput	Signal level 0(2)-10 V $/$ 0(4)-20 mA, max. compliance voltage 10 V					
			Can also be used as adjustment aid					
	External s	upply	24 V DC/AC, connected upon demand					
	Load type	S	Ohmic load employed at $R_{\mbox{\tiny warm}}/R_{\mbox{\tiny coul}}$ ratio of up to 6 (only deployed for H RL3 and H RLP3)					
	Operation	al display	a LEDs and relay output (exchanger, indications ljustable)					
H RLP3 (additional toH RL3 features)	Control ty	pes	$V_{_{\mathrm{eff}}}$ / $V_{_{\mathrm{eff}}}^{2}$ / $I_{_{\mathrm{eff}}}$ / $I_{_{\mathrm{eff}}}^{2}$ / $I_{_{\mathrm{eff}}}$					
System Interface								
		Optional bus module for Profibus® DPV1, Modbus® RTU, DeviceNet™, CANopen®, Modbus® TCP, Ethernet/IP®						
	Thyro-Too	I PC software via USB inte	erface					
Type Key Example								
Type Key		Thyro-A 2A 400-280 HF RLP3						
Type ney	Thyro-A 2.	A 400-280 HF RLP3						
Explanation	Thyro-A 2	A 400-280 HF RLP3 Digital power controlle	r					
	-	Digital power controlle	r sion, suitable for 3-phase load in cost-saving 3-phase					
	Thyro-A	Digital power controller Thyro-A as 2-phase ver						
	Thyro-A 2A	Digital power controller Thyro-A as 2-phase ver circuit						
	Thyro-A 2A 400	Digital power controlled Thyro-A as 2-phase ver circuit 400 V rated voltage						
	Thyro-A 2A 400 -280	Digital power controller Thyro-A as 2-phase ver circuit 400 V rated voltage 280 A rated current						
	Thyro-A 2A 400 -280 H	Digital power controller Thyro-A as 2-phase ver circuit 400 V rated voltage 280 A rated current Semiconductor fuse						
	Thyro-A 2A 400 -280 H F	Digital power controlled Thyro-A as 2-phase ver circuit 400 V rated voltage 280 A rated current Semiconductor fuse Forced ventilation	sion, suitable for 3-phase load in cost-saving 3-phase					
	Thyro-A 2A 400 -280 H F R	Digital power controlled Thyro-A as 2-phase ver circuit 400 V rated voltage 280 A rated current Semiconductor fuse Forced ventilation Failure indicator relay	sion, suitable for 3-phase load in cost-saving 3-phase					





H 3	H RL3	H RLP3	Current (A)	Unit Rating (kVA)				Power Loss	Dir	nensio (mm)	ons	Approx. Weight
				230 V	400 V	500 V	600 V	(W)	W	Н	D	(kg)
			8	3.2	3.2	4	-	9	45	136	129	0.7
			16	3.7	6.4	8	-	30	45	136	129	0.7
			30	6.9	12	15	-	47	45	136	129	0.7
			45	10	18	22.5	-	52	52	203	184	1.7
			60	14	24	30	-	80	52	203	184	1.7
			100	23	40	50	-	105	75	203	193	1.9
			130	30	52	65	-	150	125	320	241	4
			170	39	68	85	-	210	125	320	241	4
F	F	F	280	64	112	140	-	330	125	370	241	5
F	F	F	350	80	140	175	-	390	125	400	261	8.4
F	F	F	495	-	198	247	297	603	112	414	345	15
F	F	F	650	-	260	325	390	726	112	414	345	15
F	F	F	1000	-	400	500	600	1396	239	729	516	35
F	F	F	1400	-	-	700	840	1815	239	729	516	35
F	F	F	1500	-	600	-	-	1855	239	729	516	35



THYRO-A 2A H 3/H RL3/H RLP3 DUAL-PHASE POWER CONTROLLER FOR THREE PHASE LOADS WITH THREE-PHASE CIRCUIT

H 3	H RL3	H RLP3	Current (A)	Unit Rating (kVA)			Power Loss	Dimensions (mm)			Approx. Weight
				400 V	500 V	600 V	(W)	W	Н	D	(kg)
			8	6	7	-	18	89	136	129	1.4
			16	11	14	-	60	89	136	129	1.4
			30	21	26	-	94	89	136	129	1.4
			45	31	39	-	96	104	203	184	3.4
			60	42	52	-	160	104	203	184	3.4
			100	69	87	-	210	150	203	193	3.8
			130	90	112	-	300	250	320	241	8
			170	118	147	-	420	250	320	241	8
F	F	F	280	194	242	-	660	250	393	241	11
F	F	F	350	242	303	-	780	250	430	261	16.7
F	F	F	495	343	429	514	1206	194	380	345	22
F	F	F	650	450	563	675	1453	194	380	345	22
F	F	F	1000	693	866	1039	2811	417	685	516	54
F	F	F	1400	-	1212	1454	3451	417	685	516	54
F	F	F	1500	1039	-	-	3531	417	685	516	54



THYRO-A 3A H 3/H RL3/H RLP3 THREE-PHASE POWER CONTROLLER

H 3	H RL3	H RLP3	Current (A)	Unit Rating (kVA)			Power Loss	Dimensions (mm)			Approx. Weight
				400 V	500 V	600 V	(W)	W	Н	D	(kg)
			8	6	7	-	27	135	136	129	2.1
			16	11	14	-	90	135	136	129	2.1
			30	21	26	-	141	135	136	129	2.1
			45	31	39	-	144	156	203	184	5.1
			60	42	52	-	240	156	203	184	5.1
			100	69	87	-	315	225	203	193	5.7
			130	90	112	-	450	375	320	241	12
			170	118	147	-	630	375	320	241	12
F	F	F	280	194	242	-	990	375	393	241	15
F	F	F	350	242	303	-	1170	375	430	261	25.5
F	F	F	495	343	429	514	1822	276	380	345	30
F	F	F	650	450	563	675	2192	276	380	345	30
F	F	F	1000	693	866	1039	4127	583	685	516	74
F	F	F	1400	-	1212	1454	5086	583	685	516	74
F	F	F	1500	1039	-	-	5206	583	685	516	74





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