

# SINGLE, TWIN LEGGED AND THREE PHASE THYRISTOR UNITS

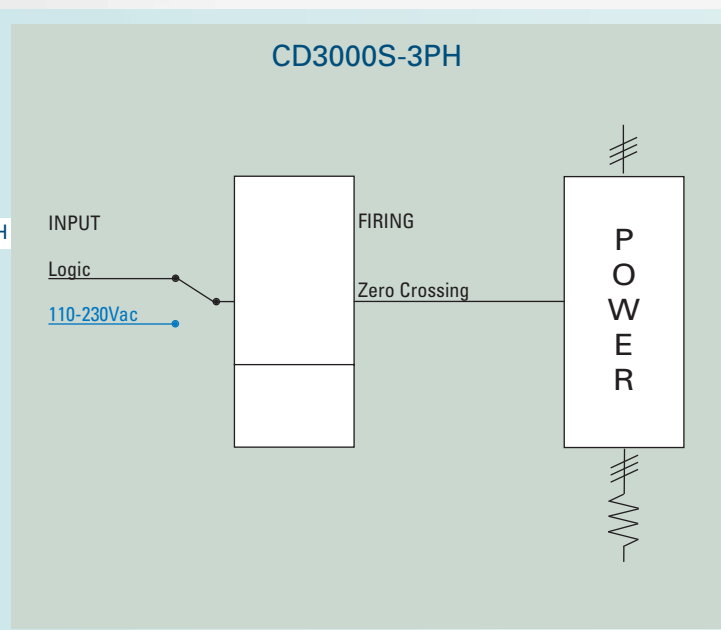
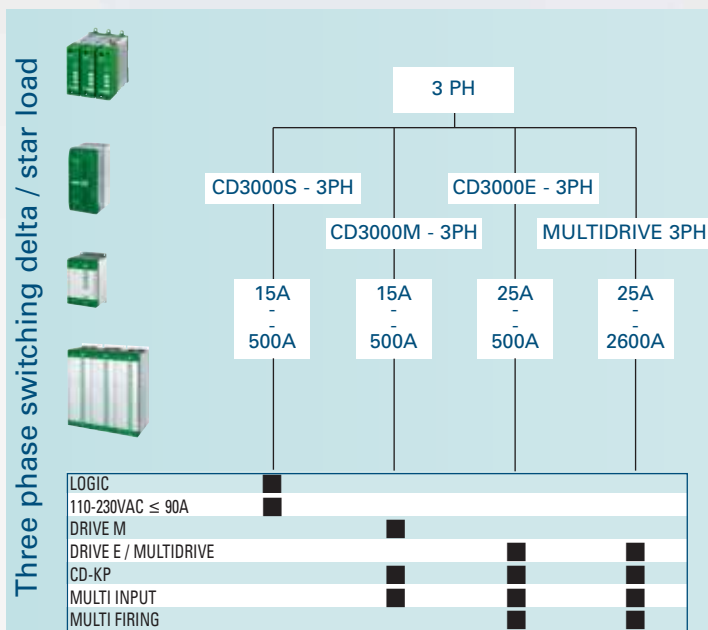
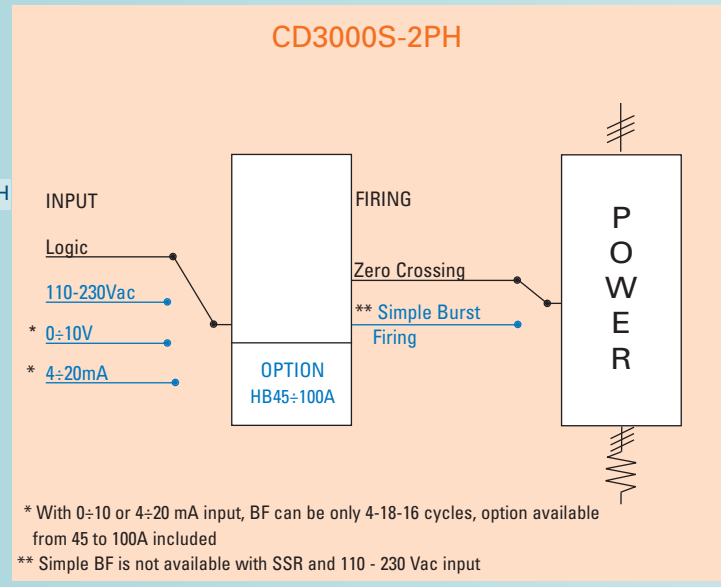
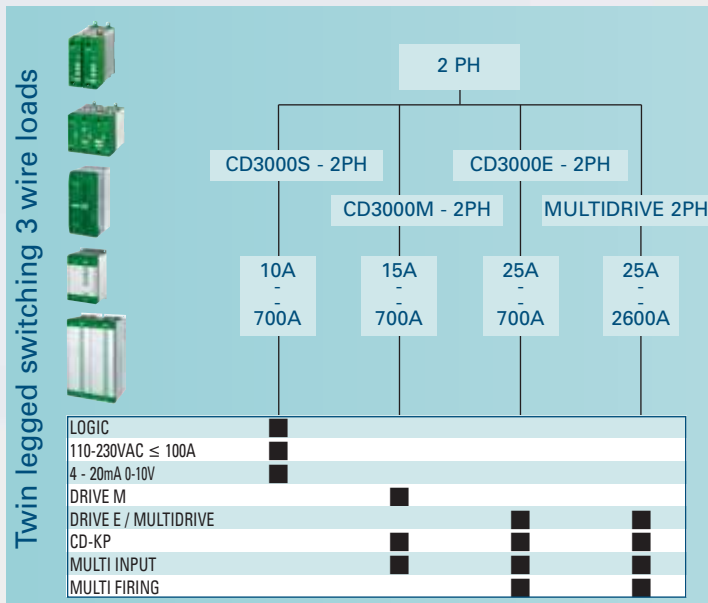
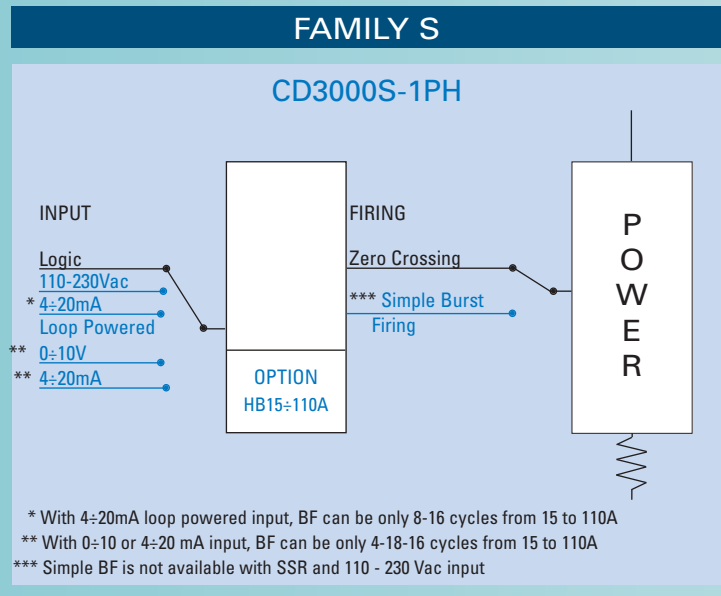
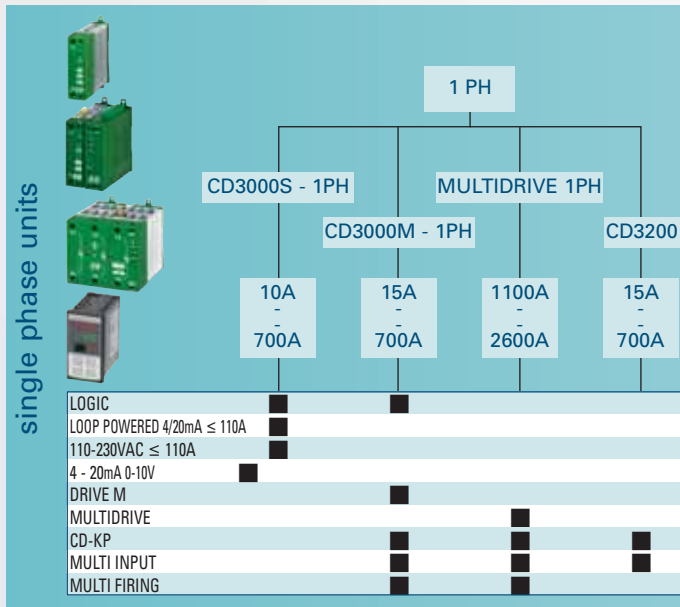


- Intelligent Thyristor Units
- RS485 interface
- Digital Technology
- CE Marked and cUL Approved

*Wir kriegen's geregelt*  
Close the loop with



# NEW PRODUCT RANGE

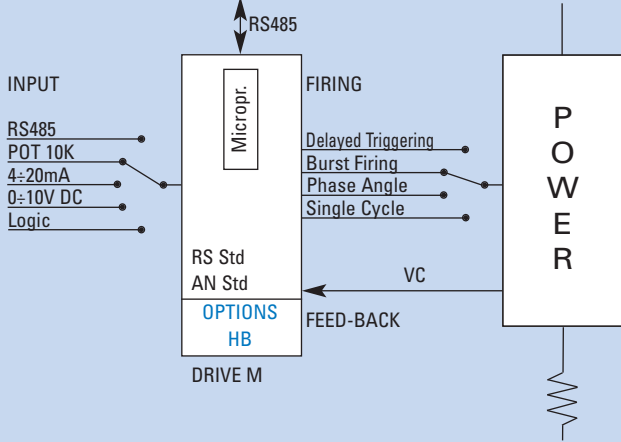


HB = Heater Break

● Deep blue color means that is an option

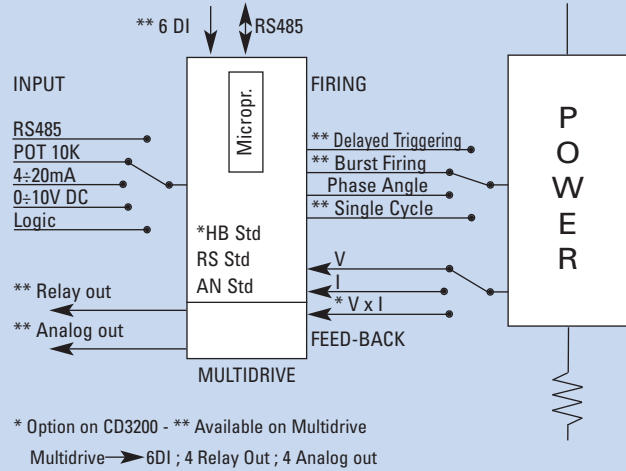
## FAMILY M

### CD3000M-1PH

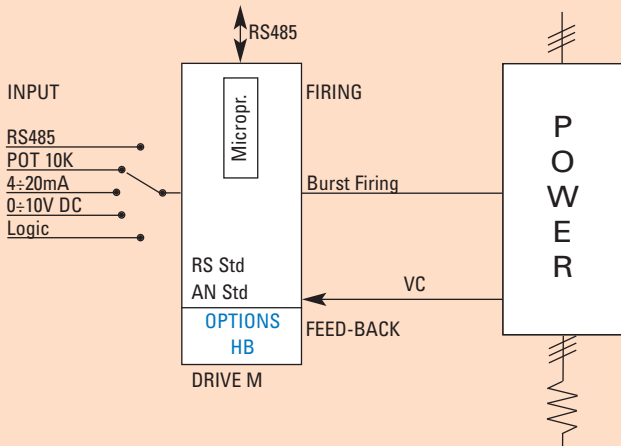


## FAMILY MULTIDRIVE - CD3000E - CD3200

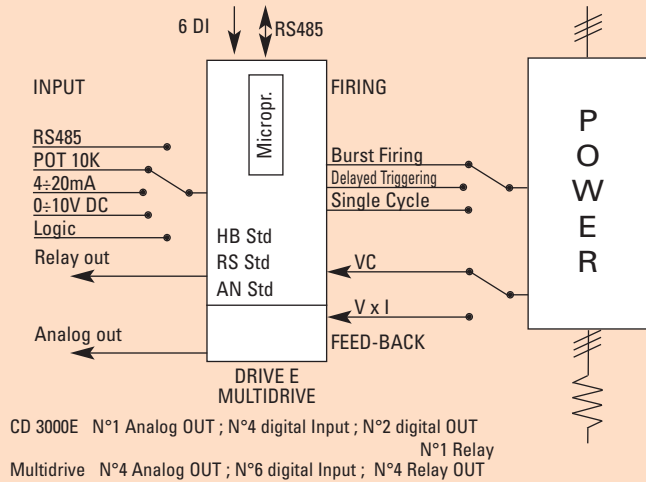
### Multidrive-1PH - CD3200



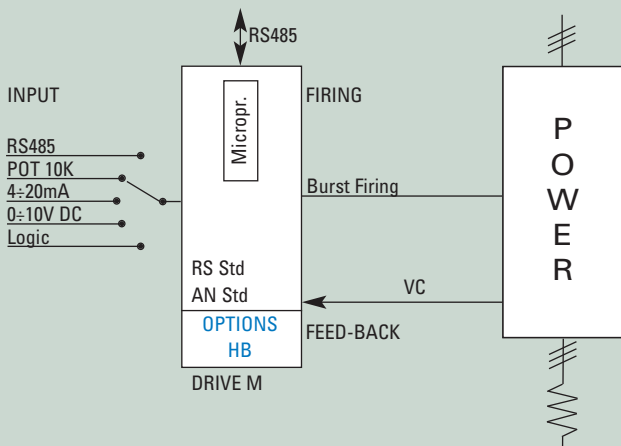
### CD3000M-2PH



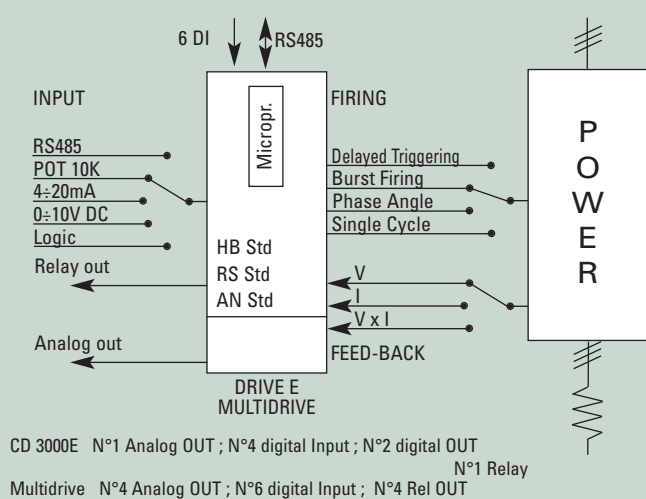
### Multidrive-2PH - CD3000E-2PH



### CD3000M-3PH



### Multidrive-3PH - CD3000E-3PH



# PRODUCT RANGE

## OVERVIEW



	CD3000S-1PH		CD3000S-2PH		CD3000S-3PH		CD3000M-1PH		CD3000M-2PH			
	SIZE	MARK	SIZE	MARK	SIZE	MARK	SIZE	MARK	SIZE	MARK		
<b>LOAD TYPE</b>												
UNIT TYPE	CD3000S-1PH		CD3000S-2PH		CD3000S-3PH		CD3000M-1PH		CD3000M-2PH			
NOMINAL MAX VOLTAGE POWER SUPPLY	240*-480-600V		480-600V		480-600V		480-600V		480-600V			
CURRENT RANGE	10÷700A		10÷700A		15÷500A		15÷700A		15÷700A			
SINGLE PHASE	■						■					
3 PHASE LOAD TWIN LEGGED			■		■				■			
3 PHASE LOAD STAR WITH NEUTRAL					■							
3 PHASE LOAD OPEN DELTA					■							
<b>INPUT SIGNAL</b>												
LOGIC 4-30VDC	■		■		■		■		■			
AC INPUT 110 or 230V	15÷110A 0		15÷100A 0		15÷90A 0							
4-20mA LOOP POWERED	15÷110A 0											
4-20mA	15÷110A 0 *		45÷100A 0 *				■		■			
0-10VDC	15÷110A 0 *		45÷100A 0 *				■		■			
POTENTIOMETER (10k)							■		■			
COMMUNICATION COMMAND							■		■			
<b>FIRING</b>												
ZERO CROSSING	■		■		■		■		■			
SINGLE CYCLE							■		■			
BURST FIRING	15÷110A 0 * <sup>3</sup>		45÷100A 0 * <sup>3</sup>				■		■			
SOFT START + BURST							■					
PHASE ANGLE							■					
DELAYED TRIGGERING							■					
UNIVERSAL FIRING							■		■			
<b>FEED BACK</b>												
VOLTAGE DROP COMPENSATION							■		■			
VOLTAGE or CURRENT FEEDBACK (V or I)							■		■			
POWER FEED BACK (V x I)							■		■			
<b>OPTION</b>												
INTERNAL CURRENT LIMIT												
EXTERNAL CURRENT LIMIT PROFILING												
HEATER BREAK + SHORT CIRCUIT ON SCR	15÷110A 0 *		45÷100A 0 *				0		0			
EXTERNAL FUSE AND FUSEHOLDER	10÷110A		10÷100A		15÷90A		15÷110A		15÷100A			
INTERNAL FUSES	>110A		>100A		>90A		>110A		>100A			
<b>CONFIG. COMM.</b>												
RS485 WITH MODBUS PROTOCOL							■		■			
PROFIBUS + DEVICENET + CANBUS							TU-PB; TU-DN		TU-PB; TU-DN			
CD-KEYPAD CONNECTIVITY (CD KP)							■		■			
FRONTAL KEYPAD							■		■			
PC PROGRAMMABLE + CD EASY							■		■			
<b>SIZES</b>												
CURRENT (Amps)	SIZE		MARK		SIZE		MARK		SIZE		MARK	
2x10/10 **	S0		cUL/CE		S0		cUL/CE		S0C		cUL/CE	
15	S0/S0H <sup>2</sup>		cUL/CE		S1		cUL/CE		S0C		cUL/CE	
25	S0/S0H <sup>2</sup>		cUL/CE		S1		cUL/CE		S0C		cUL/CE	
30					S4		cUL/CE					
35	S0/S0H <sup>2</sup>		cUL/CE		S4		cUL/CE		S3C		cUL/CE	
45	S0/S0H <sup>2</sup>		cUL/CE		S7		cUL/CE		S3C		cUL/CE	
60	S7		cUL/CE				S8		S7C		cUL/CE	
75					S8		cUL/CE				S8C	
90	S7		cUL/CE		S8		cUL/CE		S7C		cUL/CE	
100					S8		cUL/CE				S8C	
110	S8		cUL/CE						S8C		cUL/CE	
125	S9		cUL/CE		S9		cUL/CE		S9		cUL/CE	
150	S9		cUL/CE		S9		cUL/CE		S9		cUL/CE	
200	S9		cUL/CE		S10		cUL/CE		S9		cUL/CE	
225												
275					S14		cUL/CE				S14	
300	S12		cUL/CE						S12		cUL/CE	
350							S14		S14		cUL/CE	
400	S12		cUL/CE		S14		cUL/CE		S12		cUL/CE	
450					S14		cUL/CE		S14		cUL/CE	
500	S12		cUL/CE		S14		cUL/CE		S12		cUL/CE	
600	S12		cUL/CE		S14		cUL/CE		S12		cUL/CE	
700	S12		cUL/CE		S14		cUL/CE		S12		cUL/CE	
1100												
1600												
2100												
2600												

Notes: <sup>1</sup> Strengthened ventilation system in cUL us version. <sup>2</sup> With internal current transformer the size becomes S0H and S3H. <sup>3</sup> BF is available with CD 3000S 1PH and 2PH with 4/20 mA and 0-10V analog input only, in this case BF value can be only 4 - 8 -16 cycles or on CD 3000S-1 PH with Loop-powered, where BF can be only 8 - 16.



## SIZES AND DIMENSIONS OF PRODUCT RANGE



SIZE	S0/S0H	S1	S2	S3/S3H	S4
Width	30	60	92	52	117
Height	120	120	120	120	120
Depth	120/140	120	120	120/140	123
Weight	0,35 Kg	0,70 Kg	1,05 Kg	0,55 Kg	1,15 Kg



SIZE	S0C	S1C	S2C	S3C	S4C
Width	63	95	123	85	148
Height	120	120	120	120	120
Depth	120	120	120	120	123
Weight	0,65 Kg	0,95 Kg	1,35 Kg	0,95 Kg	1,50 Kg



SIZE	S11*	S12	S13*	S14*
Width	137	137	262	262
Height	440	520	440	520
Depth	270	270	270	270
Weight	10,5 Kg	15,0 Kg	18,0 Kg	22,5 Kg

\* With CD 3000E 2PH-3PH and Multidrive 2PH-3PH this size are supplied with frontal keypad as a standard



S6  
117  
138  
123  
1,80 Kg

S7  
117  
120  
159  
1,65 Kg

S8  
117  
138  
159  
2,10 Kg

S9\*  
116  
316  
187  
5,0 Kg



S6C  
148  
138  
123  
2,0 Kg

S7C  
148  
120  
159  
2,0 Kg

S8C  
148  
138  
159  
2,10 Kg

S10\*  
116  
350  
220  
5,50 Kg



S15\*  
See overleaf

S16\*  
See overleaf

S17\*  
See overleaf

# MULTIDRIVE 1-2-3 PHASE THYRISTOR UNIT FROM 1100 TO 2600A



## General Description

- MULTIDRIVE is a full digital and universal Thyristor unit based on a powerful processor. Configurable via serial communication for all inputs, firing modes, feedback modes and load types.
- Suitable to drive resistive and inductive loads.
- Power feedback.
- Front Keypad to configure all the Internal functions and parameters.
- Universal Input signal with guided zero/span calibration.
- Universal Firing modes, customer configurable via Keypad or communication.
- Unbalanced load and Heater Break Alarm.
- RS485 serial interface. Modbus.
- Complies with **CE**

## ORDERING CODE

Controlled Phases	Current (A)	Supply voltage (V)	Load connections	Auxiliary voltage (V)	Load type	1-3 PH Firing Mode
1PH	1100A	480V	3D3 Delta	110V	RES Resistive	SC (Single Cycle)
2PH	1600A	600V	3D6 Open Delta	230V	IND Inductive	BF (Burst Firing)
3PH	2100A		3S Star		TRA Transformer	DT (Delayed Triggering)
	2600A		4S Star + neutral			PA (Phase Angle)

2 PH Firing Mode	Feedback mode	Main input	Second input	External curr. profil.	Retransmission	Standard Features
BF (Burst Firing)	W Power	SSR	SSR	SSR	V10 Voltage 0÷10V	HB (Heater Break Alarm)
DT (Delayed Triggering)	V Voltage	0÷10V	0÷10V	0÷10V	I10 Current 0÷10V	UL (Max Unbalanced Load std)
	I Current	4÷20mA	4÷20mA	4÷20mA	W10 Power 0÷10V	FF (Fuses fail microswitch)
	EX External 0÷10V	10KPot	10KPot	10KPot		RS (RS485 Modbus protocol)
		Comm	Comm	Comm		
		CD-KP (Keypad)	CD-KP (Keypad)	CD-KP (Keypad)		

## DIMENSIONS

Model	I Max (A) Ta = 40°C	V Max SCR PRV (V)	SCR	Dimensions 1 PH W x H x D (mm)	Dimensions 2-3 PH W x H x D (mm)	Power Loss (kW)	Weight (Kg)	Draw N.
TAF1100	1100	1600	CDT804	262x720x410	500x720x410	3,5	55	4141
TAF1600	1600	1600	CDT1003	262x920x410	570x920x410	5,8	82	4110
TAF2100	2100	1600	CDT636	300x920x520	736x920x520	7,2	82	4143
TAF2600	2600	1600	CDT738	300x1040x520	300x1040x515	9	165	4104

NOTE: For further information about derating curve, fuses and wiring please contact us.



## DIRECT INTEGRATION WITH BUS SYSTEMS

Will convert the most popular protocols: MODBUS, DeviceNet, PROFIBUS.



## APPLICATIONS

The thyristor units are rugged and designed for industrial environment.  
The main application areas are:

- extruders
- plastic / thermoforming machinery
- glass ovens / industry
- electrical furnaces
- print machinery
- drying process
- car industry
- paper industry
- infrared application
- packaging/sealing
- general factory automation
- textile fiber machines
- semiconductor
- food/drink processing
- chemical / petrochemical

## POWER CONTROL WITH THYRISTOR UNITS!

- Universal Thyristor unit with possibility to configure all inputs and firing modes.
- Innovative product range using digital technology even with small units (15A).
- RS485 communication with modbus protocol standard (not with 3000S series).
- Simple configuration via Front KeyPad, external KeyPad or portable PC.
- Possibility to download the suggested configuration clicking on your application.
- Wide product range from 10A to 2.600A single, two and three phase units.
- Saves money because there are ideal steps in nominal current ratings (27 sizes from 10A to 2.600A)

## AUXILIARY UNITS



### CD-RS

Compact and smart communication interface.  
Input RS232. Output RS485 or 422.

RS232 connection via a 9 pin connector on front unit.

RS485 or 422 via screw terminals.

This converter can be used to interface a computer with able to communicate Thyristor Units .

### CD EASY

This is a memory support tool used by maintenance personnel on the shop floor, which enables the user to clone the configuration of one Thyristor unit and paste it into another. The CD-EASY is very simple, with one push button to upload the configuration (Read) and another to download the stored configuration (Write). The CD-EASY can be used with all Thyristor units that have the communications facility.

### Auto/Manual Station

The CD-AM Auto Manual Station can be used to deliver the input signal to Thyristor Unit.

The unit has a frontal indicator of output and up-down pushbuttons.

Auto/Manual switch with bumpless procedure is standard.

### Field Bus Gateways

TU-PB can be used to convert RS485 in PROFIBUS DP.

TU-DN can be used to convert RS485 in DEVICENET.

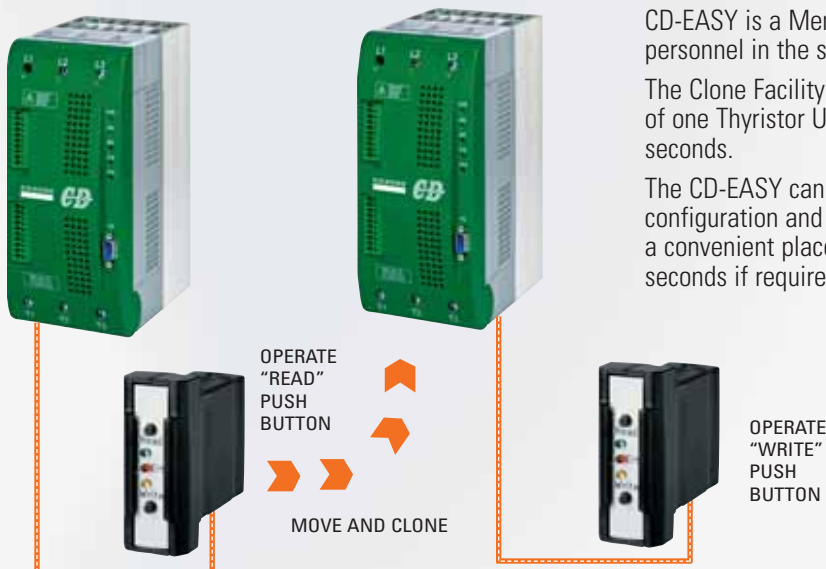
### Current transformer for Heater Break option

The external current transformer is used at one phase units up to 110A, two phase units up to 100A, three phase units up to 90A. Dimensions are always 38x48x20mm (WxHxD). For Thyristor units above 110A / 100A / 90A current the transformer is build in.

## CLONE FACILITY USING CD-EASY

THYRISTOR UNIT 1

THYRISTOR UNIT 2



CD-EASY is a Memory Support used in by maintenance personnel in the shop floor.

The Clone Facility makes it possible to copy the configuration of one Thyristor Unit and paste it into another in a matter of seconds.

The CD-EASY can be loaded with the standard unit operating configuration and stored together with the system drawings in a convenient place, enabling unit reconfiguration within seconds if required.

# FUSES AND FUSEHOLDERS

High speed fuses for semi-conductor protection.



SIZE	F0	F1	F2	F3
Width	17	26	35	37
Height	80	110	125	150
Depth	60	77	77	107

Fuse & Fuseholder Selection TAB	Models		CD1000 CD3000S CD3000M CD3200		CD3000S-2PH CD3000M-2PH		CD3000S-3PH CD3000M-3PH		CD3000E		MULTIDRIVE	
	Current	Size	(1 off)	(each phase)	(3 off)	(each phase)	(3 off)	(each phase)	(each phase)	(each phase)	(each phase)	(each phase)
			Fuse+Fuseholder	Spare fuses	Fuse+Fuseholder	Spare fuses	Fuse+Fuseholder	Spare fuses	Spare fuses	Spare fuses	Spare fuses	Spare fuses
3.5A	F0	FFH1038/8A	FU1038/8A	FFH1038/16A	FU1038/16A	FFH1038/16A	FU1038/16A					
2X10A	F0	FFH1038/16A	FU1038/16A	FFH1038/16A	FU1038/16A	FFH1038/16A	FU1038/16A					
15A	F0	FFH1038/16A	FU1038/16A	FFH1038/16A	FU1038/16A	FFH1038/16A	FU1038/16A					
25A	F0	FFH1038/32A	FU1038/32A	FFH1038/32A	FU1038/32A	FFH1038/32A	FU1038/32A		FU50FE	FU50FE	FU50FE	FU50FE
30A	F1					FFH1451/40A	FU1451/40A					
35A	F1	FFH1451/40A	FU1451/40A	FFH1451/40A	FU1451/40A	FFH1451/40A	FU1451/40A		FU63FE	FU63FE		
45A	F1	FFH1451/50A	FU1451/50A	FFH1451/63A	FU1451/63A	FFH1451/63A	FU1451/63A		FU80FE	FU80FE	FU80FE	FU80FE
60A	F2	FFH2258/80A	FU2258/80A			FFH2258/80A	FU2258/80A					
75A	F2	FFH2258/125A	FU2258/125A			FFH2258/100A	FU2258/100A		FU100FE	FU100FE	FU100FE	FU100FE
90A	F2	FFH2258/125A	FU2258/125A			FFH2258/125A	FU2258/125A					
100A	F2								FU160FEE	FU2X80FE	FU160FE	FU160FE
110A	F3	FFHPS127/160A	FU2760/160A									
125A	IF	IF	FU200FEE	IF	FU200FEE	IF	FU2X100FE	IF	FU200FEE	FU2X100FE	FU200FEE	FU200FE
150A	IF	IF	FUURB250 or FU200FEE	IF	FUURB250 or FU200FEE	IF	FU2X100FE	IF	FUURB250 or FU200FEE	FU2X100FE	FUURB250 or FU200FEE	FUURB250 or FU200FEE
200A	IF	IF	FUURB315	IF	FUURB315	IF	FUURB315	IF	FUURB315			
225A	IF							IF	FUURB315 or 2xFEE160		FUURB315 or 2xFEE160	FUURB315 or 2xFEE160
275A	IF					IF	FUURB315 or 2xFEE160		FUURB315 or 2xFEE160		FUURB315 or 2xFEE160	FUURB315 or 2xFEE160
300A	IF	IF	FU350FM					IF	FU450FMM	FU450FMM		FU450FMM
350A	IF							IF	FU550FMM	FU550FMM		FU550FMM
400A	IF	IF	FU550FMM	IF	FU550FMM	IF	FU550FMM	IF	FU550FMM	FU550FMM	FU550FMM	FU550FMM
450A	IF			IF	2xFU315FM	IF	2xFU315FM	IF	2xFU315FM	2xFU315FM	2xFU315FM	2xFU315FM
500A	IF	IF	FU700FMM	IF	2xFU315FM	IF	2xFU315FM	IF	2xFU315FM	2xFU315FM	2xFU315FM	2xFU315FM
600A	IF	IF	2xFU450FMM	IF	2xFU450FMM	IF	2xFU450FMM	IF	2xFU450FMM	2xFU450FMM	2xFU450FMM	2xFU450FMM
700A	IF	IF	2xFU450FMM	IF	2xFU450FMM	IF	2xFU450FMM	IF	2xFU450FMM	2xFU450FMM	2xFU450FMM	2xFU450FMM

Fuse & Fuseholder Selection TAB	Models cULus approved		CD 1000 CD3000S CD3000M CD3200		CD3000S-2PH CD3000M-2PH		CD3000S-3PH CD3000M-3PH		CD3000E		MULTIDRIVE	
	Current	Size	(1 off)	(each phase)	(3 off)	(each phase)	(3 off)	(each phase)	(each phase)	(each phase)	(each phase)	(each phase)
			Fuse+Fuseholder	Spare fuses	Fuse+Fuseholder	Spare fuses	Fuse+Fuseholder	Spare fuses	Spare fuses	Spare fuses	Spare fuses	Spare fuses
3.5A	F0	FFH1038/8A-UL	FU1038/8A-UL	FFH1038/16A-UL	FU1038/16A-UL	FFH1038/16A-UL	FU1038/16A-UL					
2X10A	F0	FFH1038/16A-UL	FU1038/16A-UL	FFH1038/16A-UL	FU1038/16A-UL	FFH1038/16A-UL	FU1038/16A-UL					
15A	F0	FFH1038/16A-UL	FU1038/16A-UL	FFH1038/16A-UL	FU1038/16A-UL	FFH1038/16A-UL	FU1038/16A-UL					
25A	F0	FFH1038/32A-UL	FU1038/32A-UL	FFH1038/32A-UL	FU1038/32A-UL	FFH1038/32A-UL	FU1038/32A-UL		FU50FE	FU50FE	FU50FE	FU50FE
30A	F1					FFH1451/40A-UL	FU1451/40A-UL					
35A	F1	FFH1451/40A-UL	FU1451/40A-UL	FFH1451/40A-UL	FU1451/40A-UL	FFH1451/40A-UL	FU1451/40A-UL		FU63FE	FU63FE		
45A	F1	FFH1451/50A-UL	FU1451/50A-UL	FFH1451/63A-UL	FU1451/63A-UL	FFH1451/63A-UL	FU1451/63A-UL		FU80FE	FU80FE	FU80FE	FU80FE
60A	F2	FFH2258/80A-UL	FU2258/80A-UL			FFH2258/80A-UL	FU2258/80A-UL					
75A	F3	FFHPS127/125A-UL	FU2760/125A-UL			FFHPS127/100A-UL	FU2760/100A-UL		FU100FE	FU100FE	FU100FE	FU100FE
90A	F3	FFHPS127/125A-UL	FU2760/125A-UL			FFHPS127/100A-UL	FU2760/100A-UL					
100A	F3					FFHPS127/160A-UL	FU2760/160A-UL		FU160FEE	FU2X80FE	FU160FE	FU160FE
110A	F3	FFHPS127/160A-UL	FU2760/160A-UL									
125A	IF	IF	FU200FEE	IF	FU200FEE	IF	FU2X100FE	IF	FU200FEE	FU2X100FE	FU200FEE	FU200FE
150A	IF	IF	FUURB250 or FU200FEE	IF	FUURB250 or FU200FEE	IF	FU2X100FE	IF	FUURB250 or FU200FEE	FU2X100FE	FUURB250 or FU200FEE	FUURB250 or FU200FEE
200A	IF	IF	FUURB315	IF	FUURB315	IF	FUURB315	IF	FUURB315			
225A	IF							IF	FUURB315 or 2xFEE160		FUURB315 or 2xFEE160	FUURB315 or 2xFEE160
275A	IF					IF	FUURB315 or 2xFEE160		FUURB315 or 2xFEE160		FUURB315 or 2xFEE160	FUURB315 or 2xFEE160
300A	IF	IF	FU350FM					IF	FU450FMM	FU450FMM		FU450FMM
350A	IF							IF	FU550FMM	FU550FMM		FU550FMM
400A	IF	IF	FU550FMM	IF	FU550FMM	IF	FU550FMM	IF	FU550FMM	FU550FMM	FU550FMM	FU550FMM
450A	IF			IF	2xFU315FM	IF	2xFU315FM	IF	2xFU315FM	2xFU315FM	2xFU315FM	2xFU315FM
500A	IF	IF	FU700FMM	IF	2xFU315FM	IF	2xFU315FM	IF	2xFU315FM	2xFU315FM	2xFU315FM	2xFU315FM
600A	IF	IF	2xFU450FMM	IF	2xFU450FMM	IF	2xFU450FMM	IF	2xFU450FMM	2xFU450FMM	2xFU450FMM	2xFU450FMM
700A	IF	IF	2xFU450FMM	IF	2xFU450FMM	IF	2xFU450FMM	IF	2xFU450FMM	2xFU450FMM	2xFU450FMM	2xFU450FMM

NOTES: IF = internal fuses, FFH = external fuse+fuseholder.

In accordance with our policy of continuous improvement, we reserve the right to change specifications from those shown in this document.

APPLICATION GUIDE

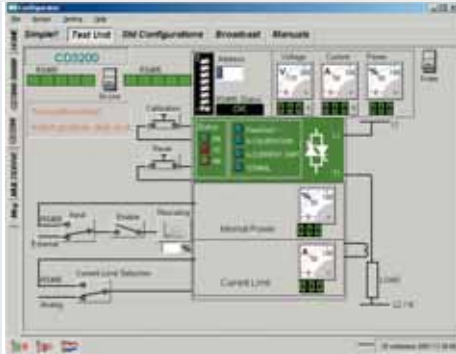
APPLICATION	LOAD TYPE	MODEL	CURRENT	N° of UNITS	CTRL. PHASES
	Resistive load Infrared medium and long wave	CD3000S-1PH	700A	1	1
		MULTIDRIVE-1PH	1100÷2600A	1	1
		CD3000M-1PH	700A	1	1
		CD3200	700A	1	1
	Molibdenium, Tungsten, Superkanthal, Platinum, infrared short wave	CD3200	700A	1	1
		MULTIDRIVE-1PH	1100÷2600A	1	1
	Silicon carbide elements	CD3000M-1PH	700A	1	1
		CD3200	700A	1	1
		MULTIDRIVE-1PH	1100÷2600A	1	1
	Transformers and inductances	CD3000M-1PH	700A	1	1
		CD3200	700A	1	1
		MULTIDRIVE-1PH	1100÷2600A	1	1
	Resistive load	CD3000S-2PH	700A	1	2
		CD3000M-2PH	700A	1	2
		MULTIDRIVE-2PH	1100÷2600A	1	2
	Resistive load	CD3000S-3PH	500A	1	3
		CD3000M-3PH	500A	1	3
		MULTIDRIVE-3PH	1100÷2600A	1	3
	Silicon carbide elements	CD3000E-3PH	500A	1	3
		MULTIDRIVE-3PH	1100÷2600A	1	3
	Molibdenium, Tungsten, Superkanthal, Platinum, infrared short wave	CD3000E-3PH	500A	1	3
		MULTIDRIVE-3PH	1100÷2600A	1	3
	Three phase transformer	CD3000E-3PH	500A	1	3
		MULTIDRIVE-3PH	1100÷2600A	1	3
	Three phase resistive load load resistance with delta connection	CD3000S-3PH	500A	1	3
		CD3000M-3PH	500A	1	3
		MULTIDRIVE-3PH	1100÷2600A	1	3

FEEDBACK MODE: VC = Voltage compensation - V = Voltage feedback - Vxl = Power feedback.

SUGGESTED FIRING MODE FOR YOUR APPLICATION						OTHER FEATURES		SIZING		NOTE
ZC	SC	BF	S+BF	DT	PA	CL	FEEDBACK	V	I	
■								V	$\frac{P}{V}$	For ohmic load applications with low variations in temperature and age. For fast acting loads (quartz) Single Cycle (SC) or Phase Angle (PA) should be used.
		■	■		■		V			
	■	■			■		VC			
					■		V	V	$\frac{P}{V}$	These resistances change with temperature but have low variations with age. Starting current with cold elements can be 16 times nominal current (superkanthal). Infrared quartz lamps can reach 8 time nominal current.
					■	■	V			
		■						V	$\frac{P}{V}$	These resistances change value with temperature and age and the value at the end it's life is 4 times the initial value. Constant power control is necessary. An algorithm suited to drive in Single Cycle Silicon carbide elements is available .
					■		Vxl			
					■			V	$\frac{P}{V \cos \phi}$	Inductive loads have inrush current on start up. Phase Angle plus Soft Start and current limit are required. To switch ON-OFF the transformer can be used DT firing that automatically switches ON-OFF when current value is zero. DT couldn't work with cold resistance.
							VC			
					■	■	V			
						■		V		
■								V	$\frac{P}{1.73V}$	CD3000M-2PH is suitable to control resistive loads with delta or star connection without neutral. With analog input use BF and with SSR input use ZC.
		■					VC			
		■					VC			
■								$\frac{V}{1.73}$	$\frac{P}{1.73V}$	Three phase load with star plus neutral must be controlled on the three phases.
		■					VC			
		■					VC			
						■		V	$\frac{P}{1.73V}$	On three phase silicon carbide elements Vxl feedback is suggested to have a constant power control. This is necessary to compensate resistance change with temperature and age. Resistance value at the end of element life is 4 times the initial one. It also needs a voltage supply that is two times the nominal with new elements. It's also recommended to use SIL Algorithm to use BF firing.
						■	Vxl			
						■	■	V	$\frac{P}{1.73V}$	These resistances change with temperature but have low variations with age. Start up current with cold elements can be many times nominal current, thus is necessary to use Phase Angle +Current Limit (infrared short wave).
						■	V			
						■	■	V	$\frac{P}{1.73V \cos \phi}$	Three phase Multidrive and CD 3000E are specially designed to drive three phase transformers coupled on secondary with normal or special resistive loads.
						■	V			
■								V	$\frac{P}{3V}$	Delta can be driven by three phase unit. With analog input the units will be one Master and two Slaves.
		■					VC			
		■					VC			

## CD3000 configurator

- Windows based.
- Easy to use with recipe facility. Each Thyristor unit can easily be configured.
- Possibility to configure the firing mode on line without de-energizing.
- Look for your application and download the configuration software.



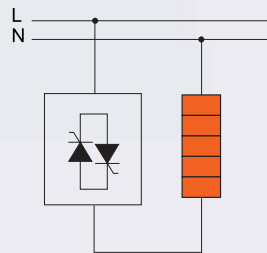
## Glossary

### What is a Thyristor Unit

A Thyristor unit is a semiconductor device which acts as a switch formed by two Silicon Controlled Rectifiers (SCR) in antiparallel.

To switch ON the load current the input signal must be ON. The thyristor will switch OFF at the first zero crossing voltage without input control signal.

The benefits of Thyristor units compared with ordinary contactors are as follows: no moving parts, no maintenance. Thyristors are a good solution to control trans-formers and special loads that change resistance with temperature and age.



### Terminology

V: voltage between any two lines of a 3 phase supply.

I: the full circulating current in Thyristor unit.

P: total load power.

### Input signal

**Logic:** This input type is a square waveform given by a temperature controller.

ON: 4...30V, OFF <4V DC

Firing of the unit is shown on the next page.

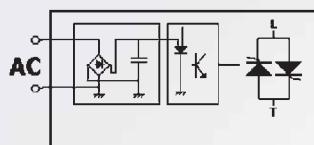
AN: Analog input 4-20mA/0-10VDC.

POT: Potentiometer.

RS: Communication Command.

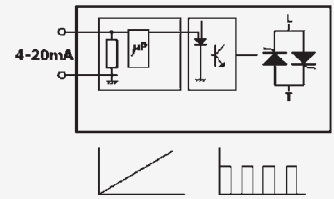
### AC INPUT 110 or 230V

This kind of input allows to drive the Thyristor unit by a 110 or 230Vac signal.



### LP 4-20mA Loop Powered.

The voltage supply for Micro is given by 4-20mA input signal. With this input is possible to have a simple Burst Firing 8 or 16 Cycles.



### Feedback

Supply voltage fluctuation changes the power to the load. To compensate this effect the voltage supplied to the load is measured and compared with the power demand set internal at the Thyristor controller. As result, the power at the load is kept at constant level. When the load changes its value it is necessary to use  $V \times I$  feedback.

### Extra Features

**HB:** Heater Break circuit to diagnose partial or total load failure as short circuit on Thyristor. Thyristor units provide a microprocessor based circuit with automatic setting via a digital input.

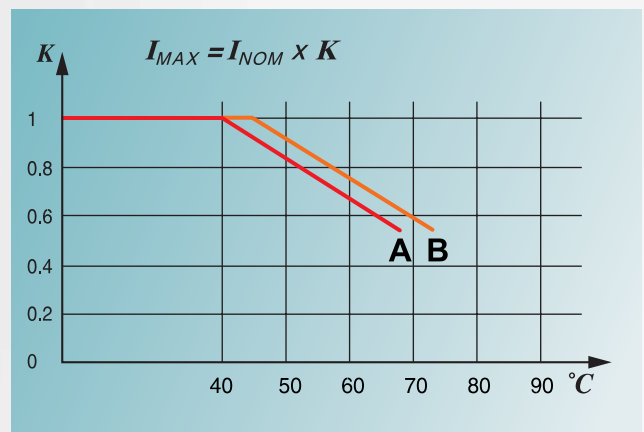
**CL:** Current Limit limits the current to the set value from 0 to 100% of nominal current.

The Current Limit must be used with inductive loads, Molybdenum, Superkanthal, Platinum and infrared quartz lamps.

**RS:** RS485 serial communication with MODBUS Protocol. Thyristors units that provide this option, can communicate to a supervisory computer following data: current to the load, HB set, HB status.

### Derating Curve

The nominal current of the unit in specification is referred to continuous service at 40°C or 45°C ambient temperature. For higher temperature use derating curve below.



A: Use this curve for:

CD3000S-1PH and CD3000M-1PH ≤ 110A

CD3000S-2PH and CD3000M-2PH ≤ 100A

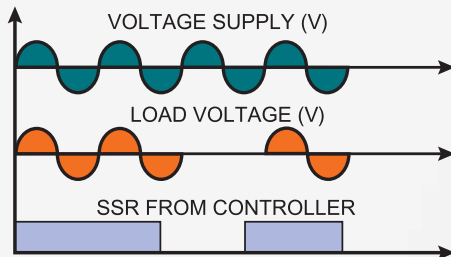
CD3000S-3PH and CD3000M-3PH ≤ 90A

B: Use this curve for all products not included in the above list.

### Zero Crossing ZC

ZC firing mode is used with Logic Output from temperature controllers. The Thyristor operates like a contactor. The cycle time is given by a temperature controller.

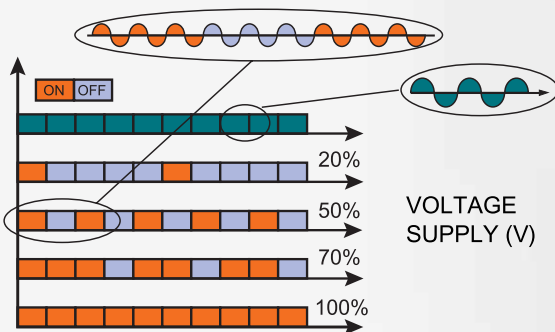
Zero Crossing minimizes interferences because the Thyristor unit switches at zero voltage.



### Burst Firing BF

This firing method performed in a digital mode gives a lot of advantages. Switch Thyristor at zero voltage crossing without EMC interferences. Analog input is used for BF. It can be decided how many complete cycles should be performed at 50% of power demand.

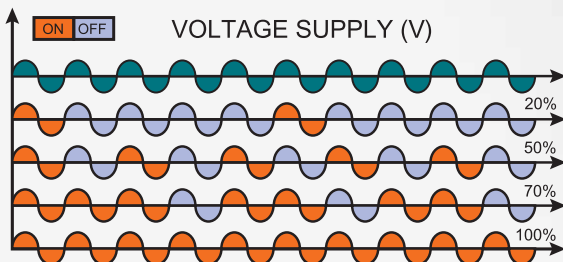
This value can be selected from 1 to 255 complete cycles. When 1 is set the firing name becomes Single Cycle (see below).



### Single Cycle SC

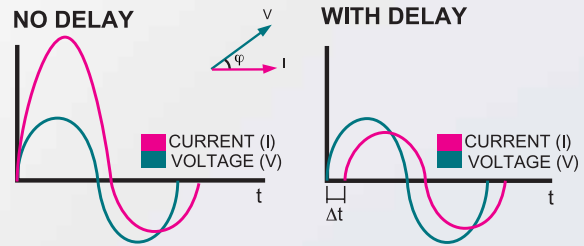
It's the fastest zero crossing switching method with respect to the power demand from a temperature controller or an external signal.

At 50% input signal there is one cycle ON and one cycle OFF. At 75% it's 3 cycles ON and one cycle OFF.



### Delayed Triggering DT

This method is used to compensate phase shifting ( $\cos \varphi$ ) at transformers with resistive load.

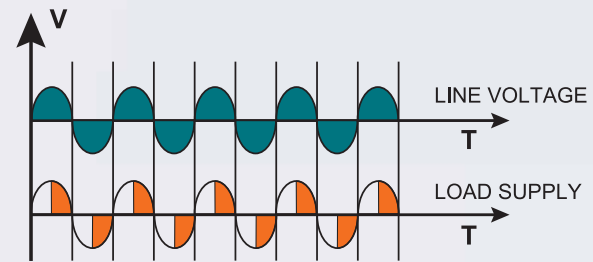


### Phase Angle PA

With Phase Angle it is possible to control the power to the load allowing the Thyristor to be in conduction for a variable part of the voltage cycle.

The load can be adjusted from 0% to 100% as a function of the analog input signal.

Phase Angle is preferably used with inductive loads.

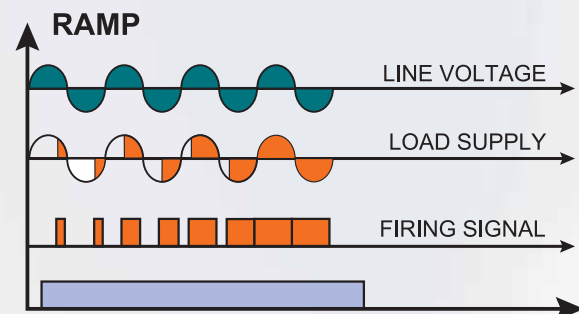


### Soft Start+Burst Firing S+BF

The unit starts in Phase Angle mode with a ramp starting from zero up to full voltage in a presettable time.

The ON period will be remaining at full conduction.

Soft Start+Burst Firing is used to switch inductive loads to avoid inrush current and to reduce electrical interferences at minimum.





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