REVO

THE THYRISTOR EVOLUTION

From 10A to 2700A

AUTOMATION

- Intelligent Thyristor Units
- EMC and CE Marked
- RS485 Comm. STD
- cUL Approved
- Diagnostic

We are delivering Real Cost Benefits

CD Automation was founded in 1987 with the clear strategy of becoming a leading supplier of quality industrial automation products to the Italian market.
Key to this success was the formation of a sales team educated from a strong technical background.
The philosophy was simple; provide product & application experts able to work in partnership with the customer to find the right solution.

In 1990 **CD Automation** began its development of thyristor power controllers and quickly became the world wide market leader in using microprocessor based technology including RS485 communication.

CD Automation now boasts the most comprehensive power control device range on the market today. The extensive range is capable of accurately controlling a wide spectrum of electrical loads up to 3000kW, from simple single-phase heaters up to complex high temperature-coefficient three-phase load.

Technical Service

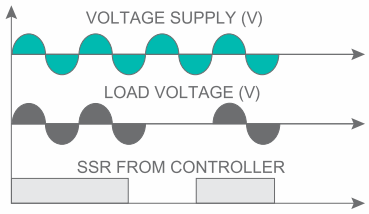
CD Automation has invested heavily in computerised testing equipment & state-of-the-art production equipment.
All products are individually testing including full functional, to improve quality and product reliability.
Our help desk service is available 10 hours per day with ex-stock delivery for spare parts.
Remote service via Internet is also available for thyristor units with RS485 communications.

INDEX

Glossary

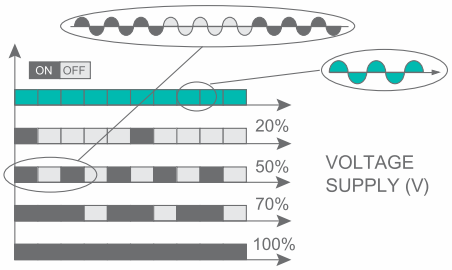
Zero Crossing ZC

ZC firing mode is used with the logic output from a temperature controller and so the thyristor operates like a contactor. The cycle time is performed by the temperature controller. Zero Crossing minimizes interferences as the thyristor unit switches ON-OFF at zero voltage.



Burst Firing BF

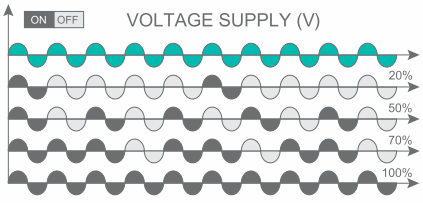
This firing is performed digitally within the thyristor unit at zero volts, producing no EMC interference. Analogue input is necessary for BF and the number of complete cycles must be specified for 50% power demand. This value can be between 1 and 255 complete cycles, determining the speed of firing. When 1 is specified, the firing mode becomes Single Cycle (SC).



Soft Start + Burst Firing now availabe as an option.

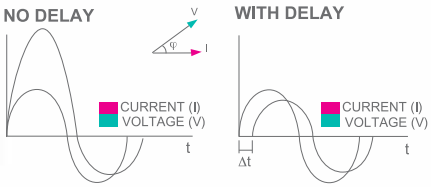
Single Cycle SC

SC is the fastest zero crossing switching method. At 50% input signal, one cycle is ON and one cycle is OFF. At 75%, 3 cycles are ON and one cycle is OFF. If power demand is 76% the unit performs the same as for 75% but every time the unit switches ON the microprocessor divides 76/75 and memorises the ratio. When the sum is one the unit delivers one cycle more to the load. With this firing it is necessary to have analogue input.



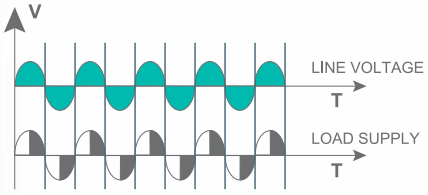
Delayed Triggering DT

Used to switch the primary coil of transformers when coupled with normal resistive loads (not cold resistance) on the secondary, DT prevents the inrush current when zero voltage (ON-OFF) is used to switch the primary. The thyristor unit switches OFF when the load voltage is negative and switches ON only when positive with a pre-set delay for the first half cycle.



Phase Angle PA

PA controls the power to the load by allowing the thyristor to conduct for part of the AC supply cycle only. The more power required, the more the conduction angle is advanced until virtually the whole cycle is conducting for 100% power. The load power can be adjusted from 0 to 100% as a function of the analogue input signal, normally determined by a temperature controller or potentiometer, PA is normally used with inductive loads.



Soft Start+Burst Firing S+BF

This is an additional feature to Burst Firing. Starting in Phase Angle mode, the unit ramps from zero to full voltage at a pre-set time, finishing at full conduction for the remainder of the ON period. Idealy used to switch small inductive loads, S+BF avoids current surge and minimizes electrical interference.

Feedback/Control Mode

Supply voltage fluctuations changes the power to the load. To overcome this effect the voltage supplied to the load is measured and compared with the power demand from the controller. The error signal is used to automatically hold the power at the value requested.

Three types of control more are available:

Voltage Control Mode, where the input signal is proportional to the voltage output (voltage feedback).

Current Control Mode, where the input signal is proportional to the current output (current feedback).

Power Control Mode, where the input signal is proportional to the power output (power feedback).

As an option it is possible to transfer control mode from voltage to power via a simple digital command.

What our Customers want?

They want a positive experience with our total solution, not just a cheap price!

CD Automation is confident of achieving this with...

Knowledgeable Sales Team

We have a team of sales engineers focused on core business products only. An expert at no cost, not an engineer with a big catalogue and little product knowledge, will welcome customers. Easy access to engineers when you need a special performance project.

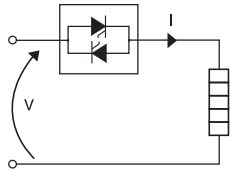
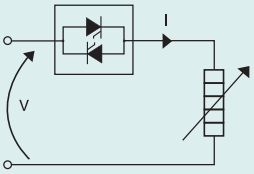
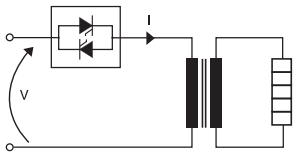
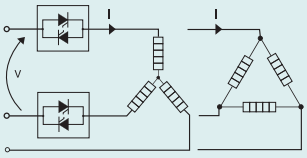
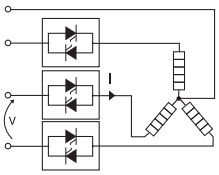
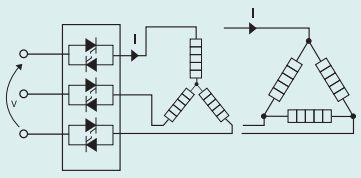
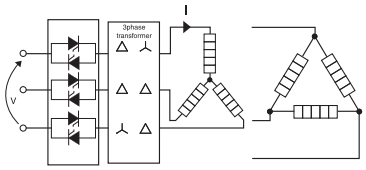
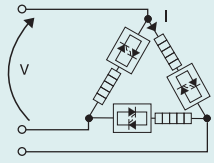
Fast Service

Excellent pre sales and after sales service including engineering support.

Easy to do business with us

Fast reaction to your enquiry, short lead times, timely production of order acknowledgement, invoices etc.
Catalogues & manuals of all our products plus configuration software, available free of charge from our web-site.
Our people are always welcoming to our customers.

APPLICATION GUIDE

APPLICATION GUIDE	LOAD TYPE	MODEL	CURRENT RANGE	N. OF UNITS	PHASE CONTROLLED
	Normal Resistance Infrared Medium and long waveform	REVO SSR	It depends on heat sink	1	1
		REVO S 1PH	30-700A	1	1
	Quartz lamp infrared short waveform	REVO M 1PH	35-700A	1	1
		REVO CL	35-700A	1	1
	Molibdenum, Tungstenum, Superkanthal, Platinum	REVO CL	35-700A	1	1
	Silicon carbide elements	REVO M 1PH	35-700A	1	1
		REVO CL	35-700A	1	1
	Transformers coupled with normal resistance	REVO M 1PH	35-700A	1	1
	Transformers coupled with cold resistances (kanthal super)	REVO CL	35-700A	1	1
	Normal Resistance	REVO S 2PH	30-700A	1	2
		REVO M 2PH	30-700A	1	2
	Normal Resistance	REVO S 3PH	30-500A	1	3
		REVO M 3PH	30-500A	1	3
	Silicon carbide elements	CD3000E 3PH (1) MULTIDRIVE 3PH	25-500A 35-2700A	1	3
		REVO M 3PH	30-500A	1	3
	Molibdenum, Tungstenum Super Kantal Platinum, Quartz lamp infrared short waveform	CD3000E 3PH	25-500A	1	3
		MULTIDRIVE 3PH	35-2700A	1	3
	Three phase transformer	CD3000E 3PH	25-500A	1	3
		MULTIDRIVE 3PH	35-2700A	1	3
	Three phase normal load resistance with open delta connection	REVO S 3PH	30-500A	1	3
		REVO M 3PH	30-500A	1	3
	Cold resistance	REVO CL	30-700A	3	3

CONTROL MODE: V = Voltage feedback V^2 = Square Voltage feedback VxI = Power feedback.

SUGGESTED FIRING MODE FOR YOUR APPLICATIONS					OTHER FEATURES				SIZING		NOTE
ZC	SC	BF	BF Basic	S+BF	DT	PA	CL	Control	V	I	
■									V	$\frac{P}{V}$	For general resistance applications with low variations in temperature and age. For low inertia loads use Single Cycle (SC) or Phase Angle (PA).
■			■								
	■	■				■		V^2			
						■	■	VxI			
						■	■	I	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 lamp short waveform can reach 8 time nominal current.
		■						V to VxI	V	$\frac{P}{V}$	These resistances change value with temperature and age. The value at the end of element life can be 4 times the initial value. Constant power regulation is necessary with V to VxI Transfer.
						■					
					■			V	V	$\frac{P}{Vco\phi}$	Transformers and inductors have inrush current on start up. Phase Angle plus Soft Start and current limit are required. To switch the transformer ON-OFF, use DT firing that will automatically switch ON-OFF when current value is at zero.
						■	■	VxI V^2	V	$\frac{P}{Vco\phi}$	Use Phase Angle + Current Limit.
■			■						V	$\frac{P}{1,73V}$	REVO M-2PH is suitable to control resistive loads with delta or star connection without neutral.
		■						V^2	V	$\frac{P}{1,73V}$	
■			■						$\frac{V}{1.73}$	$\frac{P}{1.73V}$	Three phase load with star plus neutral connection must be controlled on the three phases.
		■						V^2			
						■		V to VxI	V	$\frac{P}{1.73V}$	On three phase silicon carbide elements VxI 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 original value. With REVO M use BF firing and Power Limit.
		■									
						■	■	I			These resistances change with temperature but have low variations with age. Start up current with cold elements can be many times the nominal current value. In this case it is necessary to use Phase Angle + Current Limit.
						■	■	I			
						■	■	V	V	$\frac{P}{1.73Vco\phi}$	Three phase Multidrive and CD3000E are specially designed to drive three phase transformers coupled on secondary with normal or special resistive loads.
						■	■	V			
■			■						V	$\frac{P}{3V}$	Open delta can be driven by three phase unit.
		■						VxI V^2			
						■	■	V	V	$\frac{P}{3V}$	

	PREVIOUS UNIT TYPE	REVO CL	REVO SSR	REVO S - 1PH	REVO S - 2PH	REVO S - 3PH	REVO M - 1PH	REVO M - 2PH
	ACTUAL UNIT TYPE	**RCL**	**SSR**	**RS1**	**RS2**	**RS3**	**RM1**	**RM2**
LOAD TYPE	MAX VOLTAGE 480V	■	■	■	■	■	■	■
	MAX VOLTAGE 600V	■	■	■	■	■	■	■
	MAX VOLTAGE 690V	■ > 280A					■ >280A	■ >280A
	SINGLE PHASE	■	■	■			■	
	3 PHASE LOAD STAR NO NEUTRAL OR DELTA				■	■		■
	3 PHASE LOAD STAR WITH NEUTRAL					■		
	3 PHASE LOAD OPEN DELTA	■				■		
INPUT TYPE	SSR 4:30VDC		■	■	■	■	■	■
	4:20 mA	■		0	0	0	■	■
	0:10 Vdc	■		0	0	0	■	■
	10K Potentiometer	■					■	■
	COMMUNICATION COMMAND	■					■	■
FIRING	ZERO CROSSING		■	■	■	■	■	■
	SINGLE CYCLE						■	
	BURST FIRING			0 (4)	0 (4)	0 (4)	■	■
	SOFT START + BURST FIRING						■	
	PHASE ANGLE	■					■	
	SOFT START + PHASE ANGLE	■					■	
	DELAYED TRIGGERING + BURST FIRING	■					■	
CONTROL MODE	VOLTAGE	■					■	■
	SQUARE VOLTAGE	■					■	
	CURRENT	■					■	
	VOLTAGE X CURRENT (POWER)	■					■	■
	VOLTAGE TO POWER TRANSFER	■					■	
	EXTERNAL CONTROL MODE							
	TEMPERATURE CONTROLLER							
OPTION	INTERNAL CURRENT LIMIT	■ (1)						
	HEATER BREAK + THYRISTOR SHORT CIRCUIT	■	O	O	O	O	O	O
	INTEGRATED FIXED FUSES	■ > 45A	> 45A	■ > 45A	■ > 45A	■ > 45A	■ > 45A	■ > 45A
	FUSE & FUSE HOLDER	=< 45A	=< 45A	=< 45A	=< 45A	=< 45A	=< 45A	=< 45A
	FLAT WIRING TERMINAL		O (2)	O (2)	O (2)	O (2)	O	
COMM.	RS485 WITH MODBUS PROTOCOL	■					■	■
	PROFIBUS DP; CAN OPEN ETHERNET	0					0	0
	FRONTAL KEY PAD	■					■	■
	PC PROGRAMMABLE + USB\TTL Conv.	■					■	■
	REVO EASY	■					■	■
CURRENT	**CURRENT**	**SIZE**	**SIZE**	**SIZE**	**SIZE**	**SIZE**	**SIZE**	**SIZE**
	25							
	30		SR0.SR1	SR6	SR7	SR8		SR10
	35	SR9		SR6	SR7	SR8	SR9	SR10
	40	SR9		SR6	SR7	SR8	SR9	SR10
	45	SR9					SR9	
	60	SR15		SR12	SR12	SR13	SR15	SR16
	75							
	90	SR15		SR12	SR12	SR13	SR15	SR16
	100							
	120	SR15		SR12	SR13	SR14	SR15	SR16
	125							
	150	SR15		SR12	SR13	SR14	SR15	SR16
	180	SR15		SR12	SR13	SR14	SR15	SR16
	200							
	210	SR15		SR12	SR13	SR14	SR15	SR16
	225					S13		
	280	S9		S9	S10		S9	S10
	300					S14		
	350					S14		
	400	S12		S12	S14	S14	S12	S14
	450				S14	S14		S14
	500	S12		S12	S14	S14	S12	S14
	600	S12		S12	S14		S12	S14
	700	S12		S12	S14		S12	S14
	850							
	1000							
	1400							
	1500							
	1850							
	2000							
	2400							
	2700							

■ Standard ○ Option (1) Phase Angle only (2) Flat wiring available as option ≤ 45A (4) 4-8-16 Cycles Simplified Burst Firing available with Analog Input only

H	REVO M - 3PH	CD3000E-2PH	CD3000E-3PH	MULTIDRIVE 1PH	MULTIDRIVE 2PH	MULTIDRIVE 3PH	REVO - TC1	REVO - TC2	REVO - TC3
	RM3	RE2	RE3	RD1	RD2	RD3	RT1	RT2	RT3
	■	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■	■
	■ >210A			■	■	■			
				■			■		
	■	■	■		■	■		■	■
	■		■			■			■
	■		■			■			■
	■	■	■	■	■	■	■	■	■
	■	■	■	■	■	■			
	■	■	■	■	■	■			
	■	■	■	■	■	■			
	■	■	■	■	■	■	■	■	■
	■	■	■				■	■	■
				■					
	■	■	■	■	■	■			
			■	■		■			
			■	■		■			
			■	■		■			
		■	■	■	■	■			
	■	■	■	■	■	■			
				■		■			
			■	■		■			
	■	■	■	■	■	■			
			■	■		■			
			■	■		■			
							■	■	■
			■ (1)	■ (1)		■ (1)			
	O	■	■	■	■	■	0	0	0
	■ > 45A	■	■	■	■	■	> 45A	> 45A	> 45A
	=< 45A						=< 45A	=< 45A	=< 45A
							(2)	(2)	(2)
	■	■	■	■	■	■	■	■	■
	0	0	0	0	0	0	0	0	0
	■	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■	■
	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE
		S09	S09						
	SR11							SR10	SR11
	SR11	S09	S09		S13		SR9	SR10	SR11
	SR11						SR9	SR10	SR11
		S09	S09		S13		SR9		
	SR16						SR15	SR16	SR16
		S09	S09		S13	S13			
	SR16						SR15	SR16	SR16
		S09	S11		S13	S13			
	SR17						SR15	SR16	SR17
		S09	S11		S13	S13			
	SR17	S09	S11		S13	S13	SR15	SR16	SR17
	SR17						SR15	SR16	SR17
		S10							
	SR17						SR15	SR16	SR17
	S13				S13	S13			
		S14	S13						
	S14		S14		S14	S14			
	S14	S14	S14			S14			
	S14	S14	S14		S14	S14			
	S14	S14	S14		S14	S14			
	S14	S14	S14		S14	S14			
		S14			S14				
					S14	S15			
					S15				
				S18	S16	S22			
				S19	S17	S25			
				S19	S17	S25			
				S20	S23	S26			
				S20	S23	S26			
				S21	S24	S27			
				S21	S24	S27			

SIZE AND DIMENSIONS

SR0 H 36 x W 97 x D 32 - 0,11kg.

SR1 H 36 x W 97 x D 92 - 0,14kg.

SR2 H 36 x W 121 x D 87 - 0,27kg.

SR3 H 36 x W121 x D 125 - 0,44kg.

SR4 H 72 x W 121 x D 125 - 0,88kg.

SR5 H 108 x W 121 x D 125 - 1,32kg.

SR6 H 36 x W 121 x D 185 - 0,6kg.

SR7 H 72 x W 121 x D 185 - 1,2kg.

SR8 H 108 x W 121 x D 185 - 1,8kg.

S9 H 350 x W 120 x D 230 - 5,5kg

S10 H 350 x W 240 x D 230 - 14kg.

S11 H 520 x W 137x D 270 - 10,5kg.

S15 2PH H 520 x W 400 x D 270 - 43kg. (850A)

S16 2PH H 580 x W 400 x D 435 - 54kg. (1000A)

S17 2PH H 780 x W 400 x D435 - 65kg. (1500A)

S18 1PH H 580 x W 263 x D 435 - 28kg. (1000A)

S19 1PH H 780 x W 263 x D 435 - 39kg. (1500A)

S20 1PH H 780 x W 263 x D 533 - 48kg. (2000A)

S21 1PH H 890 x W 263 x D 518 - 58kg. (2700A)

SIZE AND DIMENSIONS

SR9 H 72 x W 121 x D 185 - 1,15kg.

SR10 H 108 x W 121 x D 185 - 1,76kg.

SR11 H 144 x W 121 x D 185 - 2,6kg.

SR12 H 93 x W 247 x D 185 - 3,4kg.

SR13 H 186 x W 247 x D 185 - 6,8kg.

SR14 H 279 x W 247 x D 185 - 10,2kg.

SR15 H 93 x W 247 x D 169 - 3,4kg.

SR16 H 186 x W 247 x D 169 - 6,8kg.

SR17 H 279 x W 247 x D 169 - 10,2kg.

S12 H 520 x W 137 x D 270 - 15kg.

S13 H 440 x W 262 x D 270 - 18kg.

S14 H 520 x W 262 x D 270 - 22,5kg.

S22 3PH H 580 x W 525 x D 435 - 56kg. (1000A)

S23 2PH H 780 x W 525 x D 533 - 96kg. (2000A)

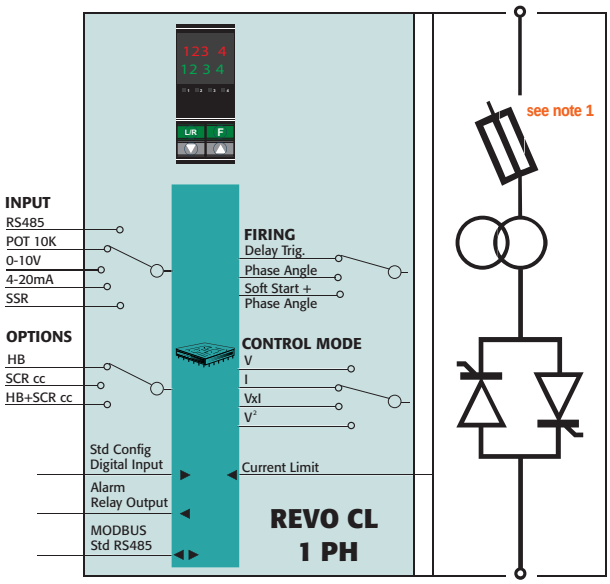
S24 2PH H 890 x W 525 x D 518 - 116kg. (2700A)

S25 3PH H 780 x W 520 x D 435 - 77 kg. (1500A)

S26 3PH H 790 x W 780 x D 533 - 144kg. (2000A)

S27 3PH H 790 x W 890 x D 518 - 174kg. (2700A)

REVO CL - 1PH



Specifications

- **Dimensions:** See size at page 6-7 and dimensions at page 7-8
- **Load type:** Normal resistive, infrared long, short and medium waveform, Silicon Carbide and cold resistance
- **Inputs:** 0-10V dc, 4-20mA, 10kpot, SSR, RS485
- **Firing mode:** Zero Crossing, Burst Firing, Single Cycle, Soft Start + Phase Angle, Delayed Triggering
- **Operating temperature:** 0 to 40° C without derating
- **Control mode:** V², V Voltage, VxI Power and current I
- **RS485 port. Modbus**
- **Comply with EMC and cUL**
- **Data sheet:** More details on "REVO CL" bulletin

Option

Current Transformer + Heater Break CT + HB

Note 2

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
REVO CL 1PH	R	C	L	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4, 5, 6 Current

Description code	Numeric code
35A	0 3 5
40A	0 4 0
45A	0 4 5
60A	0 6 0
90A	0 9 0
120A	1 2 0
150A	1 5 0
180A	1 8 0
210A	2 1 0
280A	2 8 0
400A	4 0 0
500A	5 0 0
600A	6 0 0
700A	7 0 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6
690V Available on units > 280A	7

8 Aux. Voltage supply

Description code	Numeric code
90:130V	1
170:265V	2
230:345V	3
300:530V	5
510:690V	6
600:760V	7

9 Input

Description code	Numeric code
0:10V dc	V
4:20 mA	A
10 K Pot.	K
RS 485	R

10 Firing

Description code	Numeric code
Delayed Triggering + Burst Firing DT+BF (8 cycles at 50% power demand)	D
Phase Angle PA	P
Soft Start + Phase Angle S+PA	E

11 Control Mode

Description code	Numeric code
Open Loop	0
Voltage Feed Back V	U
Power Feed Back VxI	W
Voltage Square V²	Q
Current Feed Back I	I

12 Fuse & Option

Description code	Numeric code
Fuse + Fuse Holder + CT (1)	Y
Fuse + Fuse Holder +CT +HB (1)	H

13 Fan Voltage

Description code	Numeric code
No Fan < 120A	0
Fan 110V > 90A	1
Fan 220V > 90A Std Version	2

LEGEND
IFH = Integrated Fuse + Fuse Holder
IF = Internal Fixed Fuse
CT = Current Transformer
HB = Heater Break Alarm

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market	L

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Version

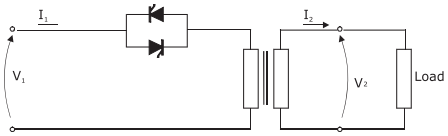
Description code	Numeric code
Std with fuse + fuse holder up to 45A	1
Second fuse normally used with phase to phase voltage supply (note 4)	2
Second fuse with an additional safety elettromecanichal relay to open in alarm conditions (note 4)	3

Note (1): Fuse & Fuse Holder are included as std up to 45A. Fixed Fuses for all other rating
Note (2): After 16th digit, write current and voltage of load inside brackets. Ex (190A-400V)
Note (3): Load voltage must be included in Selected Auxiliary Voltage Range
Note (4): This option is possible with unit up to 45A. Dimension equal REVO M-2PH of same rating.

Thyristor Unit connected with Transformers

REVO CL has been specifically designed to drive transformers and has all the drive capability & techniques required, configurable from the front panel display.

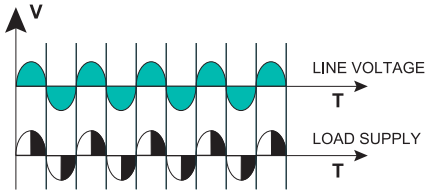
Close examination of the transformer application needs to be made as the typical inrush current, when switched on.
This over-current will have the result of fuse or thyristor failure.



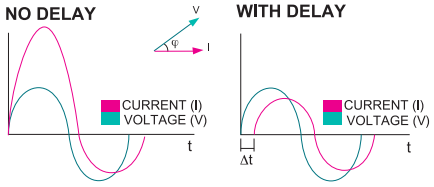
To avoid this peak current two techniques can be used:

- Phase angle firing with soft start and current limit. This type of firing can be used with all types of loads.

  - Normal resistance.
  - Cold resistance (Example: Kanthall Super elements)
  - Transformer coupled with normal or cold resistance.



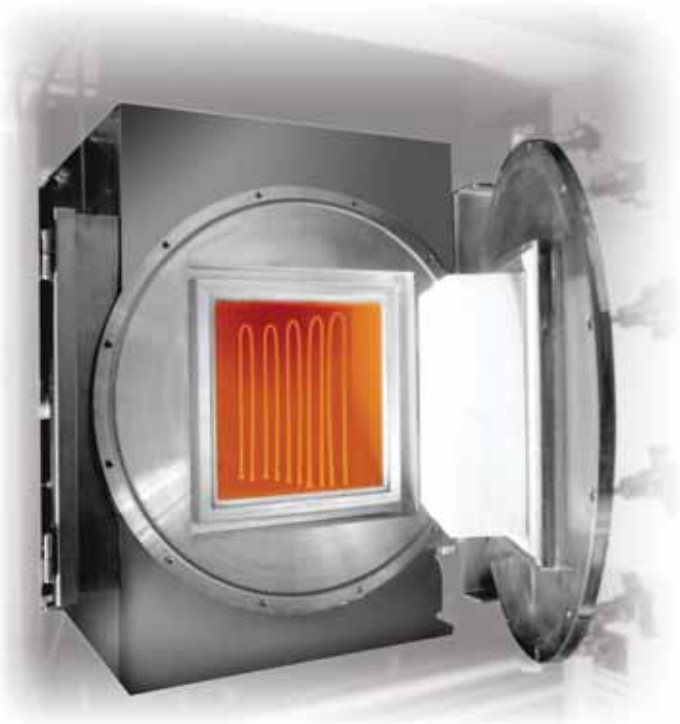
- Burst firing using the Delay Triggering (DT) technique. To avoid magnetic circuit saturation, the thyristor unit will switch OFF when the load voltage is negative and switch ON again when positive. The unit also has an adjustable delay on voltage zero crossing. In this way it is possible to switch ON when current is zero. This Firing technique can only be used with normal resistance, where its resistive value remains constant with temperature variations.



The BIG advantage with REVO CL

Buy one unit and you remove all application risks, selecting Phase Angle or Delayed Triggering as required via frontal Key Pad.

Resistivity of some typical cold resistance

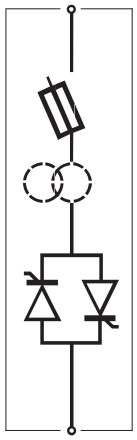


REVO SSR

SIZE SR0

REVO SSR ANALOG

SIZE SR1 FUSES & FUSE HOLDER



Specifications REVO SSR

- **Dimensions: SR0, SR1,** (See page 8)
- **Load type:** Normal resistive, infrared medium and long waveform
- **Inputs:** SSR
- **Firing mode:** Zero Crossing
- **Operating temperature:** See graph on right page
- **Comply with EMC and cUL**
- **Data sheet:** More details on “REVO SSR” Bulletin

Option

All options below are available with Fuse + Fuse Holder only
Current Transformer
Current Transformer+ HB (Heater Break)
Current Transformer+ HB (Heater Break) + flat wiring system

Specifications REVO ANALOG

- **Dimensions: SR0, SR1,** (See page 8)
- **Load type:** Normal resistive, infrared medium and long waveform
- **Inputs:** 0:10V; 4-20mA
- **Firing mode:** Zero Crossing
- **Operating temperature:** See graph on right page
- **Comply with EMC and cUL**
- **Data sheet:** More details on “REVO SSR ANALOG” Bulletin

Option

All below option are available with Fuse + Fuse Holder only
Current Transformer
Current Transformer+ HB (Heater Break)
Current Transformer+ HB (Heater Break) + flat wiring system

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
REVO SSR	S	S	R	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4,5,6 Current

Description code	Numeric code
62A	0 6 2
74A	0 7 4
90A	0 9 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6

8 Aux. Voltage supply

Description code	Numeric code
Without HB No Auxiliary Voltage Supply	0
With HB 12:24V ac-dc opt. Available only with Fuse+Fuse Holder	4

9 Input

Description code	Numeric code
SSR 3:30V dc	S

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z

11 Control Mode

Description code	Numeric code
Open Loop	0

12 Fuse & Option (2)

Description code	Numeric code
No Fuse	0
Fuse + Fuse Holder	F
Fuse + Fuse Holder +CT	Y
Fuse + Fuse Holder +CT +HB	H
Fuse + Fuse Holder +CT +HB +Flat Wiring System	X

13 Fan Voltage

Description code	Numeric code
No Fan	0

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market	L

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Version

Description code	Numeric code
Standard version	1

Note (1): Auxiliary voltage supply used only with HB option
Note (2): Options available only with Fuse + Fuse Holder

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
REVO ANALOG (3)	S	S	R	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4,5,6 Current

Description code	Numeric code
62A	0 6 2
74A	0 7 4
90A	0 9 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6

8 Aux. Voltage supply

Description code	Numeric code
12:24V ac-dc	4

9 Input

Description code	Numeric code
0:10V Analog Input	V
4:20 mA Analog Input	A

10 Firing

Description code	Numeric code
Burst Firing 4 Cycles On at 50% Power Demand	4
Burst Firing 8 Cycles On at 50% Power Demand	8
Burst Firing 16 Cycles On at 50% Power Demand	6

11 Control Mode

Description code	Numeric code
Open Loop	0

12 Fuse & Option

Description code	Numeric code
Fuse + Fuse Holder	F
Fuse + Fuse Holder +CT	Y
Fuse + Fuse Holder +CT +HB	H
Fuse + Fuse Holder +CT +HB +Flat Wiring System	X

13 Fan Voltage

Description code	Numeric code
No Fan	0

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market	L

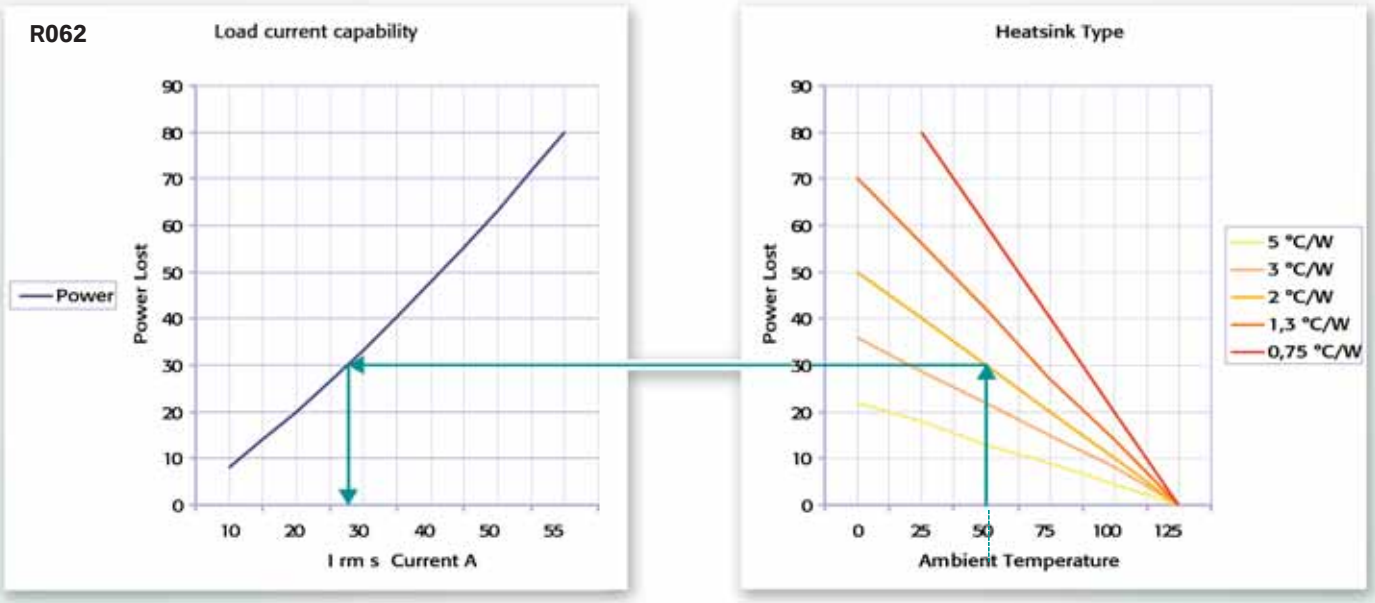
15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

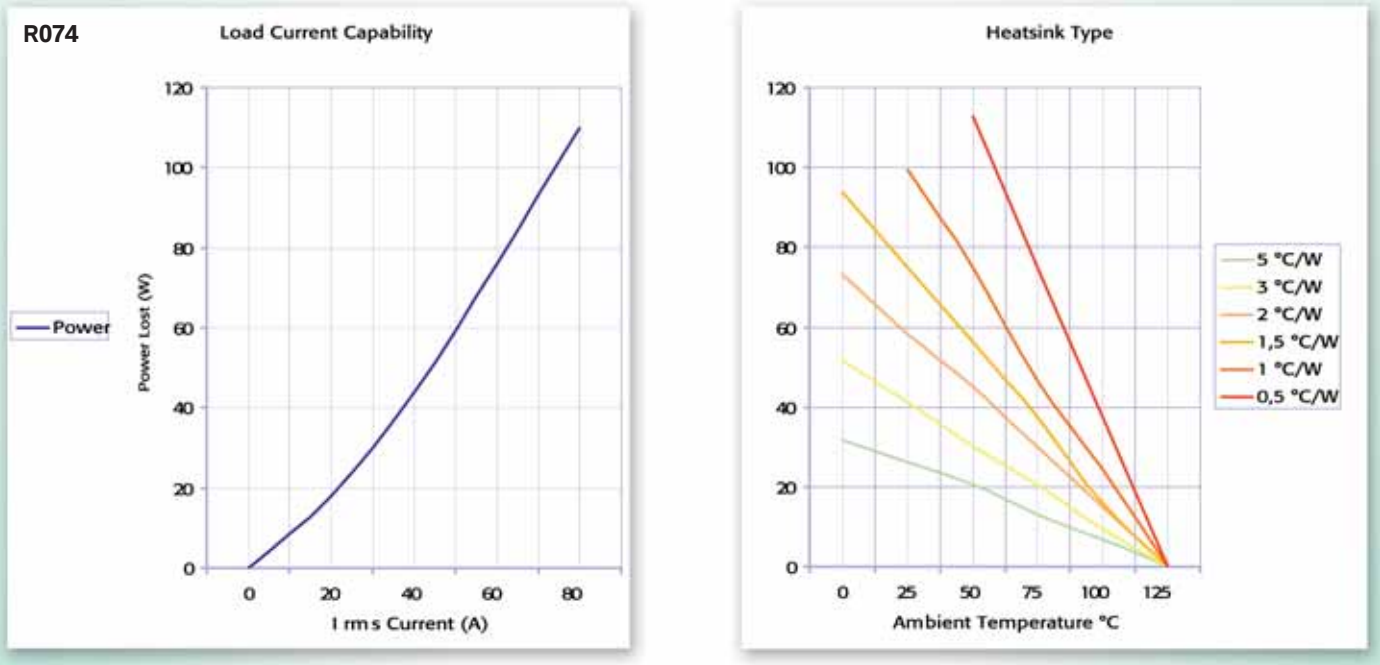
16 Version

Description code	Numeric code
Standard version	1

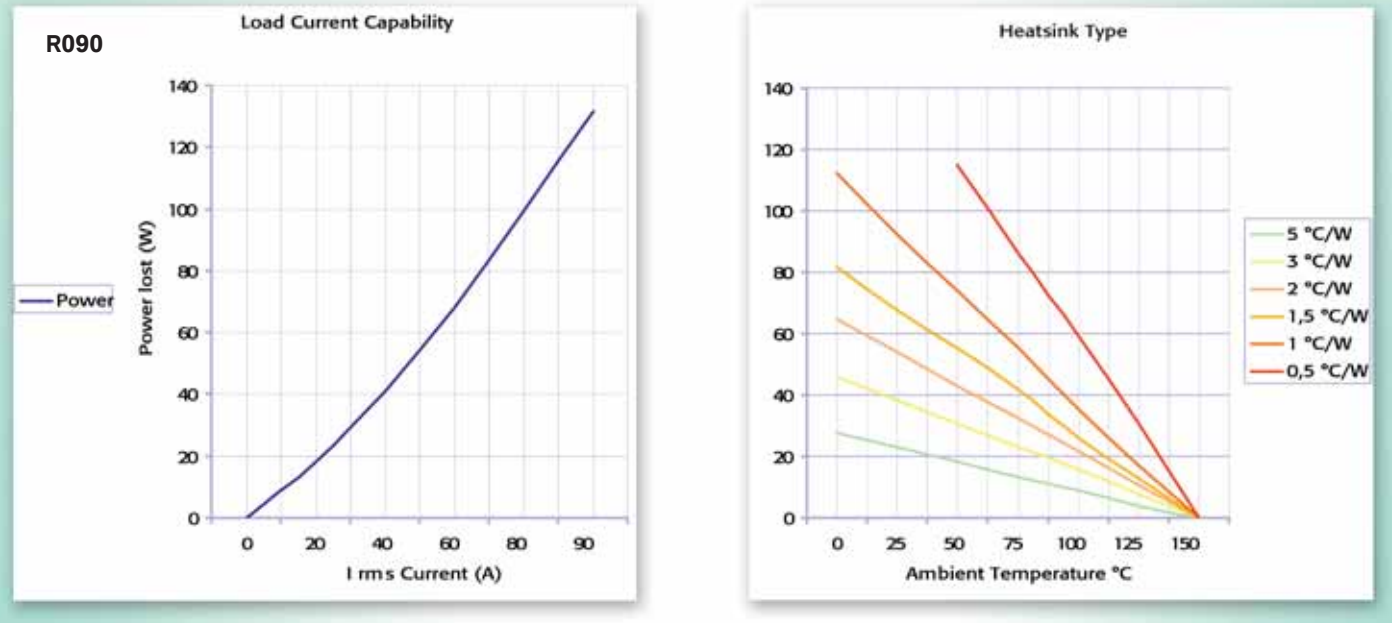
Note (3): All the REVO Analog version have Fuse + Fuse Holder



R062 MODULE Power Dissipation versus on state Current and ambient Temperature



R074 MODULE Power Dissipation versus on state Current and ambient Temperature

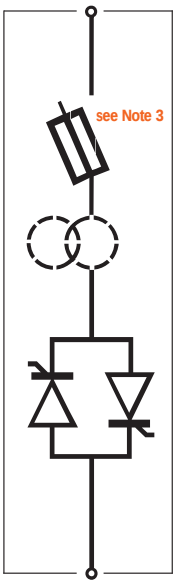


R090 MODULE Power Dissipation versus on state Current and ambient Temperature

REVO S - 1PH

SIZE SR6

SIZE S12



Specifications

- **Dimensions:** See size at page 6-7 and dimensions at page 8-9
- **Load type:** Normal resistive, infrared long and medium waveform
- **Inputs:** SSR Standard, 0:10V Analog, 4:20mA Analog, Analog + HB
- **Firing mode:** Zero Crossing, Burst Firing
- **Operating temperature:** 0 to 40° C without derating
- **Comply with EMC and cUL**
- **Data sheet:** More details on “REVOS-1PH” Bulletin

Option

No Fuse : without Fuses up to 40A

CT : with current transformer

HB + CT : with current transformer plus HB Alarm

HB + CT : + Flat wiring system

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
REVOS 1PH	R	S	1	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4, 5, 6 Current

Description code	Numeric code
30A	0 3 0
35A	0 3 5
40A	0 4 0
60A	0 6 0
90A	0 9 0
120A	1 2 0
150A	1 5 0
180A	1 8 0
210A	2 1 0
280A	2 8 0
400A	4 0 0
500A	5 0 0
600A	6 0 0
700A	7 0 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6

8 Aux. Voltage supply

Description code	Numeric code
No Aux. Voltage without HB and/or Analog Input up to 210A included	0
With HB and/or Analog Input 12:24V ac-dc	4
90:130V (5) > 210A	1
170:265V (5) > 210A	2
300:530V (5) > 210A	5

9 Input

Description code	Numeric code
SSR	S
0:10V dc	V
4:20mA	A

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z
Burst Firing 4 Cycles On at 50% Power Demand	4 (4)
Burst Firing 8 Cycles On at 50% Power Demand	8 (4)
Burst Firing 16 Cycles On at 50% Power Demand	6 (4)

11 Control Mode

Description code	Numeric code
Open Loop	0

12 Fuse & Option

Description code	Numeric code
No Fuse up to 40A	0
Fuse + Fuse Holder (1)(3)	F
Fuse + Fuse Holder +CT (1)(3)	Y
Fuse + Fuse Holder +CT +HB (1)(3)	H
Fuse + Fuse Holder +CT +HB +Flat Wiring System up to 40A	X

13 Fan Voltage

Description code	Numeric code
No Fan < 120A	0
Fan 110V > 90A	1
Fan 220V > 90A Std Version	2

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market	L

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Version

Description code	Numeric code
Std with or without fuse + Fuse Holder for RS1 ≤40A	1
Second Fuse (1)	2
Second Fuse with additional Safety Relay to open in alarm in conditons (2)	3

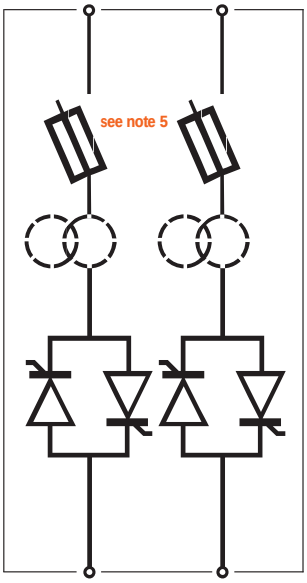
LEGEND
IFH = Integrated Fuse + Fuse Holder
IF = Internal Fixed Fuse
CT = Current Transformer
HB = Heater Break Alarm

Note (1): If you need one REVOS-1PH with 2 Fuse&Fuse Holder
For dimensions see REVOS-2PH. This solution can be used up to 40A max
Note (2): If you need one REVOS-1PH with 2 Fuse&Fuse Holder + safety relay
For dimensions see REVOS-2PH. This solution can be used up to 40A max
Note (3): Fixed Fuses over 40A
Note (4): Available only with Analog input
Note (5): Load voltage must be included in Selected Auxiliary Voltage Range for units 210A

REVO S - 2PH

SIZE SR7

SIZE S14



Specifications

- **Dimensions:** See size at page 6-7 and dimensions at page 8-9
- **Load type:** Normal resistive, infrared long and medium waveform
- **Inputs:** SSR Standard, 0:10V Analog, 4:20mA Analog
- **Firing mode:** Zero Crossing, Burst Firing
- **Operating temperature:** 0 to 40° C without derating
- **Comply with EMC and cUL**
- **Data sheet:** More details on “REVOS-2PH” Bulletin

Option

No Fuse : without Fuses

CT : with current transformer

HB + CT : with current transformer plus HB Alarm

HB + CT : + Flat wiring system

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
REVO S - 2PH	R	S	2	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4,5,6 Current

Description code	Numeric code
30A	0 3 0
35A	0 3 5
40A	0 4 0
60A	0 6 0
90A	0 9 0
120A	1 2 0
150A	1 5 0
180A	1 8 0
210A	2 1 0
280A	2 8 0
400A	4 0 0
450A	4 5 0
500A	5 0 0
600A	6 0 0
700A	7 0 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6

8 Aux. Voltage supply

Description code	Numeric code
No Aux. Voltage without HB and/or Analog Input up to 210A included	0
With HB and/or Analog Input 12:24V ac-dc	4
90:130V (4)	1
170:265V (4)	2
300:530V (4)	5

9 Input

Description code	Numeric code
SSR	S
0:10V	V
4:20mA	A

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z
Burst Firing 4 Cycles On at 50% Power Demand	4 (2)
Burst Firing 8 Cycles On at 50% Power Demand	8 (2)
Burst Firing 16 Cycles On at 50% Power Demand	6 (2)

11 Control Mode

Description code	Numeric code
Open Loop	0

12 Fuse & Option

Description code	Numeric code
No Fuse	0
Fuse + Fuse Holder (1)(3)	F
Fuse + Fuse Holder +CT (1)(3)	Y
Fuse + Fuse Holder +CT +HB (1)(3)	H
Fuse + Fuse Holder +CT +HB (3) +Flat Wiring System	X

13 Fan Voltage

Description code	Numeric code
No Fan < 120A	0
Fan 110V > 90A	1
Fan 220V > 90A Std Version	2

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market	L

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Version

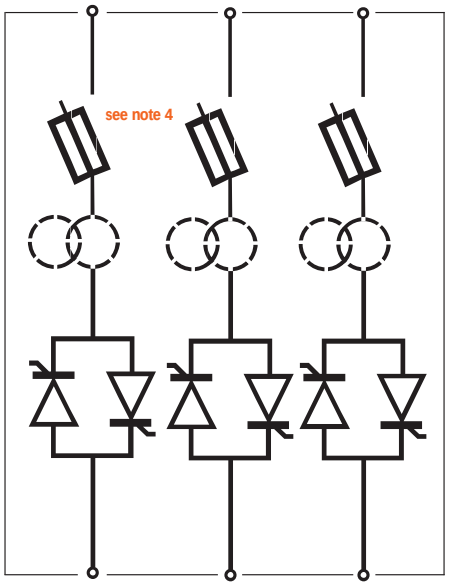
Description code	Numeric code
Std Version with two Fuses + Fuses Holder	1
Third fuse on units ≤40A (1)	2

LEGEND

IFH = Integrated Fuse + Fuse Holder
IF = Internal Fixed Fuse
CT = Current Transformer
HB = Heater Break Alarm

Note (1): If you need one REVO S - 2PH with 3 Fuse & Fuse Holder
For dimensions see REVO S - 3PH. This solution can be used up to 40A max
Note (2): Available with Analog input only
Note (3): Available up to 40A only
Note (4): Load voltage must be included in Selected Auxiliary Voltage Range for unit > 210A
Note (5): Fixed Fuses over 40A

REVO S - 3PH



Specifications

- **Dimensions:** See size at page 6-7 and dimensions at page 8-9
- **Load type:** Normal resistive, infrared long and medium waveform
- **Inputs:** SSR Standard, 0:10V Analog, 4:20mA Analog
- **Firing mode:** Zero Crossing, Burst Firing
- **Operating temperature:** 0 to 40° C without derating
- **Comply with EMC and cUL**
- **Data sheet:** More details on “REVOS-3PH” Bulletin

Option

No Fuse : without Fuses

CT : with Current Transformer

HB + CT : Current Transformer + HB alarm

HB + CT : Current Transformer + HB alarm + Flat wiring System

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
REVO S - 3PH	R	S	3	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4, 5, 6 Current

Description code	Numeric code
30A	0 3 0
35A	0 3 5
40A	0 4 0
60A	0 6 0
90A	0 9 0
120A	1 2 0
150A	1 5 0
180A	1 8 0
210A	2 1 0
225A	2 2 5
300A	3 0 0
350A	3 5 0
400A	4 0 0
450A	4 5 0
500A	5 0 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6

8 Aux. Voltage supply

Description code	Numeric code
No Aux. Voltage without HB and/or Analog Input up to 210A included	0
With HB and/or Analog Input 12:24V ac-dc	4
90:130V (5)	1
170:265V (5)	2
300:530V (5)	5

9 Input

Description code	Numeric code
SSR	S
0:10V dc	V
4:20mA	A

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z
Burst Firing 4 Cycles On at 50% Power Demand	4 (2)
Burst Firing 8 Cycles On at 50% Power Demand	8 (2)
Burst Firing 16 Cycles On at 50% Power Demand	6 (2)

11 Control Mode

Description code	Numeric code
Open Loop	0

12 Fuse & Option

Description code	Numeric code
No Fuse	0
Fuse + Fuse Holder (1)	F
Fuse + Fuse Holder +CT (1)	Y
Fuse + Fuse Holder +CT +HB (1)	H
Fuse + Fuse Holder +CT +HB (3) (1) +Flat Wiring System	X

13 Fan Voltage

Description code	Numeric code
No Fan < 120A	0
Fan 110V > 90A	1
Fan 220V > 90A Std Version	2

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market	L

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Version

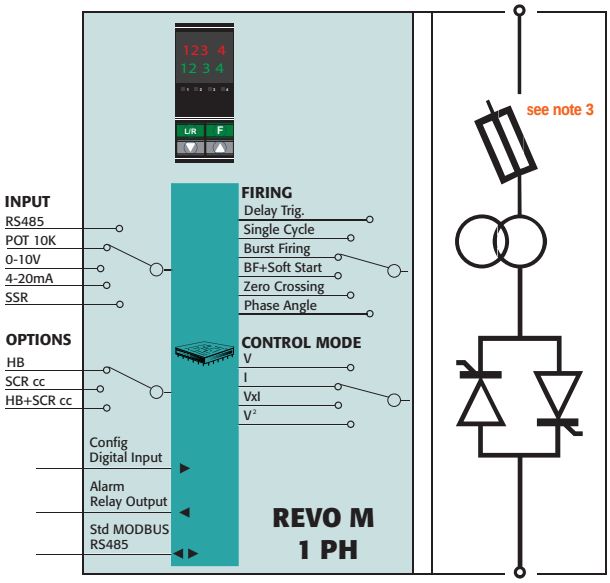
Description code	Numeric code
Std. Version	1

LEGEND

IFH = Integrated Fuse + Fuse Holder
IF = Internal Fixed Fuse
CT = Current Transformer
HB = Heater Break Alarm

Note (1): Fixed Fuses over 40A
Note (2): Available with Analog input only
Note (3): Available up to 40A only Flat wiring
Note (4): Fixed fuses over 40A
Note (5): Load voltage must be included in Selected Auxiliary Voltage Range for units > 210A

REVO M - 1PH



Specifications

- **Dimensions:** See size at page 6-7 and dimensions at page 8-9
- **Load type:** Normal resistive, infrared short long and medium waveform, Silicon Carbide
- **Inputs:** 0:10V dc, 4:20mA, 10kpot, SSR
- **Firing mode:** Zero Crossing, Burst Firing, Single Cicle, Soft Start + Phase Angle, Delayed Triggering
- **Operating temperature:** 0 to 40° C without derating
- **Control mode:** V Voltage, VxI Power, I and V^2
- **RS485 port. Modbus**
- **Comply with EMC and cUL**
- **Data sheet:** More details on “REVO M - 1PH” bulletin

Option

HB + CT : with current transformer plus HB Alarm

Note 5

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
REVO M 1PH	R	M	1	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4, 5, 6 Current

Description code	Numeric code
35A	0 3 5
40A	0 4 0
45A	0 4 5
60A	0 6 0
90A	0 9 0
120A	1 2 0
150A	1 5 0
180A	1 8 0
210A	2 1 0
280A	2 8 0
400A	4 0 0
500A	5 0 0
600A	6 0 0
700A	7 0 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6
690V (4)	7

8 Aux. Voltage supply (6)

Description code	Numeric code
90:130V	1
170:265V	2
230:345V	3
300:530V	5
510:690V	6
600:760V	7

9 Input

Description code	Numeric code
SSR	S
0:10V dc	V
4:20mA	A
10KPot	K
RS485	R

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z
Single Cycle SC	C
Burst Firing BF	B
Soft Start + Burst Firing S+BF	J
Delayed Triggering + Burst Firing DT+BF	D
Phase Angle PA	P
Soft Start + Phase Angle S+PA	E

11 Control Mode

Description code	Numeric code
Open Loop	0
Voltage Feed Back V	U
Power Feed Back VxI	W

12 Fuse & Option

Description code	Numeric code
Fuse + Fuse Holder + CT (3)	Y
Fuse + Fuse Holder +CT +HB (3)	H

13 Fan Voltage

Description code	Numeric code
No Fan < 120A	0
Fan 110V > 90A	1
Fan 220V > 90A Std Version	2

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market	L

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

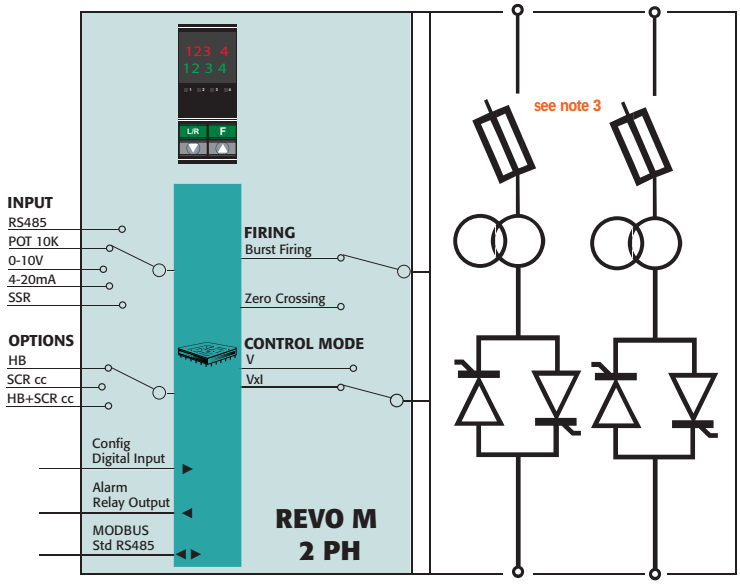
16 Version

Description code	Numeric code
Std version with one fuse+ Fuse Holder ≤45A	1
Second fuse used with Phase to Phase voltage Supply for unit ≤45A (1)	2
Second fuse + additional safety relay (2)	3

LEGEND
IFH = Integrated Fuse + Fuse Holder
IF = Internal Fixed Fuse
CT = Current Transformer
HB = Heater Break Alarm

Note (1): If you need one REVO M 1PH with 2 Fuse & Fuse Holder
For dimensions see REVO M 2PH. This solution can be used up to 45A max
Note (2): If you need one REVO M 1PH with 2 Fuse & Fuse Holder + safety relay
For dimensions see REVO M 2PH. This solution can be used up to 45A max
Note (3): Fixed Fuse over 45
Note (4): Available on units ≥ 400A
Note (5): After 16th digit write current and voltage of load inside brackets Ex. (190A-400V)
Note (6): Load voltage must be included in Selected Auxiliary Voltage Range

REVO M - 2PH



Specifications

- **Dimensions:** See size at page 6-7 and dimensions at page 8-9
- **Load type:** Normal resistive, infrared long and medium waveform, Silicon Carbide
- **Inputs:** 0-10V dc, 4-20mA, 10kpot, SSR
- **Firing mode:** Zero Crossing, Burst Firing
- **Operating temperature:** 0 to 40° C without derating
- **Control mode:** V Voltage, VxI Power
- **RS485 port. Modbus**
- **Comply with EMC and cUL**
- **Data sheet:** More details on “REVO M - 2PH” bulletin

Option

HB + CT : with current transformer plus HB Alarm

Note 4

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
REVO M - 2PH	R	M	2	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4,5,6 Current

Description code	Numeric code
30A	0 3 0
35A	0 3 5
40A	0 4 0
60A	0 6 0
90A	0 9 0
120A	1 2 0
150A	1 5 0
180A	1 8 0
210A	2 1 0
280A	2 8 0
400A	4 0 0
450A	4 5 0
500A	5 0 0
600A	6 0 0
700A	7 0 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6
690V Available on units ≥ 400A (2)	7

8 Aux. Voltage supply (5)

Description code	Numeric code
90:130V	1
170:265V	2
230:345V	3
300:530V	5
510:690V	6
600:760V	7

9 Input

Description code	Numeric code
SSR	S
0:10V dc	V
4:20mA	A
10KPot	K
RS485	R

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z
Burst Firing BF	B

11 Control Mode

Description code	Numeric code
Open Loop	0
Voltage Feed Back V	U
Power Feed Back VxI	W

12 Fuse & Option

Description code	Numeric code
Fuse + Fuse Holder + CT (3)	Y
Fuse + Fuse Holder +CT +HB (3)	H

13 Fan Voltage

Description code	Numeric code
No Fan < 120A	0
Fan 110V > 90A	1
Fan 220V > 90A Std Version	2

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market	L

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

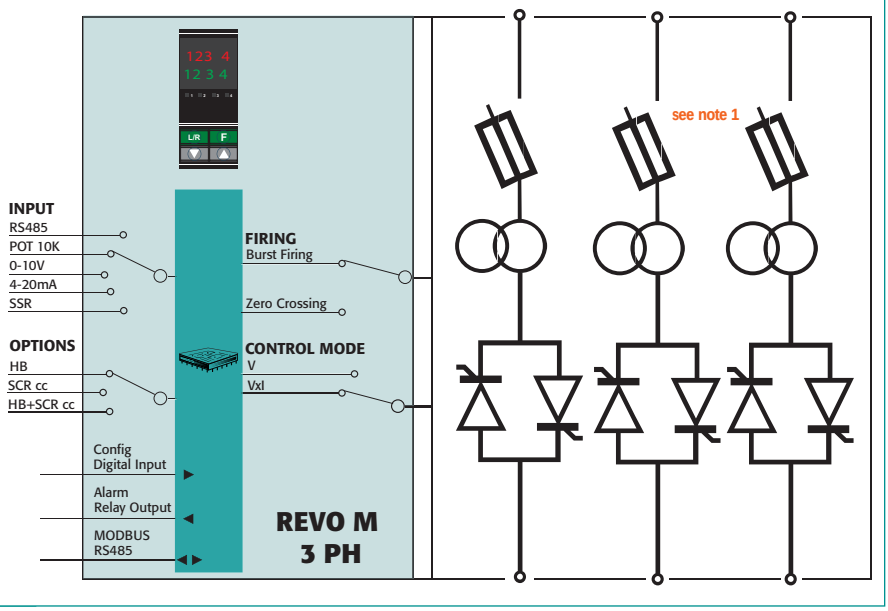
16 Version

Description code	Numeric code
Std. version with two Fuse & Fuse Holder ≤40A	1
Third Fuse (1)	2

LEGEND
IF = Internal Fixed Fuse
CT = Current Transformer

Note (1): If you need one REVO M 2PH with 3 Fuse & Fuse Holder
For dimensions see REVO M - 3PH. This solution can be used up to 40A max
Note (2): Available on units ≥ 400A
Note (3): Fixed Fuses over 40A
Note (4): After 16th digit write current and voltage of load inside brackets Ex. (190A-400V)
Note (5): Load voltage must be included in Selected Auxiliary Voltage Range

REVO M - 3PH



Specifications

- **Dimensions:** See size at page 6-7 and dimensions at page 8-9
- **Load type:** Normal resistive, infrared long and medium waveform, Silicon Carbide
- **Inputs:** 0-10V dc, 4-20mA, 10kpot, SSR
- **Firing mode:** Zero Crossing, Burst Firing
- **Operating temperature:** 0 to 40° C without derating
- **Control mode:** V Voltage, VxI Power
- **RS485 port. Modbus**
- **Comply with EMC and cUL**
- **Data sheet:** More details on “REVO M - 3PH” bulletin

Option

HB + CT : with current transformer plus HB Alarm

Note 2

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
REVO M - 3 PH	R	M	3	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4,5,6 Current

Description code	Numeric code
30A	0 3 0
35A	0 3 5
40A	0 4 0
60A	0 6 0
90A	0 9 0
120A	1 2 0
150A	1 5 0
180A	1 8 0
210A	2 1 0
225A	2 2 5
300A	3 0 0
350A	3 5 0
400A	4 0 0
450A	4 5 0
500A	5 0 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6
690V Available on units ≥ 225A	7

8 Aux. Voltage supply (3)

Description code	Numeric code
90:130V	1
170:265V	2
230:345V	3
300:530V	5
510:690V	6
600:760V	7

9 Input

Description code	Numeric code
SSR	S
0:10V dc	V
4:20mA	A
10KPot	K
RS485	R

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z
Burst Firing BF	B

11 Control Mode

Description code	Numeric code
Open Loop	0
Voltage Feed Back V	U
Power Feed Back VxI	W

12 Fuse & Option

Description code	Numeric code
Fuse + Fuse Holder + CT (1)	Y
Fuse + Fuse Holder +CT +HB (1)	H

13 Fan Voltage

Description code	Numeric code
No Fan < 120A	0
Fan 110V > 90A	1
Fan 220V > 90A Std Version	2

14 Approvals

Description code	Numeric code
CE EMC For European Market	E
cUL For American Market	L

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

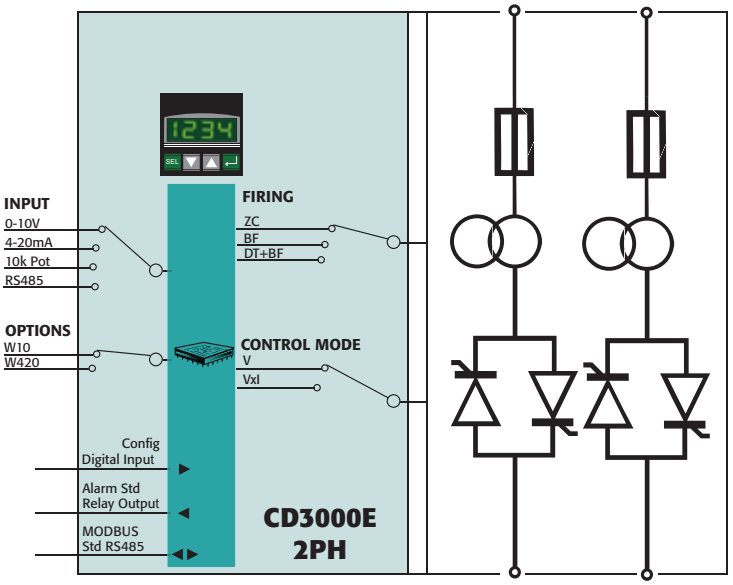
16 Version

Description code	Numeric code
Version Std with 3 fuses	1

LEGEND
IF = Internal Fixed Fuse
CT = Current Transformer
HB = Heater Break Alarm

Note (1): Fixed Fuses over 40A.
Note (2): After 16th digit write current and voltage of load inside brackets Ex. (190A-400V).
Note (3): Load voltage must be included in Selected Auxiliary Voltage Range

CD 3000E - 2PH



Specifications

- **Dimensions:** See size at page 6-7 and dimensions at page 8-9
- **Load type:** Normal resistance, three phase transformer, coupled with normal resistance
- **Inputs:** 0-10V dc, 4-20mA, 10k Pot, SR485
- **Firing mode:** Zero Crossing, Burst Firing, DT+BF (not with cold resistance)
- **Operating temperature:** 0° to 40°C without derating
- **Control mode:** V Voltage, VxI Power, Open Loop
- **RS485 port. Modbus**
- **Comply with EMC and cUL**
- **Data sheet:** More details on "CD3000E - 2PH" bulletin

Option

None
No Heater Break Alarm (HB STD)

W10 (0:10V Power Retransmission)
W420 (4:20mA Power Retransmission)

Note 2

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
CD3000E - 2PH	R	E	2	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4,5,6 Current

Description code	Numeric code
25A	0 2 5
35A	0 3 5
45A	0 4 5
75A	0 7 5
100A	1 0 0
125A	1 2 5
150A	1 5 0
200A	2 0 0
280A	2 8 0
400A	4 0 0
450A	4 5 0
500A	5 0 0
600A	6 0 0
700A	7 0 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6

8 Aux. Voltage supply

Description code	Numeric code
110V	1
230V	2

9 Input

Description code	Numeric code
0:10V	V
4:20mA	A
10KPot	K
RS485	R

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z
Burst Firing BF	B
Delayed Triggering (1) + Burst Firing DT+BF	D

11 Control Mode

Description code	Numeric code
Open Loop	0
Voltage Feed Back V	U
Power Feed Back VxI	W

12 Option

Description code	Numeric code
Control Mode Retransmission 4:20mA	A
Control Mode Retransmission 0:10V	V

13 Fan Voltage

Description code	Numeric code
Fan Voltage equal to Aux. Voltage	3

LEGEND
IF = Internal Fixed Fuse
CT = Current Transformer
HB = Heater Break Alarm

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market	L

15 Manual

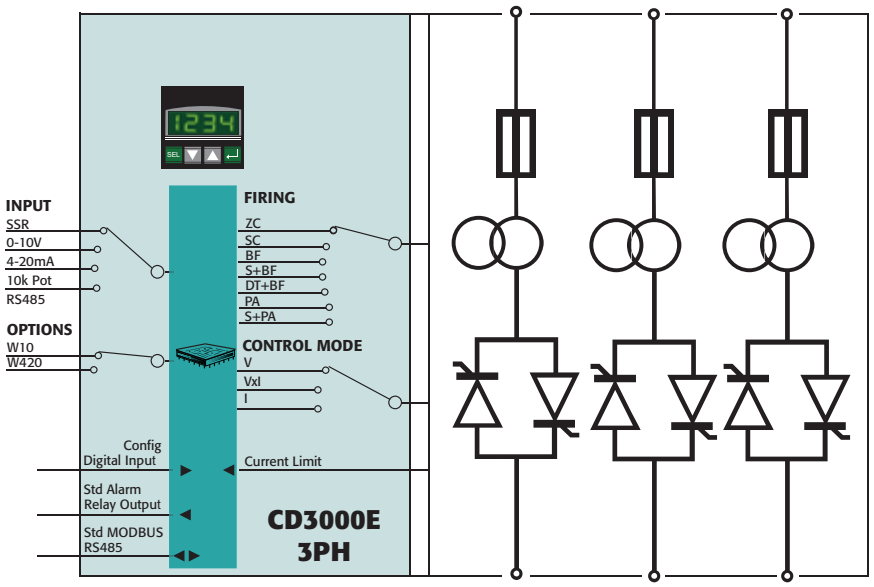
Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Load type/Connection

Description code	Numeric code
Resistive Load/ Delta Connection	1
Resistive Load/ Star Connection	2
Transformer Load/ Delta Connection	3
Transformer Load/ Star Connection	4

Note (1): DT + BF can be used to drive transformers coupled with normal resistance
Note (2): After 16th digit write current and voltage of load inside brackets Ex. (190A-400V). Required if units are to be tuned to load.

CD 3000E 3PH



Specifications

- **Dimensions:** See size at page 6-7 and dimensions at page 8-9
- **Load type:** Normal resistance, three phase transformer coupled with normal or cold resistance.
- **Inputs:** None, SSR, 0-10V, 4-20mA, 10kpot, RS485 communication
- **Firing mode:** Zero Crossing, Single Cycle, Burst Firing, Soft Start + Burst Firing, Delayed Triggering + Burst Firing, Phase Angle, Soft Start + Phase Angle
- **Operating temperature:** 0° to 40°C without derating
- **Control mode:** V, VxI, I
- **RS485 port. Modbus**
- **Comply with EMC and cUL**
- **Data sheet:** More details on “CD3000E - 3PH” bulletin

Option

None
No Heater Break Alarm (HB STD)

W10 (0:10V Power Retransmission)
W420 (4:20mA Power Retransmission)

Note 1

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
CD3000E 3PH	R	E	3	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4, 5, 6 Current

Description code	Numeric code
25A	0 2 5
35A	0 3 5
45A	0 4 5
75A	0 7 5
100A	1 0 0
125A	1 2 5
150A	1 5 0
225A	2 2 5
300A	3 0 0
350A	3 5 0
400A	4 0 0
450A	4 5 0
500A	5 0 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6

8 Aux. Voltage supply

Description code	Numeric code
110V	1
230V	2

9 Input

Description code	Numeric code
0:10V	V
4:20mA	A
10KPot	K
RS485	R

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z
Single Cycle SC	C
Burst Firing BF	B
Soft Start + Burst Firing S+BF	J
Delayed Triggering + Burst Firing DT+BF	D
Phase Angle PA	P
Soft Start + Phase Angle S+PA	E

11 Control Mode

Description code	Numeric code
Open Loop	0
Voltage Feed Back V	U
Power Feed Back VxI	W
Current Feed Back I	I

12 Option

Description code	Numeric code
Control Mode Retransmission 4:20mA	A
Control Mode Retransmission 0:10V	V

13 Fan Voltage

Description code	Numeric code
Fan Voltage equal to Aux. Voltage	3

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market	L

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

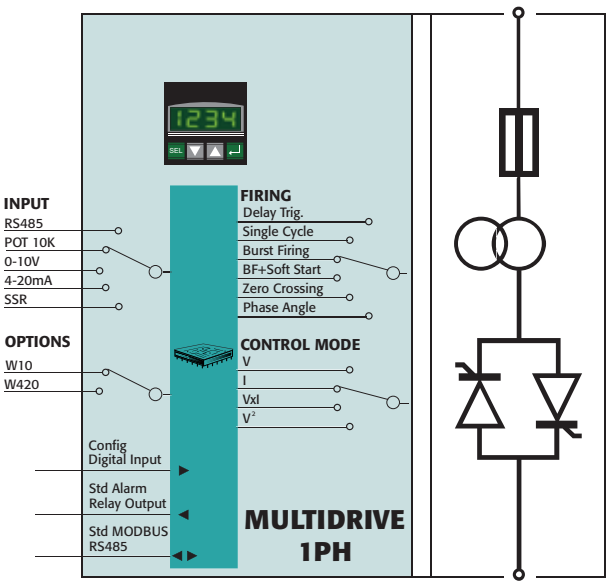
16 Load type/Connection

Description code	Numeric code
Resistive Load/ Delta Connection	1
Resistive Load/ Star Connection	2
Resistive Load/ Star Connection + Neutral	7
Transformer Load/ Delta Connection	3
Transformer Load/ Star Connection	4
Transformer Load/Star Connection + Neutral	5
Resistive Load/ Open delta	6

LEGEND
IF = Internal Fixed Fuse
CT = Current Transformer
HB = Heater Break Alarm

Note (1): After 16th digit write current and voltage of load inside brackets Ex. (190A-400V). Required if units are to be tuned to load.

MULTIDRIVE 1PH



Specifications

- **Dimensions:** See size at page 6-7 and dimensions at page 8-9
- **Load type:** Normal resistance, one phase transformer coupled with normal or cold resistance.
- **Inputs:** 0-10V, 4-20mA, 10kpot, RS485 communication
- **Firing mode:** Burst Firing, Soft Start + Burst Firing, Delayed Triggering + Burst Firing, Phase Angle, Soft Start + Phase Angle
- **Operating temperature:** 0° to 40°C without derating
- **Control mode:** Voltage, Power, External signal
- **RS485 port. Modbus**
- **Comply with EMC and cUL**
- **Data sheet:** More details on “Multidrive 1 PH” bulletin

Option

None	W10 (0:10V Power Retransmission)
No Heater Break Alarm (HB STD)	W420 (4:20mA Power Retransmission)

Note 1

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
MULTIDRIVE 1PH	M	1	_	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4, 5, 6 Current

Description code	Numeric code
850A	0 8 5 0
1000A (2)	1 0 0 0
1400A	1 4 0 0
1500A (2)	1 5 0 0
1850A	1 8 5 0
2000A (2)	2 0 0 0
2400A	2 4 0 0
2700A (2)	2 7 0 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6
690V	7

8 Aux. Voltage supply

Description code	Numeric code
110V	1
230V	2

9 Input

Description code	Numeric code
0:10V	V
4:20mA	A
10KPot	K
RS485	R

10 Firing

Description code	Numeric code
Burst Firing BF	B
Soft Start + Burst Firing S+BF	J
Delayed Triggering + Burst Firing DT+BF	D
Phase Angle PA	P
Soft Start + Phase Angle S+PA	E

11 Control Mode

Description code	Numeric code
Open Loop	0
Voltage Feed Back V	U
Power Feed Back Vxl	W
Current Feed Back I	I
External Feed Back	E

12 Option

Description code	Numeric code
4:20mA Retransmission Load Voltage, Load Current and Load Power (3)	A
0:10V Retransmission Load Voltage, Load Current and Load Power (3)	V

13 Fan Voltage

Description code	Numeric code
Fan Voltage equal to Aux. Voltage	3

14 Approvals

Description code	Numeric code
CE EMC For European Market	E

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Load type/Connection

Description code	Numeric code
Resistive Load	8
Transformer Load	9

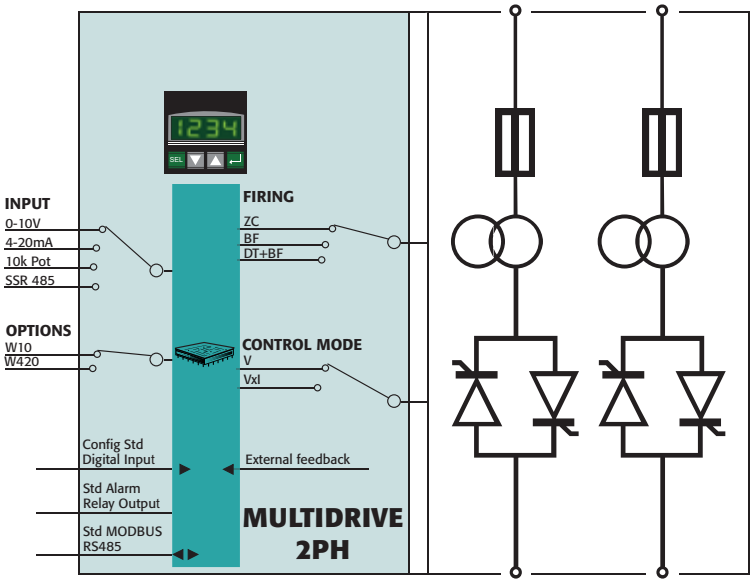
LEGEND
IF = Internal Fixed Fuse
CT = Current Transformer
HB = Heater Break Alarm

Note (1): After 16th digit write current and voltage of load inside brackets Ex. (190A-400V). this is to receive the Thyristor unit already tuned from CD Automation

Note (2): Rating not available at 690V

Note (3): In total are available 4 Analog Output.
One dedicated to Control Mode and the other 3 dedicated to Current, Voltage etc.

MULTIDRIVE 2PH



Specifications

- **Dimensions:** See size at page 6-7 and dimensions at page 8-9
- **Load type:** Normal resistance, three phase transformer coupled with normal resistance.
- **Inputs:** 0-10V, 4-20mA, 10kpot, RS485 communication
- **Firing mode:** Zero Crossing, Burst Firing, Delayed Triggering + Burst Firing (not with cold resistance)
- **Operating temperature:** 0° to 40°C without derating
- **Control mode:** V Voltage, VxI Power and open loop
- **RS485 port. Modbus**
- **Comply with EMC and cUL**
- **Data sheet:** More details on “Multidrive 2 PH” bulletin

Option

None	W10 (0:10V Power Retransmission)
No Heater Break Alarm (HB STD)	W420 (4:20mA Power Retransmission)

Note 1

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
MULTIDRIVE 2PH	M	2	_	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4, 5, 6 Current

Description code	Numeric code
45A	0 0 4 5
75A	0 0 7 5
100A	0 1 0 0
125A	0 1 2 5
150A	0 1 5 0
225A	0 2 2 5
275A	0 2 7 5
400A	0 4 0 0
450A	0 4 5 0
500A	0 5 0 0
600A	0 6 0 0
850A	0 8 5 0
1000A (2)	1 0 0 0
1400A	1 4 0 0
1500A (2)	1 5 0 0
1850A	1 8 5 0
2000A (2)	2 0 0 0
2400A	2 4 0 0
2700A (2)	2 7 00

7 Max Voltage

Description code	Numeric code
480V	4
600V	6
690V	7

8 Aux. Voltage supply

Description code	Numeric code
110V	1
230V	2

9 Input

Description code	Numeric code
0:10V	V
4:20mA	A
10KPot	K
RS485	R

10 Firing

Description code	Numeric code
Burst Firing BF	B
Delayed Triggering + Burst Firing DT+BF	D

11 Control Mode

Description code	Numeric code
Open Loop	0
Voltage Feed Back V	U
Power Feed Back VxI	W

12 Option (3)

Description code	Numeric code
4:20mA Retransmission Load Current and Control Mode	A
0:10V Retransmission Load Current and Control Mode	V

13 Fan Voltage

Description code	Numeric code
Fan Voltage equal to Aux. Voltage	3

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market up to 700A (4)	L

15 Manual

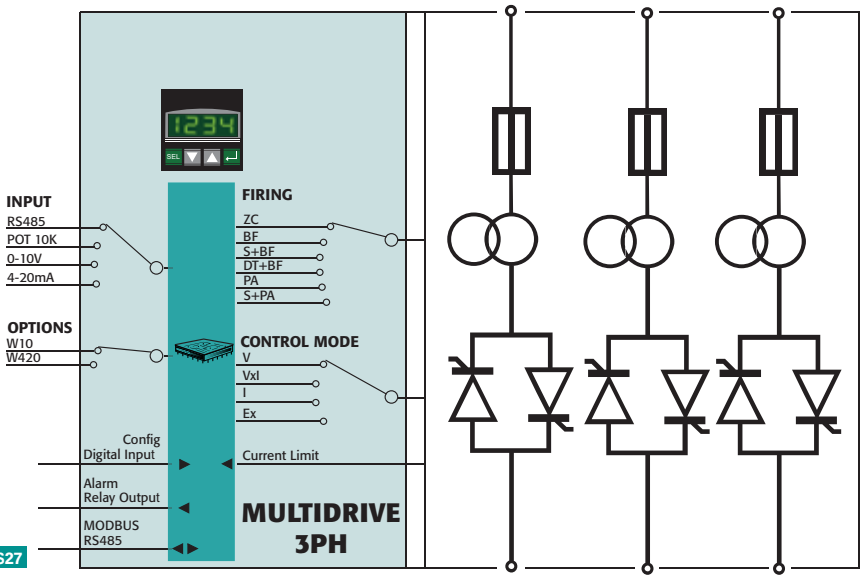
Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Load type/Connection

Description code	Numeric code
Resistive Load/ Delta Connection	1
Resistive Load/ Star Connection	2
Transformer Load/ Delta Connection	3
Transformer Load/ Star Connection	4

Note (1): After 16th digit write current and voltage of load inside brackets Ex. (190A-400V). this is to receive the Thyristor unit already tuned from CD Automation
Note (2): Rating not available at 690V
Note (3): In total are available 4 Analog output. One dedicated to control mode and the other 3 for current on phases 1-2-3
Note (4): cUL Approval up to 600A included

MULTIDRIVE 3PH



Specifications

- **Dimensions:** See size at page 6-7 and dimensions at page 8-9
- **Load type:** Normal resistance, Three phase transformer coupled with normal or cold resistance
- **Inputs:** 0-10V, 4-20mA, 10kpot, RS485 communication
- **Firing mode:** Zero Crossing, Burst Firing, Soft Start + Burst Firing, Phase Angle, Soft Start + Phase Angle and Delayed Triggering
- **Operating temperature:** 0° to 40°C without derating
- **Control mode:** Voltage, Power, Current, External Profiling 0:10V, Open Loop
- **RS485 port. Modbus**
- **Comply with EMC and cUL**
- **Data sheet:** More details on “Multidrive 3 PH” bulletin

Option

None
110V Fan option available ≥75A
No Heater Break Alarm (HB STD)

W10 (0:10V Power Retransmission)
W420 (4:20mA Power Retransmission

Note 1

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
MULTIDRIVE 3PH	M	3	_	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4, 5, 6 Current

Description code	Numeric code
35A	0035
45A	0045
75A	0075
100A	0100
125A	0125
150A	0150
225A	0225
300A	0300
350A	0350
400A	0400
450A	0450
500A	0500
600A	0600
850A	0850
1000A (2)	1000
1400A	1400
1500A (2)	1500
1850A	1850
2000A (2)	2000
2400A	2400
2700A (2)	2700

7 Max Voltage

Description code	Numeric code
480V	4
600V	6
690V	7

8 Aux. Voltage supply

Description code	Numeric code
110V	1
230V	2

9 Input

Description code	Numeric code
0:10V dc	V
4:20mA	A
10KPot	K
RS485	R

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z
Single Cycle SC	C
Burst Firing BF	B
Soft Start + Burst Firing S+BF	J
Delayed Triggering + Burst Firing DT+BF	D
Phase Angle PA	P
Soft Start + Phase Angle S+PA	E

11 Control Mode

Description code	Numeric code
Open Loop	0
Voltage Feed Back V	U
Power Feed Back VxI	W
Current Feed Back I	I
External Feed Back	E

12 Option (3)

Description code	Numeric code
4:20mA Retransmission Load Current and Control Mode	A
0:10V Retransmission Load Current and Control Mode	V

13 Fan Voltage

Description code	Numeric code
Fan Voltage equal to Aux. Voltage	3

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market up to 500A	L (4)

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Load type/Connection

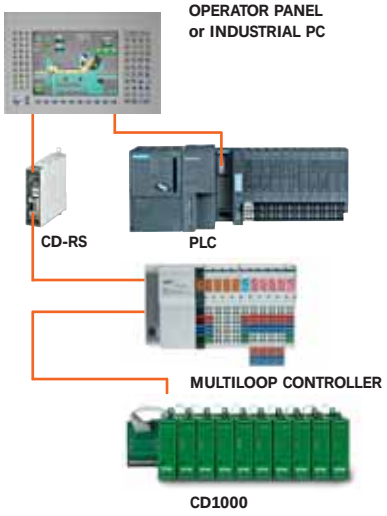
Description code	Numeric code
Resistive Load/ Delta Connection	1
Resistive Load/ Star Connection	2
Resistive Load/ Star Connection + Neutral	7
Transformer Load/ Delta Connection	3
Transformer Load/ Star Connection	4
Transformer Load/Star Connection + Neutral	5
Resistive Load/ Open delta	6

LEGEND
IF = Internal Fixed Fuse
CT = Current Transformer
HB = Heater Break Alarm

Note (1): After 16th digit write current and voltage of load inside brackets Ex. (190A-400V). this is to receive the Thyristor unit already tuned from CD Automation
Note (2): Rating not available at 690V
Note (3): In total are available 4 Analog output . One dedicated to control mode and the other 3 for current on phases 1-2-3
Note (4): cUL approval up to 500A included

CD1000 Thyristor Unit

Industrial Thyristor package



CD1000 is normally used where there are multiple zones: coextrusion, blow moulding and thermoforming machinery.

- Dramatic reduction of wiring.
- Wiring between Thyristor units achieved with flat cables and connectors to avoid to make traditional wiring for auxiliary voltage supply, **RS485** comm. and HB alarm.
  Only input/output power cables has to be wired.
- All setup parameters and real-time information, such as load status and current value, are available via **RS485**.
  The power output of the Thyristor unit can be set using analog or **RS485** command.

Specification

- **CD1000** is a digital and universal Thyristor unit configurable via serial communication port for different types of input and firing modes.
- **RS485** communication and HB alarm are standard features. Current transformer is mounted internally on 3.5A model, externally for other models.
- Universal input and firing are customer configurable via serial port. Single Cycle, Burst Firing, Phase Angle and Soft Start can be configured. Firing types can be changed 'live' via the serial port with CD1000 fully powered.
- Current rating: 3.5 - 25 - 35 - 45A
- DIN rail mounting side by side.

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
CD1000	C	D	K	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4,5,6 Current

Description code	Numeric code
3,5A	003
15A	015
25A	025
35A	035
45A	045

7 Max Voltage

Description code	Numeric code
480V	4

8 Aux. Voltage supply

Description code	Numeric code
18:21V ac	8

9 Input

Description code	Numeric code
0:10V	V
4:20mA	A
SSR	S
RS485	R

10 Firing

Description code	Numeric code
Single Cycle SC	C
Burst Firing BF	B
Soft Start + Burst Firing S+BF	J
Phase Angle PA	P

11 Control Mode

Description code	Numeric code
Drop Voltage Compensation with Analog Input	0

12 Option

Description code	Numeric code
Current Transformer + CT	Y
Current Transformer +CT +HB	H

13 Fan Voltage

Description code	Numeric code
No Fan	0

14 Approvals

Description code	Numeric code
CE EMC For European Market	0

15 Manual

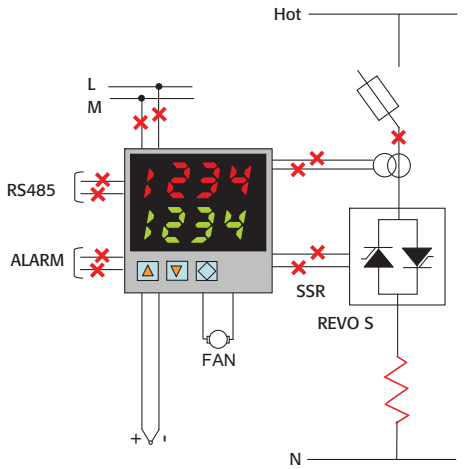
Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Manual

Description code	Numeric code
Std version	1

LEGEND
CT = Current Transformer
HB = Heater Break Alarm

REVO TC



Specifications

- **Dimensions: SR9 / SR10 / SR11/ SR15 / SR16 / SR17** See size at page 6-7 and dimensions at page 8-9
- **Load type:** Normal resistance with one or three phase loads
- **Inputs:** Thermocouple, PT100, 0:10V, 4:20mA
- **Firing mode:** Zero Crossing
- **Operating temperature:** 40°C without derating
- **Control mode:** PID temperature controller
- **Two alarm output std and configurable**
- **RS485 port. Modbus**
- **Comply with EMC and cUL**
- **Data sheet:** More details on “REVO TC” bulletin

Option

HB Heater Break Alarm including internal, Current Transformer

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
REVO TC	R	T	_	_	_	_	-	_	_	_	_	_	_	_	_	_	_

3 Phase Controlled

Description code	Numeric code
1 PHASE UNIT 1PH	1
2 PHASE UNIT 2PH	2
3 PHASE UNIT 3PH	3

4,5,6 Phase Current 1PH/2PH/3PH

Description code	Numeric code
30A (2)	0 3 0
35A	0 3 5
40A	0 4 0
45A (3)	0 4 5
60A	0 6 0
90A	0 9 0
120A	1 2 0
150A	1 5 0
180A	1 8 0
210A	2 1 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6

8 Aux. Voltage supply

Description code	Numeric code
12:24V ac dc	4

9 Input

Description code	Numeric code
Thermocouple	T
Pt 100	N
0:10V dc	V
4:20mA	A

10 Output 2

Description code	Numeric code
Relay Output 2	R
Heating Only	0

11 Wiring System

Description code	Numeric code
RS485+1DI	1
RS485+1DO	2

12 Fuse & Option

Description code	Numeric code
Fuse + Fuse Holder +CT +HB (1)	H
Fuse + Fuse Holder +CT +HB (4) +Flat Wiring System (1)	X
Fuse + Fuse Holder +CT	Y

13 110 Fan Option

Description code	Numeric code
None	0
110V fan available≥ 120A	1

LEGEND
CT = Current Transformer
HB = Heater Break Alarm

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market up to 210A	L

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Version (3)

Description code	Numeric code
Version 1 Std with one Fuse&Fuse Holder	1
Second fuse normally used with phase to phase voltage supply (2) (3)	2
Second fuse with an additional safety elettromecanichal relay to open in alarm conditions (2) (3)	3

Note (1): Fixed fuses over 45A
Note (2): This size is not available on one phase unit
Note (3): This size is available on one phase unit only
Note (4): Flat wiring available with Fuse&Fuse Holder Only

REVO TC philosophy

- Wiring labour reduced dramatically using multiple cable with connector.
- Reduction of space used, saving cabinet cost.
- Single loop integrity with easy local identification of the faulty zone.
- **REVO TC** up to 45A is typically used for plastics machinery.
- **REVO TC** over 60A in one, two and three phase versions is typically used in Furnaces.

PID temperature controller with Pre Tune, Self Tune and Manual tuning

- Up to 3 PID pallets can be enabled at programmed temperature values.
- RS485 communication from 19200 to 57600 Baud Modbus RTU protocol.
- Dual Display to read PV, Set Point and load current.
- Auto/Manual with bumpless transfer.
- Universal input for Thermocouples, RTD and linear Signal.
- Four configurable outputs Relay, SSR and 4:20mA.
- Cooling Output selection for Water, Oil or Ventilation.
- USB port with CD Automation programming cable.

REVO Thyristor unit

- The temperature controller can be connected with different sized **REVO Thyristor units**.
- If using SSR output from the controller use REVO S family.
- If using Analogue output from the controller use REVO M family.

REVO TU Module

The **REVO TU** is a termination unit with the following capabilities:

- Provides the power supply & RS485 comms (Modbus RTU) for up to a max. 14 REVO TC units.
- Collects alarm & digital input states from all connected REVO TC units.
- Can switch on all REVO TC units at the same time using the internal Clock-Relay (date & time), ideal for a pre-heat warm-up function.

TU-PB Gateway RS485 to ProfibusDP

TU PB Gateway can connect Profibus DP Masters (Multiloop, PLC, DCS) to a max 30 REVO TC.
For more information see our documentation section on **www.cdautomation.com**

REVO-PC

EVOLUTION IN POWER CONTROL

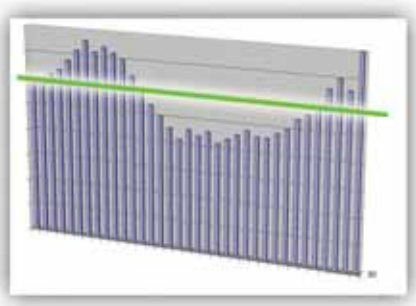
REVO PC was designed specifically to manage multizone systems. This powerful unit, with its unique algorithm, will minimize your energy costs by controlling sychronization and power limit of each zone. Benefits include:

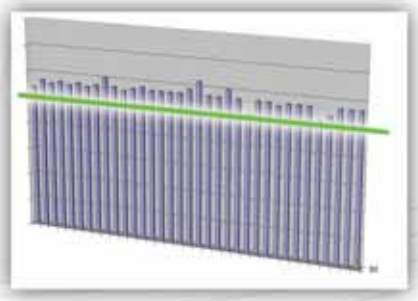
- Elimination of power overshoot (see graph below).
- Power factor close to one due to zero crossing firing.
- **REVO-PC** keeps your instantaneous power within the limit of your electricity supply contract.
- Prevents increases in energy supply tariffs imposed by your electricity supplier.
- Quick return on your investment.

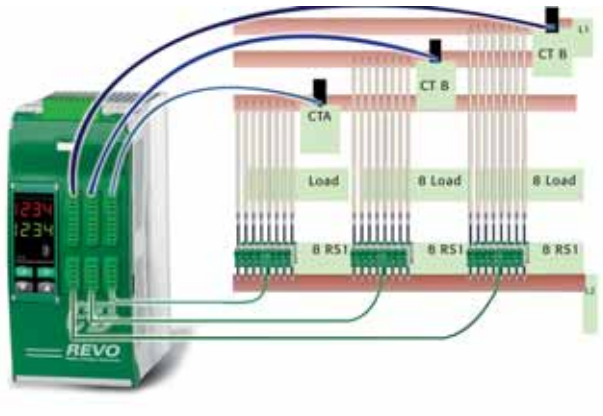
This powerful unit with high performance micro can drive simple thyristor unit Revo S with zero crossing firing. By using the REVO PC, simple thyristor units can be used reducing the overall financial investment.

- Simultaneous fast full wave control of
  8-16-24 REVO S - 1PH
  8-16-24 REVO S - 2PH/3PH for 3 phase loads
  8-16-24 REVO S - 2PH/3PH for 3 phase load with current calculation for each phase.

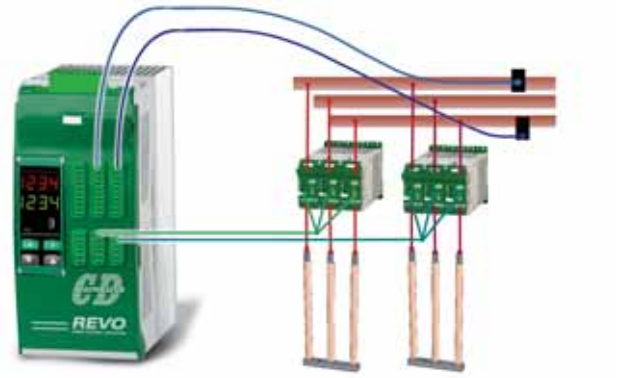
- Each loop's process information is managed independently.
  - Calculation of instant current and RMS Voltage, Current and Power.
  - Calculation of load resistance with Heater Break Alarm.
  - Modbus Master, Modbus slave, Profilbus DP, Modbus/TCP, Can-Open







APPLICATION WITH 8, 16 OR 24 SINGLE PHASE LOADS



APPLICATION WITH 8, 16 OR 24 THREE-PHASE LOADS

Easy to start REVO-PC

- Set the operative current of the heater zone.
- Set the Total Power Limit.
- Set the Power of each zone

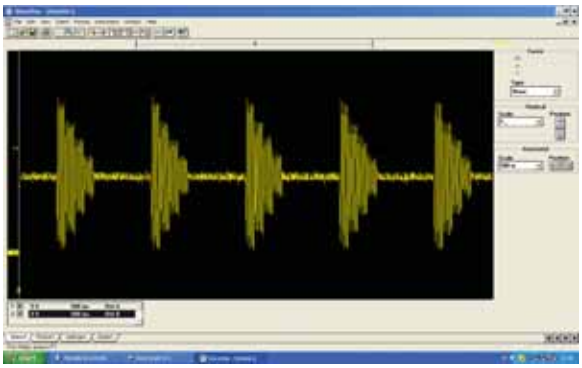
The REVO-PC strategy is easy to implement. Do the same operation with a competitor's load management system and the operator must learn up to 15 pages of the manual and understand up to five models of synchronization.

Synchronization

On all controlled zones, the Live Predictive Synchronization is automatic resulting in superior performance:

- Total current is equal to a sinusoidal wave form.
- Power factor > 0,9.
- Instantaneous current close to average value.
- Cancellation of harmonics.
- Power saving by harmonic reduction.
- Flickering effect removed.

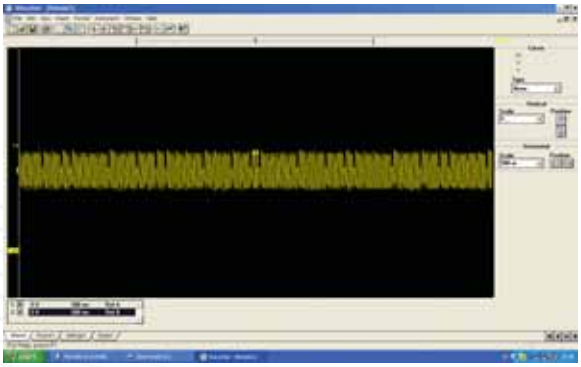
Synchronization selection is available for normal resistive loads or short infrared.



WITHOUT POWER CONTROL OPTIMISATION

Smart Power limitation

- Smart power limitation works together with synchronization. If this function is enabled, REVO-PC makes a live calculation of power at each period and generates the output values for the next period.
- If the calculated power is below the power limit value, the previous values remain with each channel using full power.
- If the power is above the power limit value, the setpoint of each channel is reduced proportionally to restrict power overshoot. This function significantly reduces disturbances on the main network compared to a full power system, preventing any increase in energy tariffs imposed by the electricity supplier.
- This function can be activated/deactivated and the limit value changed at any time.



WITH POWER CONTROL OPTIMISATION

	1	2	3	4	5		6	7	8	9	10	11	12	13	14	15	16
REVO-PC	R	P	C	_	_	-	_	_	_	0	0	0	0	0	0	0	0

4,5 Channels	
Description code	**Numeric code**
8 Channels	0 8
16 Channels	1 6
24 Channels	2 4

6 Current Sensor	
Description code	**Numeric code**
N. 1 CS 200 Amps	1
N. 2 CS 200 Amps	2
N. 3 CS 200 Amps	3
N. 1 CS 400 Amps	4
N. 2 CS 400 Amps	5
N. 3 CS 400 Amps	6
N. 1 CS 600 Amps	7
N. 2 CS 600 Amps	8
N. 3 CS 600 Amps	9

7 Communication	
Description code	**Numeric code**
Ethernet	1
ModBus Slave	2
ModBus Master	3
Profibus	4
Profinet	5
CANopen	6
EtherCAT	7

8 Transformer	
Description code	**Numeric code**
Transformer 24V	1

AUXILIARY UNITS

CD-RS

Compact and smart communication converter.
Input RS232. Output RS485 or 422.
RS232 connection via a 9 pin connector on front of unit.
RS485 or 422 via screw terminals.
This converter can be used to interface a computer with CD Automation communicating Thyristor Units.
Code: CD-RS

For more informations see "CD-RS" bulletin

Field Bus Modules

Code: TU-RS485-PDP used to convert RS485 Modbus to Profibus DP
TU-RS485-DNE used to convert RS485 Modbus to Devicenet
TU-RS485-ETH used to convert RS485 Modbus to Ethernet
TU-RS485 CAN used to convert RS485 Modbus to Can

For more informations see "Field Bus Modules" bulletin

CD KP

The CD-KP is designed to be connected with CD Automation's Thyristor units via RS485 communications. The LED display will show Power, Voltage or Current values, all in engineering units. Any one of these variables can be selected and retransmitted via an isolated output (4-20mA or 0-10V). No need to open the cubicle door and stop the process, an RS485 connector on the front of the unit allows direct connection to a portable PC for easy configuration of the thyristor unit or REVO TC. In addition the display unit allows simple diagnostics of fault conditions.

For more informations see "CD-KP" bulletin

CD EASY

This is a memory support tool that can be used by maintenance personnel on the shop floor. The user can copy 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 CD Automation Thyristor units that have the communications facility.
Remote diagnostic services can be conducted via the internet using our Help and Support Center (see following pages).
Code: CD-EASY

Indicators

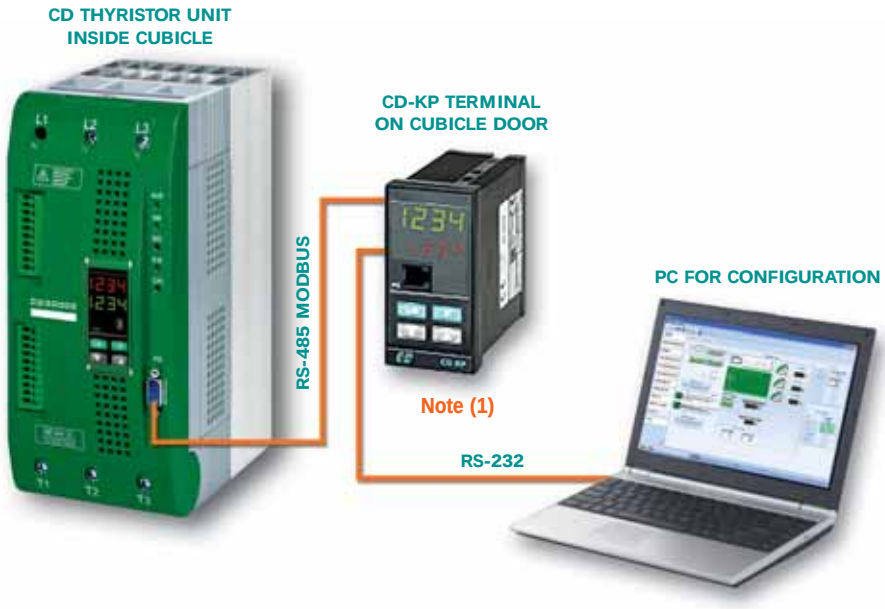
CD Automation have a range of indicators with or without RS485 communications and Modbus protocol
CD1800 - a 48x96mm indicator 3 1⁄2 digit
W 6100 - a 48x48mm indicator 4 digits with RS485 as option
W 8010 - a 48x96mm indicator 4 digits with RS485 as option
Fully configurable microprocessor based indicators that can be connected to our Thyristor units.
Code: CD1800
W6100
W8010

For more informations are available bulletin for each type

Current transformers for Heater Break option

External current transformers used on single phase units up to 110A, two phase units up to 100A and three phase units up to 90A. All external CT's have dimensions of 38x48x20mm (WxHxD). Thyristor units above the stated size have current transformers mounted internally.
Code: see page 32

CD AUTOMATION KEYPAD FOR THYRISTOR UNIT



General Description

- **Local/Remote facility**
- **Set point ramp up/down**
- **Scroll selection of:**
  Set point power
  Power read out
  Current
  Voltage
- **Display indication for these parameters:**
  Heater Break alarm SCR short circuit
- **Retransmission (4-20mA or 0-10V) of one parameter: power, current or voltage.**
- **Dimensions 48x96x92mm (WxHxD)**

CD-KP is designed to give two access levels.

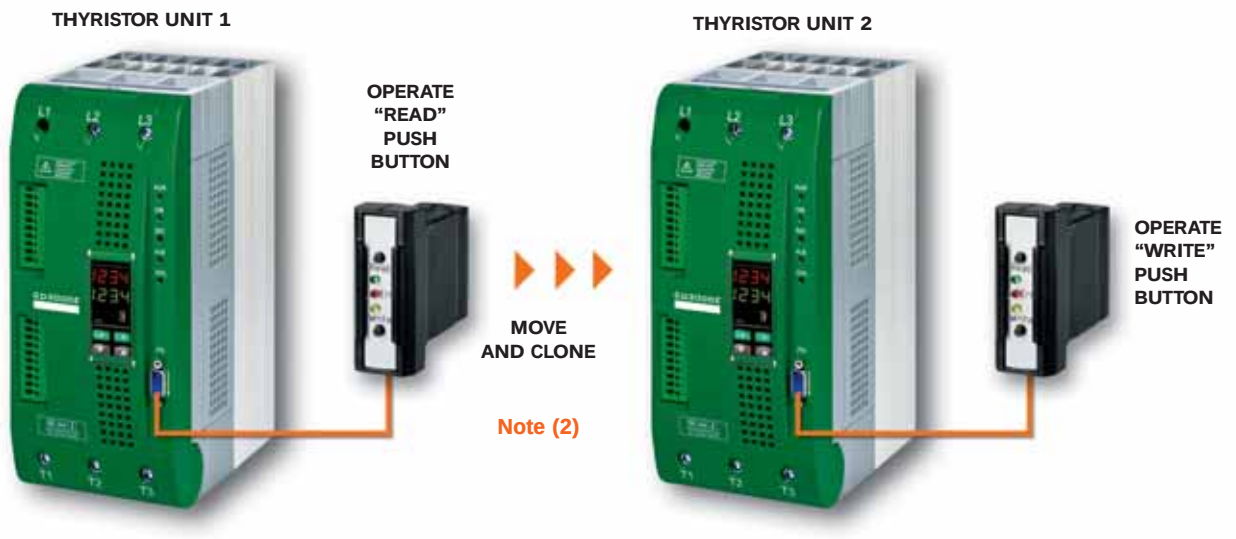
- First Access Level: the operator is able to view the power, current and voltage levels as well as set the power when the CD-KP is in Local Mode. At this level the password function is disabled.
- Second Access Level: By connecting a PC to the RS232 port, located on the front of the CD-KP, it is possible to access all parameters of the CD Automation Thyristor Unit using the free downloadable Configuration Software. Configuration changes can be made interactively, without powering down the unit, removing the need to open the cabinet or to stop the process.

Note (1): CD-KP Terminal can be used with CD3000E and Multidrive

CLONE FACILITY USING CD-EASY

CD-EASY is a Memory Support Tool used by maintenance personnel on 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 operating configuration of the standard unit and stored together with the system drawings in a convenient place, enabling unit reconfiguration within seconds if required.



Note (2): CD EASY be used with CD3000E and Multidrive

SOLID STATE POWER CONTROLLER

Stock only 8 units and you have 28 different solutions

CD2010 CD0010

PRODUCT PHILOSOPHY

This product line has been designed for Distributors and OEM's
Quantity commitment make this product very competitive
The total quantity can be a mix of any units from this product range
- Stocking only 8 units allows you to dispatch 28 different types of solid state power controllers, simply by plug and play

CD1-025

CD1 FAMILY BASIC VERSION TO DRIVE 1 PHASE LOAD

CD1-025 This solid state relay is sized for 25A at 480V max with SSR input
CD1-045 This solid state relay is sized for 45A at 480V max with SSR input
CD1-060 This solid state relay is sized for 60A at 480V max with SSR input
CD1-090 This solid state relay is sized for 90A at 480V max with SSR input
This unit is CD1-060 with additional fan supplied in kit

CD1-025

CD2 FAMILY BASIC VERSION TO DRIVE 3 PHASE LOAD ON TWO PHASE

CD2-025 This unit is formed with 2 x CD1-025
CD2-045 This unit is formed with 2 x CD1-045
CD2-075 This solid state relay is sized for 75A at 480V max with SSR input
CD2-090 This solid state relay is sized for 90A at 480V max with SSR input
This unit is CD2-075 with additional fan supplied in kit

CD1-060

CD3 FAMILY BASIC VERSION TO DRIVE 3 PHASE LOAD

CD3-025 This unit is formed with 3 x CD1-025
CD3-045 This unit is formed with by 3 x CD1-045
CD3-060 This solid state relay is sized for 60A at 480V max with SSR input
CD3-090 This solid state relay is sized for 90A at 480V max with SSR input
This unit is CD3-060 with additional fan supplied in kit

CM FAMILY

DRIVE M

This intelligent module, when connected with one of the units listed above,
transform the Basic Solid State Power unit into a more sophisticated one with the following additional features:
Input: Select from 0:10V, 4:20mA, 10Kpot, SSR and RS 485 Comm
Firing: Select via software SSR, Burst Firing and Single Cycle
Communication: RS485 as standard with Modbus protocol
Option: Heater Break Alarm to diagnose partial or total load failure

TA

CURRENT TRANSFORMERS

Current Transformers has to be used when HB option has been selected
1 Off Current Transformer with current = > nominal current of Solid State Relay
3 Off Current Transformer with current = > nominal current of Solid State Relay

Current Transformer 38x48x20: **25/0,05 Code: C T 2 5**
Current Transformer 38x48x20: **50/0,05 Code: C T 5 0**
Current Transformer 38x48x20: **100/0,05 Code: C T 1 0**

FAN

FAN

Fans with dimensions 92x92mm are used with the units described above to increase their current rating.
The Standard voltage supply is 220V ac.

SOLID STATE POWER CONTROLLER

Stock only 8 units and you have 28 different solutions

CD3000S 1PH 2PH 3PH up to 90A

CD3000M 1PH 2PH 3PH Universal Thyristor Units up to 90A


CD0010


CD1025


CD1045


CD1060


CD1090


CD2010


CD2025


CD2045


CD2075


CD2090


FAN


CD3025


CD3045


CD3060


CD3090

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
CD3000S 1PH	C	D	_	_	_	_	-	_	_	_	_	_	_	_	_	_	_

3,4,5,6 Current

Description code	Numeric code	Notes
2x10A 1PH 610A² sec	C D 0 0 1 0	
25A 1PH 610A² sec	C D 1 0 2 5	
45A 1PH 2360A² sec	C D 1 0 4 5	
60A 1PH 19100A² sec	C D 1 0 6 0	
90A 1PH 19100A² sec	C D 1 0 9 0	Use CD1060 plus Fan
10A 2PH 610A² sec	C D 2 0 1 0	
25A 2PH 610A² sec	C D 2 0 2 5	Use 2 off CD1025
45A 2PH 2360A² sec	C D 2 0 4 5	Use 2 off CD1045
75A 2PH 19100A² sec	C D 2 0 7 5	
90A 2PH 19100A² sec	C D 2 0 9 0	Use CD2075 plus Fan
25A 3PH 610A² sec	C D 3 0 2 5	Use 3 off CD1025
45A 3PH 2360A² sec	C D 3 0 4 5	Use 3 off CD1045
60A 3PH 19100A² sec	C D 3 0 6 0	
90A 3PH 19100A² sec	C D 3 0 9 0	Use CD3060 plus Fan
DRIVE M		**Adding Drive M to above products you obtain M family**

7 Max Voltage

Description code	Numeric code
480V	4

8 Aux. Voltage supply

Description code	Numeric code
No Aux. Voltage	0

9 Input

Description code	Numeric code
SSR	S

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z

11 Control Mode

Description code	Numeric code
No Control Mode	O

12 Option

Description code	Numeric code
No Fuse	O

13 Fan Voltage

Description code	Numeric code
No Fan Voltage (use fan as stated in 'Current' notes)	0

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market	L

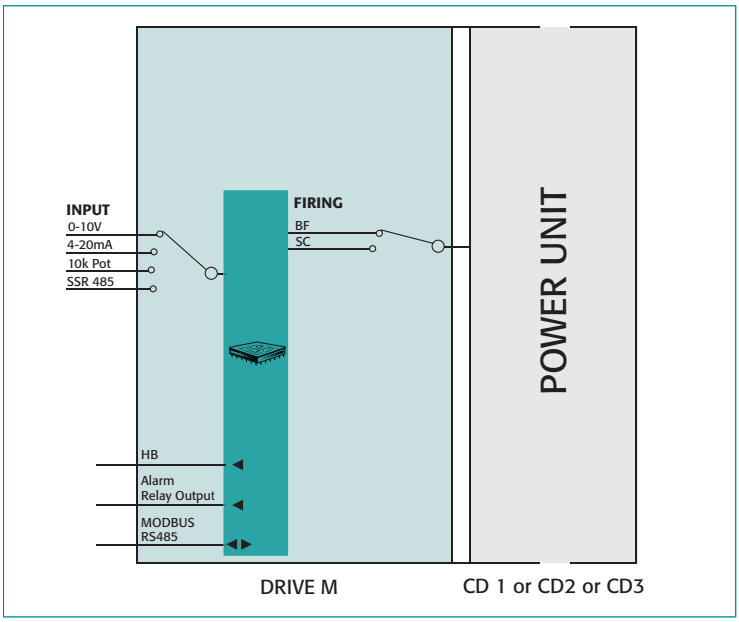
15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Load type/Connection

Description code	Numeric code
Version 1 Std.	1

DRIVE M



With the addition of the Module **DRIVE M** you can transform the Basic Units, for example CD3000S-1-2-3PH on page 33, and create a sophisticated unit with additional features such as universal unit for input and Firing. This capability means that you can satisfy applications where you need very fast firing by using Burst Firing and Single Cycle. With these features you are able to drive infrared short waveform and more general systems with low thermal inertia.

DRIVE M makes available RS485 with Modbus protocol, giving the ability to read/write all configuration parameters and to read current and load status. The load status is available if Heater Break (HB) option has been selected. To use this option one current transformer for one phase load and three for 3 phase loads are required.

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
DRIVE M	D	R	I	V	E	M	-	_	_	_	_	_	_	_	_	_	1

7 Max Voltage

Description code	Numeric code
480V	4

8 Load Voltage

Description code	Numeric code
170:265V (1)	2
300:530V (1)	5

9 Input

Description code	Numeric code
0:10V	V
4:20mA	A
10KPot	K
RS485	R

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z
Single Cycle SC	C
Burst Firing BF	B

11 Control Mode

Description code	Numeric code
No Control Mode	0

12 Option

Description code	Numeric code
No option	0
HB Alarm	H

13 Fan Voltage

Description code	Numeric code
No Fan Voltage	0

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market up to 500A	L

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Load type/Connection

Description code	Numeric code
Version 1 Std.	1

Note 1: **On auxiliary power supply Transformer are available both voltage range. Selection is done via a solder pad.**

DIN-RAIL MOUNT SEMICONDUCTOR FUSING

Protection for your CD3000S 1-2-3PH
SOLID STATE POWER CONTROLLERS

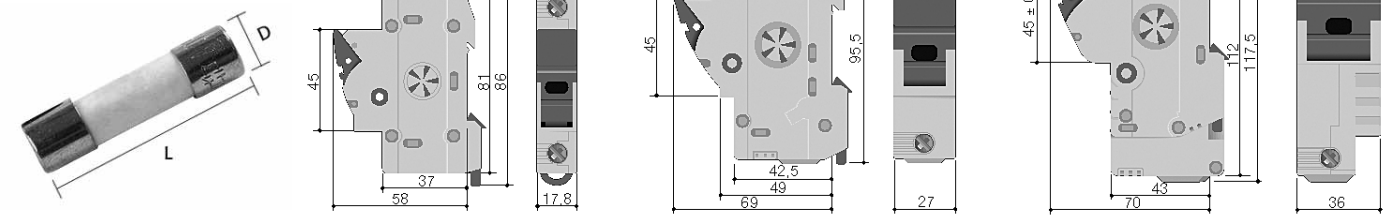
For efficient protection of your **CD3000S** solid state power controller, use semiconductor fuses to ensure a long life.

To safeguard your Power Controllers CD Automation offers Fuse and Fuse Holder correctly sized to protect the Thyristors.

All Fuses should be rated at 25% more than Power Controller rating.

The semiconductor I^2t should be 20% less than Power Controller I^2t.

Semiconductor Fuses are classified for UL as additional protection for semiconductor. They are not approved for branch circuit protection.



CE VERSION								
	FUSE				FUSE HOLDER	FUSE HOLDER		
Amp Rating	I^2t (A^2 Sec)	Code	Diameter D	Length L	Code	CD1	CD2	CD3
32	600	FU1038/32A	10,3	38	FFH1038/32A	CD1025	CD2025	CD3025
50	2000	FU1451/50A	14	51	FFH1451/50A	CD1045	CD2045	CD3045
80	6550	FU2258/80A	22	58	FFH2258/80A	CD1060		CD3060
100	13500	FU2258/100A	22	58	FFH2258/100A		CD2075	
125	14000	FU2258/125A	22	58	FFH2258/125A	CD10090	CD2090	CD3090

cUL VERSION								
	FUSE				FUSE HOLDER	THYRISTOR UNIT TYPE		
Amp Rating	I^2t (A^2 Sec)	Code	Diameter D	Length L	Code	CD1	CD2	CD3
32	600	FWC32A10F	10,3	38	FFH1038/32A	CD1025	CD2025	CD3025
50	1800	FWP50A14F	14	51	FFH1451/50A	CD1045	CD2045	CD3045
80	6600	FWP80A22F	22	58	FFH2258/100A	CD1060		CD3060
100	6970	CPURQ27x60/125	22	58	FFH2258/125A	CD10090	CD2075-CD90	CD3090

Fuse for all markets CE & cUL

Fuse for all markets CE & cUL

Model Fuse & Fuseholder Selection TAB	CD1000 REV0 S-1PH REVO M-1PH REVO CL	REVO S - 2PH REVO M - 2PH	REVO S - 2PH REVO M - 2PH	CD3000E		MULTIDRIVE		
				CD3000E-2PH	CD3000E-3PH	MULTIDRIVE-1PH	MULTIDRIVE-2PH	MULTIDRIVE-3PH
Current	Spare fuses	Spare fuses	Spare fuses	Spare fuses	Spare fuses	Spare fuses	Spare fuses	Spare fuses
30A	FU1451/40A	FU1451/40A	FU1451/40A					
35A	FU1451/50A	FU1451/50A	FU1451/50A	FU63FE	FU63FE		FU63FE	FU63FE
40A	FU1451/50A	FU1451/50A	FU1451/50A					
45A	FU1451/50A	FU1451/50A	FU1451/50A	FU80FE	FU80FE		FU80FE	FU80FE
60A	FU100FE	FU100FE	FU100FE					
75A				FU100FE	FU100FE		FU100FE	FU100FE
90A	FU100FE	FU100FE	FU100FE					
100A				FU160FEE	FU2x80FE		FU160FEE	FU160FEE
120A	FU200FEE	FU200FEE	FU200FEE					
125A				FU200FEE	FU2x100FE		FU200FEE	FU200FEE
150A	FU200FEE	FU200FEE	FU200FEE	FUURB250	FU2x100FE		FUURB250 FU200FEE	FUURB250 FU200FEE
180A	FUURB315	FUURB315	FUURB315					
200A				FUURB315				
210A	FUURB315	FUURB315	FUURB315					
225A			FUURB315		FUURB315		FUURB315 2xFEE160	FUURB315 2xFEE160
275A		FUURB315		FUURB315			FUURB315 2xFEE160	
300A	2xFURB250		FU450FMM		FU450FMM			FU450FMM
350A			FU550FMM		FU550FMM			FU550FMM
400A	FU550FMM	FU550FMM	FU550FMM	FU550FMM	FU550FMM		FU550FMM	FU550FMM
450A		2xFU315FM	FU700FMM	2xFU315FM	FU700FMM		2xFU315FM	FU700FMM
500A	FU700FMM	2xFU315FM	FU700FMM	2xFU315FMM	FU700FMM		2xFU315FM	FU700FMM
600A	2xFU450FMM	2xFU450FMM		2xFU450FMM			2xFU450FMM	
700A	2xFU450FMM	2xFU450FMM		2xFU450FMM			2xFU450FMM	
850A						2xFMM550	2xFMM550	2xFMM550
1000A						SIBA 1000A/690 2068132-1000	SIBA 1000A/690 2068132-1000	SIBA 1000A/690 2068132-1000
1500A						SIBA 1500A/690 2068132-1500	SIBA 1500A/690 2068132-1500	SIBA 1500A/690 2068132-1500
2000A						2 x SIBA 1000A/690 2 x 2068132-1000	2 x SIBA 1000A/690 2 x 2068132-1000	2 x SIBA 1000A/690 2 x 2068132-1000
2700A						2 x SIBA 1500A/690 2 x 2068132-1500	2 x SIBA 1500A/690 2 x 2068132-1500	2 x SIBA 1500A/690 2 x 2068132-1500

APPLICATIONS

CD Automation Thyristor Units are suitable to drive simple and complex Heating Elements. The wide Product Range in terms of performance (5 product families) and Current Range (from 10:2700A) offers a product solution for all application requirements.

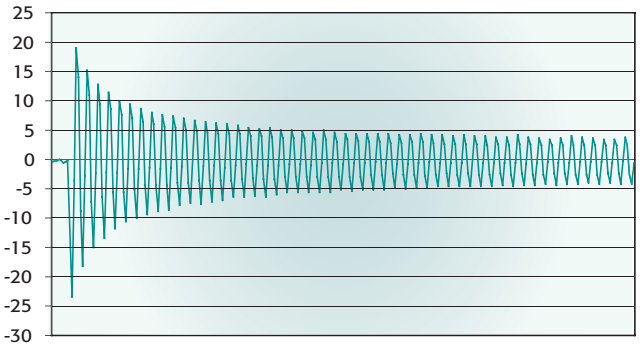
NORMAL RESISTANCE

In this application, REVO S family up to 700A is normally used. Over this current we recommend the Multidrive family up to a current of 2700A.

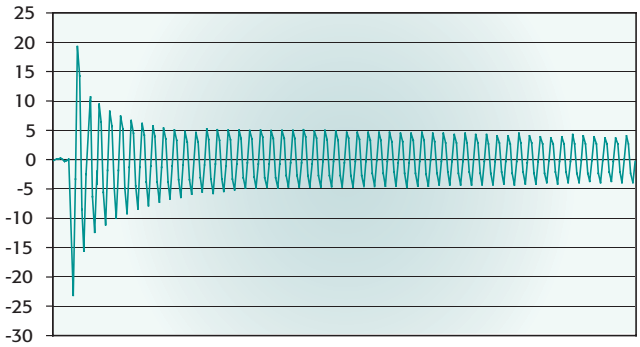
INFRARED LAMPS MEDIUM AND LONG WAVEFORM

This type of heating elements are controlled as a normal resistance load, providing that the nominal supply voltage is used.
If using medium waveform at a lower voltage than nominal, then this should be treated as short waveform load.

INFRARED LAMPS SHORT WAVEFORM



Load Current with cold IR lamp in Phase Angle + Current Limit



Load Current with cold IR lamp in Single Cycle

Infrared Short Wave loads can be driven with different types of Firing: Single Cycle, Burst Firing and Phase Angle with Current Limit.

The above graph demonstrates how the inrush current remains high for a longer period if we use Phase Angle plus Current limit, than with Single Cycle. Single Cycle technique is the most used to drive infrared short waveform. During the Off time the IRSW elements become cold (due to their low inertia) and when switched ON again there is a peak of current. This peak of current is a function of the number of Burst Firing Cycles, for this reason the Off time must be as short as possible to reduce this current peak.
Phase Angle firing is not used because the supply voltage is normally less than nominal and therefore the elements never reach the working temperature.

COMPLEX HEATING ELEMENTS

TRANSFORMERS

REVO CL has been designed to drive single phase Transformers (see page 10-11).

CD3000E-3PH or **MULTIDRIVE-3PH** are suitable to drive 3 Phase Transformers.

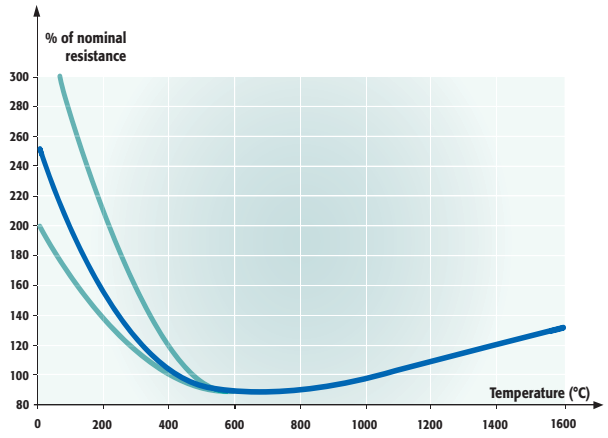
All three products work in Phase Angle, or in Delayed Triggering if transformer is coupled with normal resistance.

No need to worry which firing type to order, you can select Phase Angle or Delayed Triggering directly from the Front Keypad removing any application risks and giving you piece of mind.

SILICON CARBIDE

With this element type the resistance value changes with temperature and with age. The value at the end of the element life can be 4 times the initial value.

The elements can be wired directly to the main supply voltage with many elementary resistance wired in series.
For one phase loads use **REVOM-1PH** in Burst Firing mode and control the RMS power using power limit. The power is controlled by modulating the ON and Off time in respect to the power demand.
Similar results can be achieved by using Phase Angle Firing.
For single phase loads use **REVO CL** in Phase Angle mode and control the RMS power using power limit. The power is controlled by continuously modulating the voltage supply, in this case the **REVO CL** initially selects voltage feed back, switching automatically to VxI when required. As the elements are cold with high resistance on start-up, voltage feedback ensures the nominal voltage is not exceeded and then to increase the load voltage automatically to keep the power constant.

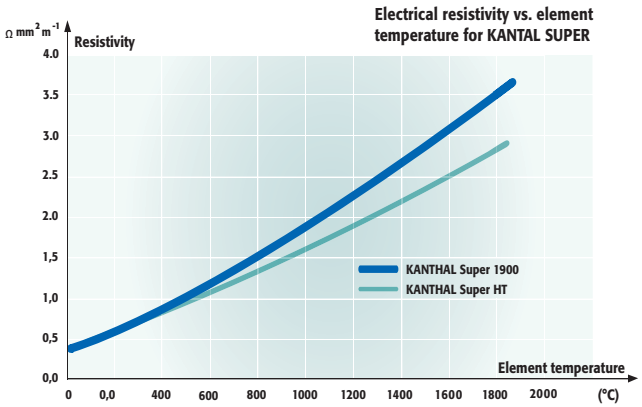


For three phase loads the same consideration should be made but the Thyristor unit is: **CD3000E-3PH**. This unit can be used in Burst Firing or Phase Angle. **MULTIDRIVE 3PH** can also be used with Burst Firing or Phase Angle with V to VxI transfer.

To have further information ask for Application notes on Silicon Carbide.

KANTHAL SUPER / COLD RESISTANCE

This type of element changes resistance value with temperature but has low variation with age. The starting current with cold elements can be up to 12 times that of the nominal current. With Kanthal Super it is mandatory to use Phase Angle and Current Limit.
The resistive elements are normally connected to the supply voltage line via a transformer. The load can be one phase or three phase.



1 Phase Load

Use **REVO CL** in Phase Angle

3 Phase Load

Use **CD3000E-3PH** or **MULTIDRIVE-3PH** in Phase Angle

With both types use a soft start plus current limit.

To have further information ask for Application notes on Kanthal Super.

GLASS INDUSTRY

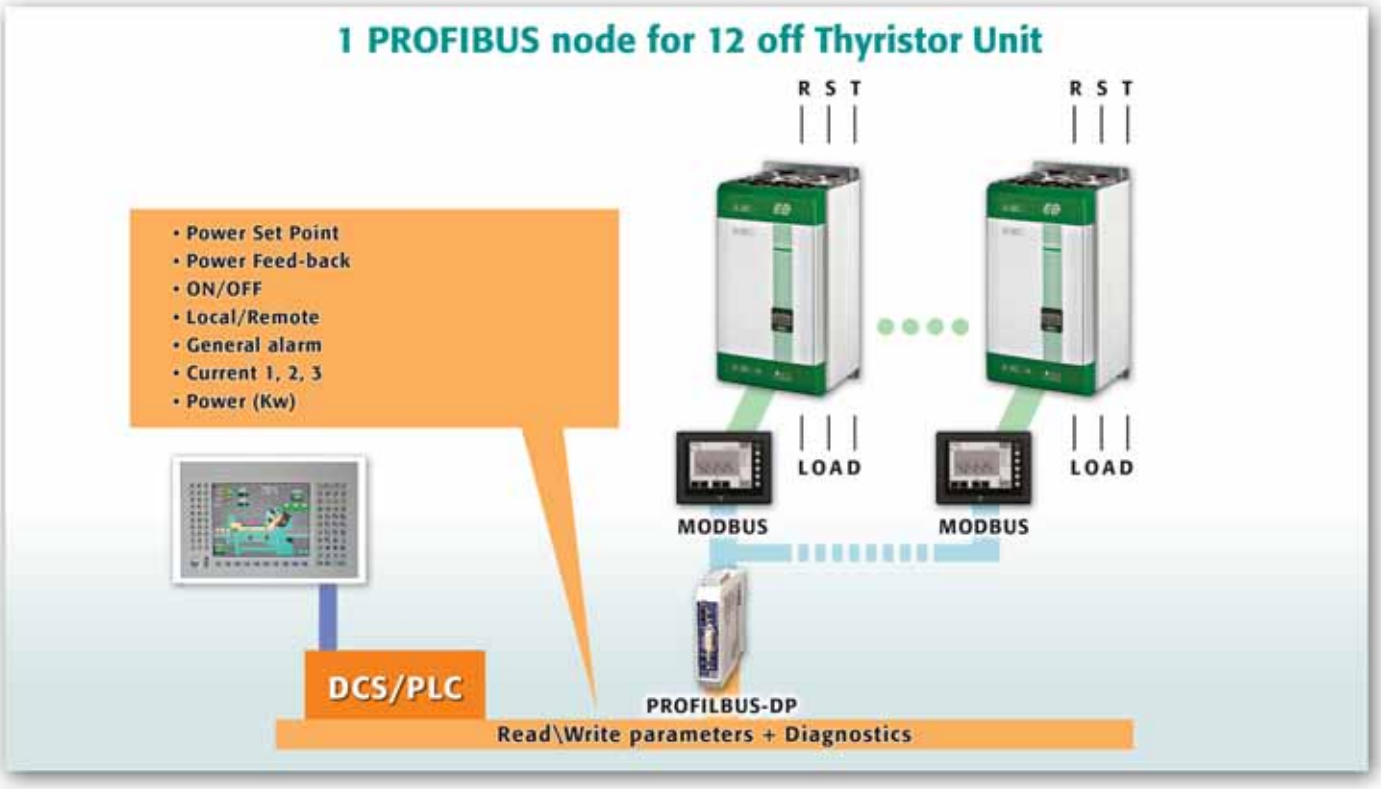
This is a cabinet to control the Bath Furnace in a Float glass Plant.

CD Automation specialises in this type of application, supplying the complete cabinet package including the Thyristor units. With its own technical department, CD Automation can study the process & system, produce the hardware & software, fully commission the start up process and provide a first class service during the Float Life.
Typical systems can have between 30 and 35 zones, each one having a power range from 100 to 150 KW.

CD Automation product normally used is **MULTIDRIVE-3PH**.

An example of a control Zone is shown below.

In addition CD Automation can offer **REVO PC** (See page 28). This powerful unit with its unique algorithm will minimize energy cost by controlling synchronisation and power limit of each zone.



CD Automation can also supply product and specialist know how for the following applications in the Glass Industry.

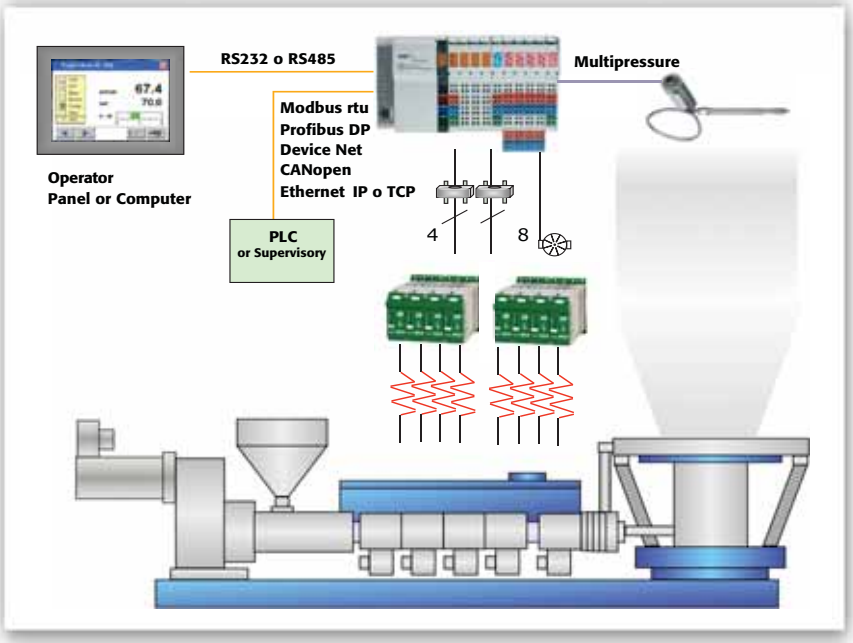
BOOSTING POWER CONTROL

TIN FURNACE POWER CONTROL

POWER CONTROL OF CONTINUOUS ANNEALING FURNACE

PLASTIC MACHINARY APPLICATION

CD Automation is the market leader for this type of application and has thyristor product specifically designed for this market. Request the REVO catalog from 30 to 210A to fully understand the product philosophy and applications.



CD Automation has extensive knowledge and experience in plastic machinery systems. CD REVO up to 45A has been designed for this application. What REVO offers?

- Modularity of its components
- Configurability that allows increased product performances

REVO's 'value add' capable of saving 50% of labour and space. Innovation based on knowledge of process. International assistance from around the world via trained distributors and Joint Venture multi-national Companies.

REVO is a system not a simple product. Includes all key components of a typical control zone.

REVO TC is an integrated product including, fuse & fuse holder, solid state relay, current transformer and temperature control, all in one.

REVO in SSR version can be mounted side by side on large heat sinks giving high density solutions.

HOT RUNNER APPLICATION

Max 64 zones with option to set temperature controllers locally, or via remote set point. Includes a boost function to give a programmed max set point to all zones to clean the mould. Heater Break alarm on each zone available as an option.
Option of standard controllers as shown in photo or a multiloop system with an operator interface on front cabinet door with 5,25" or 12" TFT colour touch screen. For further information ask for our brochure and application notes.

OTHER APPLICATION IN PLASTIC MACHINARY

THERMOFORMING
POWER CONTROL ON BLOW MOULDING
POWER CONTROL ON INJECTION MOULDING MACHINERY.

Our solution oriented web-site allows you to collect all information for your project without to getting up from your desk.
On our web-site you will find:

- Automatic selection of Thyristor Unit starting from your application.
- Technical bulletin of selected product including features and dimensions.
- Maintenance manual with electrical wiring.
- Free software tool to configure Thyristor Unit.
- Click and download suggested recipe for your application using CD Automation knowhow.
- Product quotation request form.

We guarantee your satisfaction and we help you to save time.

REVO Family Configurator

- Windows based.
- Easy to use with recipe facility. Each thyristor unit can be configured in a matter of seconds.
- Option to configure the firing mode on line without powering down the unit.
- Look for you application and download the configuration software.

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