Fastron Electronics

Solid State Contactors

F-105/135

SOLID STATE RELAYS/CONTACTORS

*

FEATURING
FAST SWITCHING FOR
CONTROL OF AC OUTPUT

*

DESIGNED
and
MANUFACTURED
by

Fastron Electronics
9B Lakewood Blvd
Braeside VIC 3195 Australia

• Power Semiconductors
• Electrical Measurement
• Process Control

Web: www.fastron.com.au
Email: sales@fastron.com.au
Telephone: + 61- 3 - 97635155
Facsimile: + 61- 3 - 97635206

OZtherm™ Range of Digital Power Controllers

Fastron first released their " X " Series of S.C.R. Power Controllers in 1980, progressively developing over 20 different models and selling over 1000 controllers worldwide.

These controllers were primarily designed as custom built, open frame, OEM assemblies sold directly to equipment manufacturers.

The Fastron Electronics range of controllers capitalize on our experience in this field to provide a reliable and robust design housed in a series of standard assemblies and enclosures.

- **F100 SERIES** ..... Contactors utilizing CRYDOM solid state relays mounted on a Heat Sink Assembly with fuses and transient suppressors.
- **F200 SERIES** ..... Solid State Contactors utilizing S.C.R.`s and control card mounted in standard enclosures.
- **F300 SERIES** ..... Phase Angle Controllers utilizing S.C.R.`s and control card mounted in standard enclosure`s
- **F400 SERIES** ..... Burst Controllers, similar to F300 in construction, featuring fast cycle, zero cross switching.

BENEFITS OF THE Fastron Electronics F105/135 SOLID STATE RELAY

- High speed, noiseless and bounceless electronic switching offers superior performance over mechanical systems
- No moving parts, no mechanical contacts and microprocessor compatible
- Low EMI and RFI on zero cross types
- Proudly Australian Designed and Manufactured in our Melbourne factory enabling us to provide complete local support for customer applications, engineering and service.

TYPICAL APPLICATIONS

Security systems	Production equipment	Instrument systems
Fire Alarm systems	Contactor replacement	Test systems
Dispensing Machines	Commercial laundries	Office machines
Navigation equipment	Medical equipment	Traffic control
Temperature controls	Lighting displays	Motor control
Amusement park rides	Elevator controls	Vending machines

Please note that electrical isolation is not provided by a Solid State Relay in the "off" state.

MODEL DESIGNATION / ORDER CODE

SINGLE PHASE

F115 -		-		-	DESCRIPTION	Fuse Rating	Case Size	Weight KG	Dissipation Watts	I^2t Thyristor Rating
Line Voltage	1				110 volt A.C line input (1 phase)					
	2				240 volt A.C line input (1 phase)					
	4				415 volt A.C line input (1 phase)					
Rated Current at 50 deg. Celcius.		50			50 amperes A.C line current	55AF	fig.2	0.689	75	260
		90			90 amperes A.C line current	90AF	fig.2	1.136	135	1,620
		120			120 amperes A.C line current	120BF	fig.3	2.447	180	1,620
		220			220 amperes A.C line current	250BF	fig.4	2.862	330	4,150
		250			250 amperes A.C line current	350BF	fig.4A	2.779	375	4,150

Options.	**A**	AC Control input (90-280 VAC)	Zero cross
	D	DC Control input (3-32 VDC)	Zero cross
	DR	DC Control input (3.5 - 26 VDC)	Random
	F	Semiconductor fuses	Includes mounting hardware
	S	R-C Snubber	Instead of standard Varistor

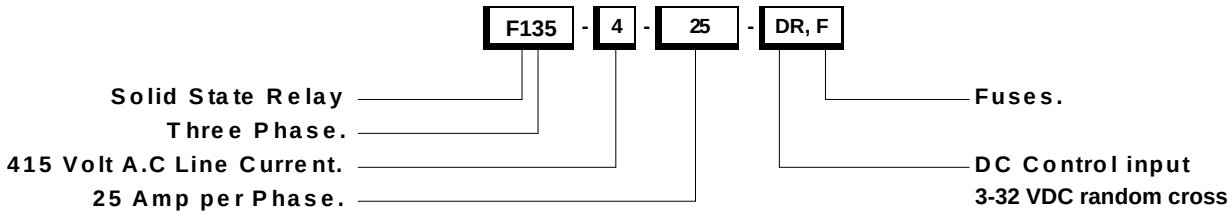
For more details and pricing view in our online store fastron.com.au

THREE PHASE

F135 -		-		-	DESCRIPTION	Fuse Rating	Case Size	Weight KG	Dissipation Watts	I^2t Thyristor Rating
Line Voltage	1				110 volt A.C line input (3 phase)					
	2				240 volt A.C line input (3 phase)					
	4				415 volt A.C line input (3 phase)					
Rated Current at 50 deg. Celcius.		13/25			13/25 amperes A.C line current	25AF	fig.1/5	2.04	112	450
		50/75			50/75 amperes A.C line current	75AF	fig.6	6.125	337	650
		90/120			90/120 amperes A.C line current	120BF	fig.6	6.275	540	1,620
		180			180 amperes A.C line current	200BF	fig.7	6.375	810	4,150
		240			250 amperes A.C line current	250BF	fig.8	7.771	1080	4,150

Options.	**A**	AC Control input (90-280 VAC)	Zero cross
	D	DC Control input (3-32 VDC)	Zero cross
	DR	DC Control input (3.5 - 26 VDC)	Random
	F	Semiconductor fuses	Includes mounting hardware
	V(S)	Varistor Mounted on output Terminals	Or Optional 240VAC Snubber

For more details and pricing view in our online store fastron.com.au



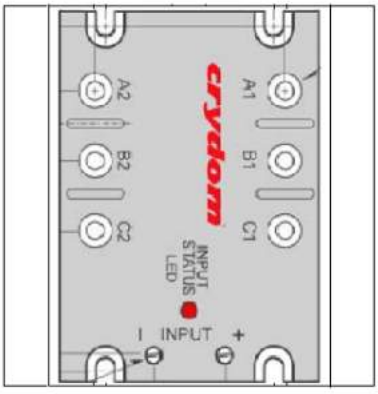
ORDERING EXAMPLE

STANDARD SPECIFICATIONS (Table 1)

Control Mode	On / off
Maximum Current	13 - 250 amperes (higher currents available on request)
Power Supply	110/240/415 volts A.C . 50 HZ. +/- 10% (60 HZ. and other voltages available on request)
Transient Protection	MOV (varistor)
Control Input	3.5 - 26 VDC (receiving impedance 1000 ohms nom.) 3 - 32 VDC (receiving impedance 1500 ohms nom.) 90 - 280 VAC (receiving impedance 60K ohms)
Temperture Range	0 - 50 degs. celcius
Ambient Humidity	0 - 85% relative humidity
Power Factor	Unity

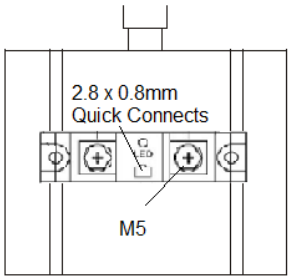
DIMENSIONS / MOUNTING DETAILS
SINGLE PHASE

Shown mounted vertically in cabinet. Mounting is via vertical bolt head slots in the heatsink.



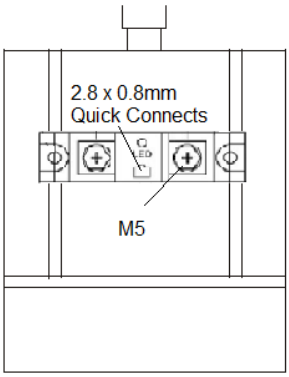
H x W x D = 110 x 125 x 81 mm

Fig. 1



H x W x D = 105 x 125 x 181 mm
Slot = 110 mm for M5 bolt

Fig. 2



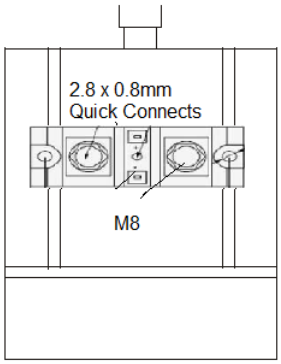
H x W x D = 155 x 125 x 181 mm
Slot = 110 mm for M5 bolt

Fig. 3

PLEASE NOTE;- **If your application requires the Solid State Contactor to function differently to our standard specifications or you are uncertain about the choice of options please contact the factory.**

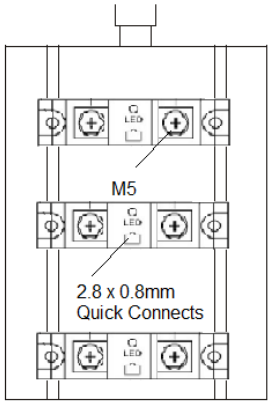
DIMENSIONS / MOUNTING DETAILS
SINGLE AND THREE PHASE

Shown mounted vertically in cabinet. Mounting is via vertical bolt head slots in the heatsink.



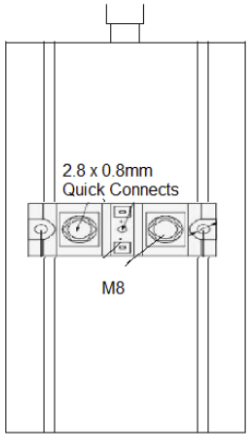
H x W x D = 105 x 125 x 191 mm
Slot = 110 mm for M5 bolt

Fig.4A



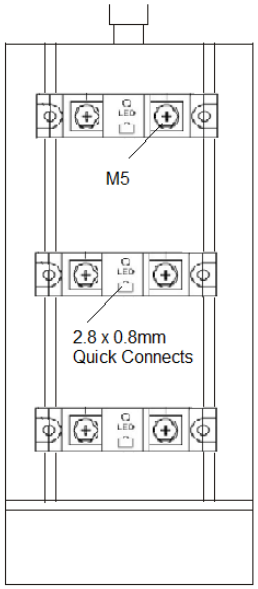
H x W x D = 150 x 125 x 181 mm
Slot = 110 mm for M5 bolt

Fig.5



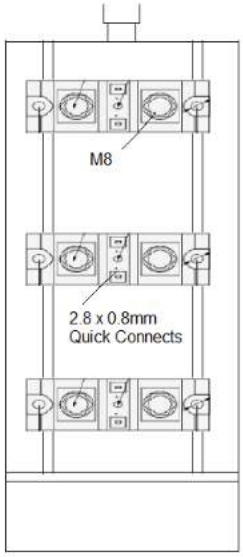
H x W x D = 210 x 125 x 191 mm
Slot = 110 mm for M5 bolt

Fig.4



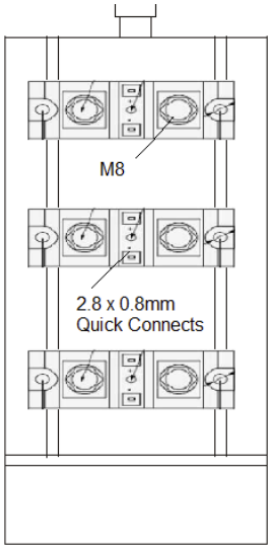
H x W x D = 210 x 125 x 155 mm

Fig. 6



H x W x D = 260 x 125 x 181 mm

Fig. 7



H x W x D = 310 x 125 x 181 mm

Fig. 8

CIRCUIT CONFIGURATION

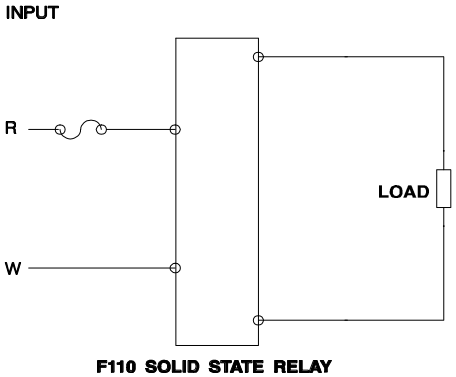


Fig.13

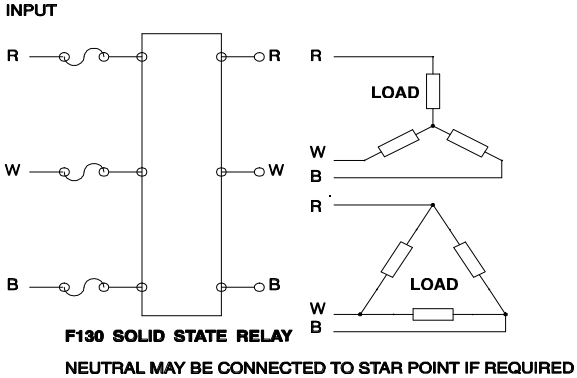


Fig.14

OZTHERM POWER PRODUCTS

Thyristor based power controllers offer numerous benefits.
They are a reliable replacement for electromechanical contactors , being virtually maintenance free.
Thyristor based power controllers are ideal for controlling complex loads , such as heating elements that change resistance over time or temperature , transformer coupled loads , plating rectifiers and fast systems.

PRINCIPLE OF OPERATION

Oztherm power controllers consist of two main parts , the control electronics and the power switching electronics.
Thyristors , also known as SCRs , are used as the power switching devices.
A thyristor functions like a diode that can be “turned on” by a momentary pulse to its gate.When a thyristor has been turned on via its gate and its anode is positive relative to its cathode it will conduct.
The thyristor turns itself off when there is near zero current through it.
To control full wave AC over the positive and negative half cycle two thyristors arranged in inverse parallel are required.
The control electronics provide the firing impulses for the thyristor gates.The control input signal is measured and the timing of the gate firing impulses are varied in response to it.

Three types of firing mode are available on Oztherm power controllers.
Phase angle control works by varying the conduction angle of the AC sine wave.
Burst control modulates power by turning the thyristors on and off for AC cycles.The control electronics turn the thyristors on at a position determined by the control signal and off at zero current. The output is the ratio of OFF time to ON time.
On/ Off control is similar to burst control and is like an “electronic relay” in operation.
F100 and F200 series power controllers use the on/ off firing mode
F300 series power controllers use the phase angle firing mode.
F400 series power controllers use the burst firing mode.

SELECTING THE CORRECT CONTROLLER FOR HEATING ELEMENT TYPES

Heating elements can be broadly divided into three categories:-

CLASS A
These elements have negligible resistance variation with either temperature or time. Examples include: Nickel/ Chromium or similar alloys.

CLASS B

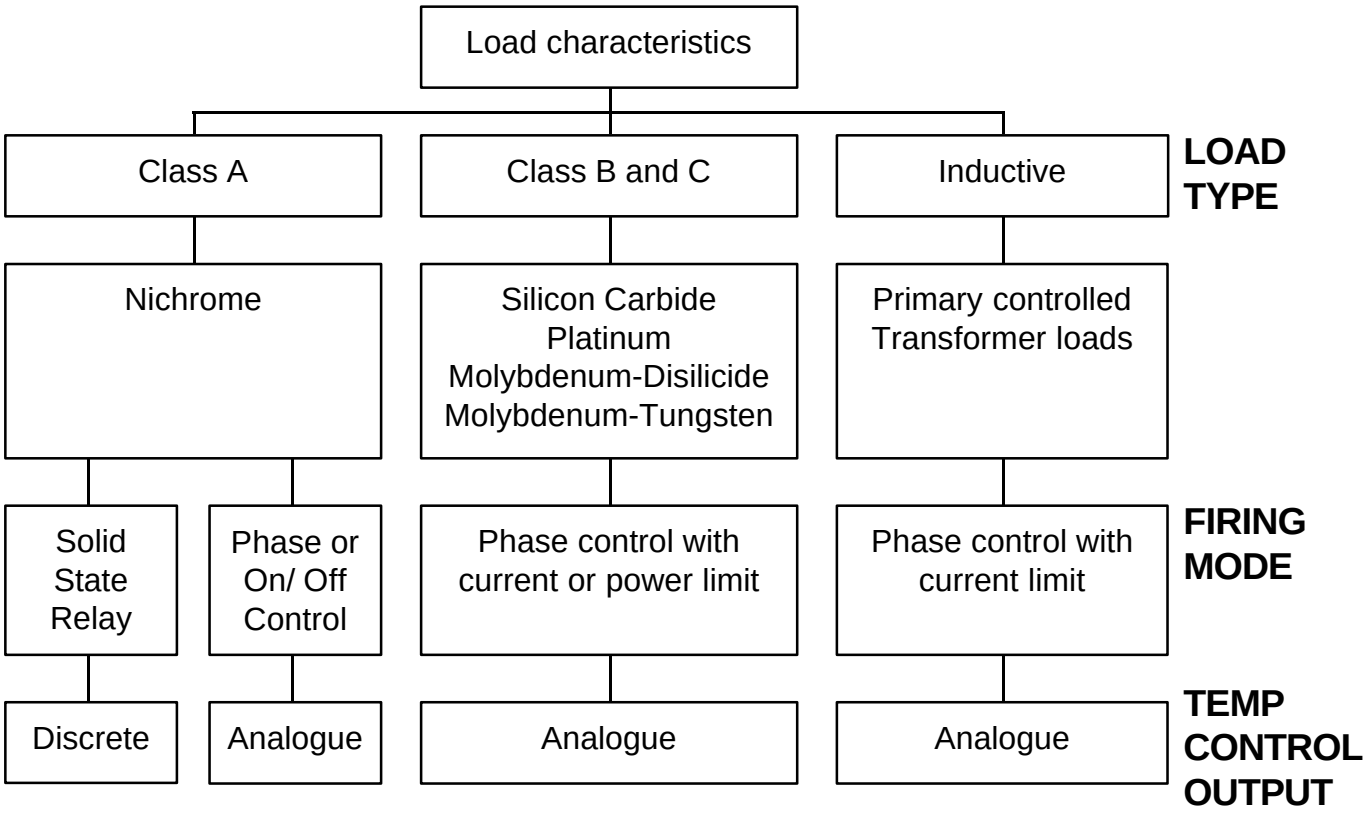
These elements have a low cold temperature resistance that increases greatly at operating temperature. Examples include: Molybdenum Disilicide, Platinum and Molybdenum Tungsten

Class B elements usually require current limit on start up, as their low cold resistance results in high currents at the operating supply voltage.These elements may also require a stepdown transformer to match the supply voltage to the rated element voltage.
Because current limit is required,and the element voltage ratings are less than line voltage,phase angle control (F300 series controllers) is the recommended firing mode.

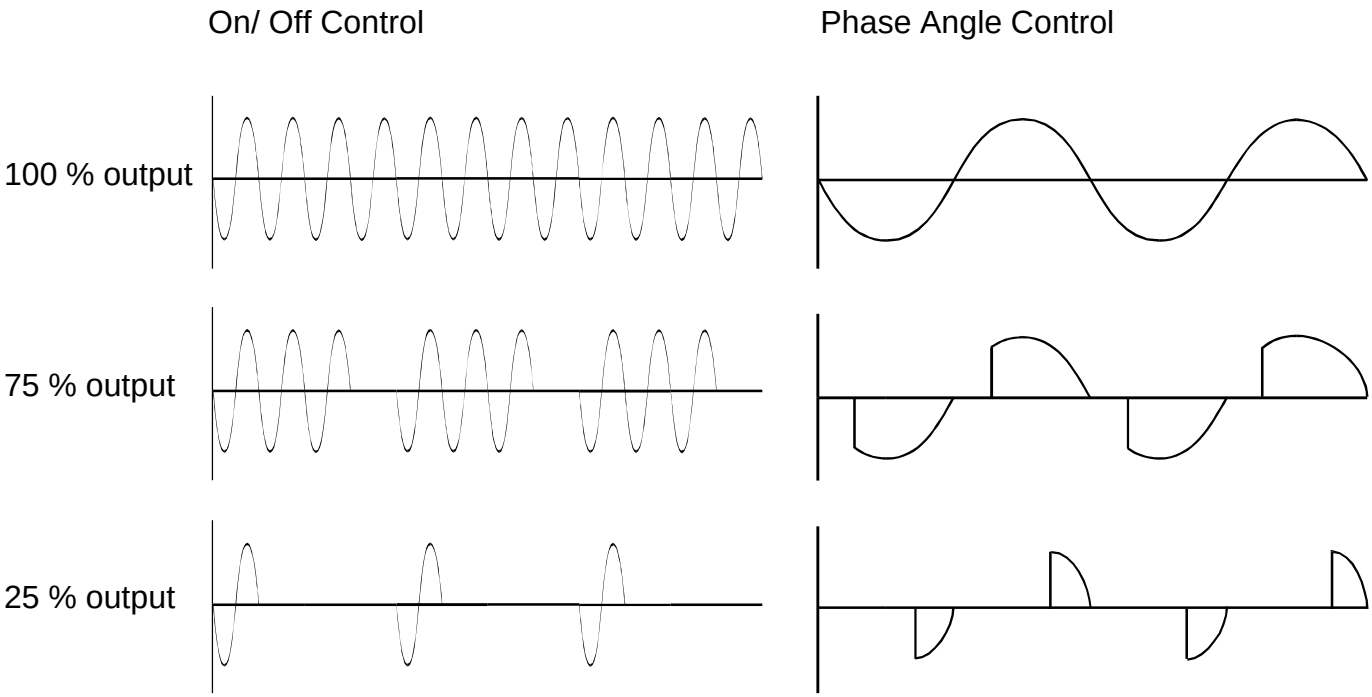
CLASS C

The resistance of these elements increases greatly with time in use (typically 2 to 4 times) and with temperature.Silicon carbide is a common example .The power controller must be sized so that it can deliver the higher currents required to maintain the desired power when the elements are new. If the elements are sized correctly the use of a stepdown transformer may be avoided.
The power limit (PW) option is recommended for this class of element as it compensates for element ageing and limits the maximum load power. Phase angle (F300 series controllers) is the recommended firing mode.

CONTROLLER SELECTION AND ELEMENT TYPE



VOLTAGE WAVEFORMS FOR ON/ OFF AND PHASE ANGLE CONTROL



Fastron Electronics

Company Profile:

Fastron Electronics is a privately owned company based in Melbourne, Australia specialising in the Manufacturing and supply of Components, Products and Solutions to the Energy Monitoring, Power Electronics, Process Control and Electrical Instrumentation markets.

We Are:

•Manufacturers, importers, design/development and consulting engineers in electrical, electronic and systems solution disciplines.

Our Mission:

•To select the most suitable components, products or engineered solutions to meet and potentially exceed our customers requirements in an unbiased and professional manner.
•To be actively involved in improving the reliability and energy efficiency of power conversion equipment, temperature and electric heating controls.
•To promote Energy Monitoring and Management solutions as the means to benchmark, measure and reduce energy waste, reduce costs and CO2 emissions.

Fastron Electronics
9B Lakewood Blvd
Braeside VIC 3195 Australia

- Power Semiconductors
- Electrical Measurement
- Process Control

Web: www.fastron.com.au
Email: sales@fastron.com.au
Telephone: + 61- 3 - 97635155
Facsimile: + 61- 3 - 97635206

Contact our sales department at sales@fastron.com.au