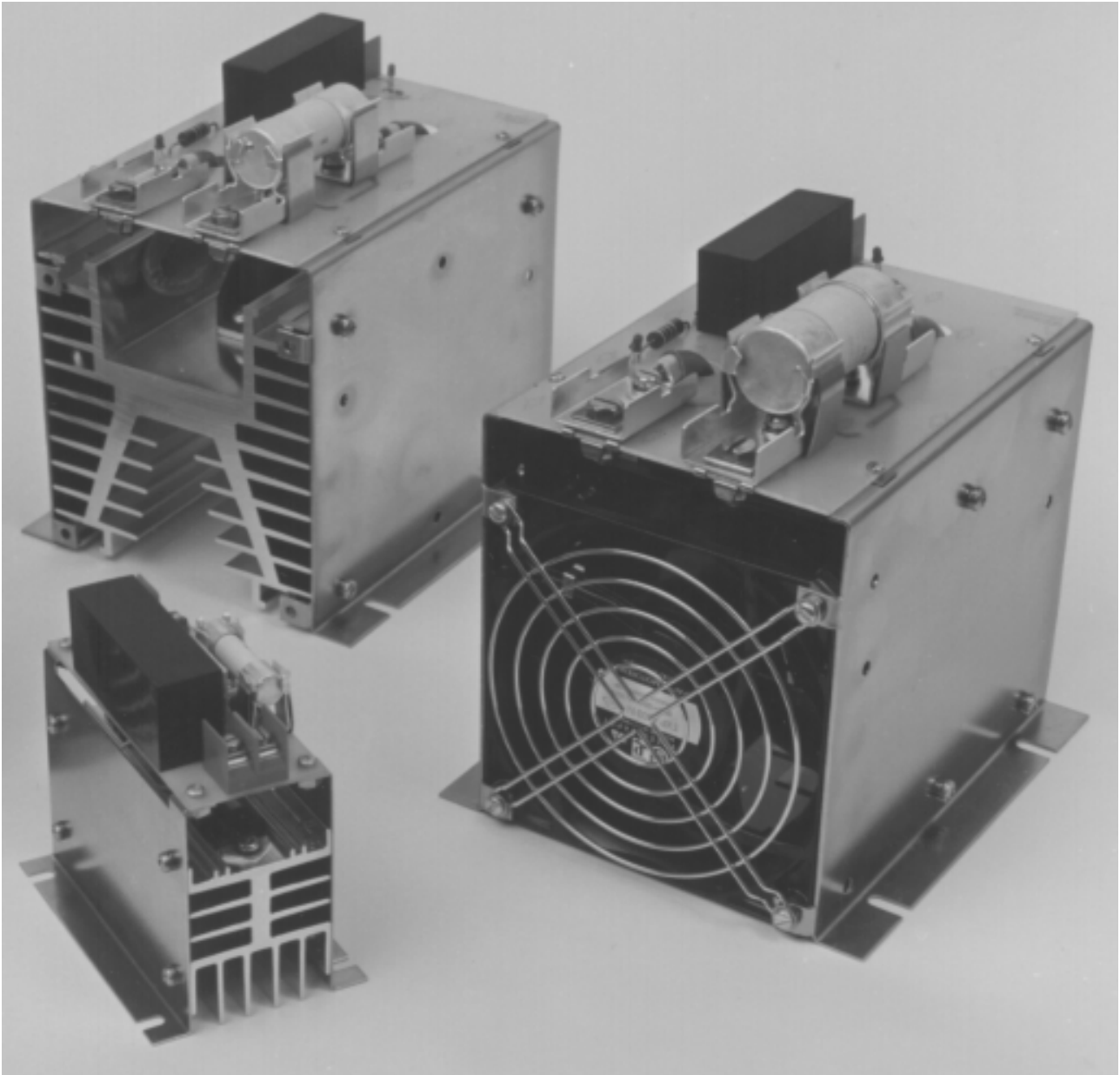


# Tactical

## TC210 MAXIWAT RANGE OF THYRISTOR SWITCHING UNITS

### INSTRUCTION MANUAL



#### CONTENTS

DESCRIPTION .....	2	SPECIFICATION .....	7
INSTALLATION .....	3	ORDERING INFORMATION.....	7
DIAGNOSTIC AID - LEDs .....	6	DIMENSIONS .....	8

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## DESCRIPTION

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The MAXIWAT TC210 range of thyristor switching units, combine high power capability with compact dimensions. With the emphasis on safety and reliability, the units are ruggedly housed.

They incorporate zero-voltage switching modules which are fully encapsulated for durability; the units accept d.c. drive signals from any suitable temperature or power controller.

Rated for up to 102 KW/660V per phase, the TC210 family comprises assemblies with line current

capacities of 16A, 25A, 40A, 55A, 75A, 100A, 125A and 155A. Each assembly is fully isolated and incorporates high speed fuse, excess voltage protection and an over temperature thermal cutout for units with forced air cooling.

A standard feature of MAXIWAT TC210 units is the clear visual indication, by two LEDs, of input logic signal and fuse/load/thyristor integrity. The combination of the states of these two LEDs aids system fault finding.

# INSTALLATION

Under normal operating conditions it is important that the TC210 power switching unit should be mounted VERTICALLY (as shown in figure 3), with the FAN end facing DOWNWARDS if fitted. Also the ambient temperature should not exceed 50 deg C.

If the TC210 cannot be mounted vertically or if the ambient temperature is higher than 50 deg C., please contact your supplier or Tactical Controls' directly to determine suitability and possible operating constraints.

## PROTECTION FUSE

The integral fuse in a MAXIWAT thyristor unit is designed primarily to protect the thyristors from any excessive over current condition. In the event of a fuse blowing, the replacement must be a high speed H.R.C. fuse of an approved type. Replacement fuses can be ordered directly from Tactical Controls or an equivalent type can be used. Fuse types for different current ratings are given in Table 1.

## WIRING

The wiring diagrams are shown in figure 1.

The basic wiring is as follow: the (L) terminal must be connected to the load supply. One end of the load must be connected to the (LOAD) terminal. The other end of the load is returned to the 'NEUTRAL' terminal or 'LINE 2' or 'LINE 3' of the mains supply, according to the load configuration.

The input logic signal supply must be connected to the terminals marked with 'I/P+' and 'I/P-'. The recommended minimum input cable size is 0.5mm square.

Table 1. Fuses and fuse ratings for the TC210 MAXIWAT range.

Current Rating (Arms)	Voltage Rating (Vrms)	Tactical Part no.	Equivalent Type
16A	240V	FUS-660V-20A	FERRAZ-660V-
	440V	FUS-660V-20A	FERRAZ-660V-
20A			
25A	240V	FUS-660V-30A	FERRAZ-660V-
	440V	FUS-660V-30A	FERRAZ-660V-
30A			
40A	240V	FUS-50LET	BRUSH-50LET
	440V	FUS-45ET	BRUSH-45ET
	500V	FUS-45ET	BRUSH-45ET
	660V	FUS-45ET	BRUSH-45ET
55A	240V	FUS-63LET	BRUSH-63LET
	440V	FUS-80ET	BRUSH-80ET
	500V	FUS-80ET	BRUSH-80ET
	660V	FUS-80ET	BRUSH-80ET
75A	240V	FUS-80LET	BRUSH-80LET
	440V	FUS-90EET	BRUSH-90EET
	500V	FUS-90EET	BRUSH-90EET
	660V	FUS-90EET	BRUSH-90EET
100A	240V	FUS-140EET	BRUSH-140EET
	440V	FUS-140EET	BRUSH-140EET
	500V	FUS-140EET	BRUSH-140EET
	660V	FUS-140EET	BRUSH-140EET
125A	240V	FUS-160EET	BRUSH-160EET
	440V	FUS-160EET	BRUSH-160EET
	500V	FUS-160EET	BRUSH-160EET
	660V	FUS-160EET	BRUSH-160EET

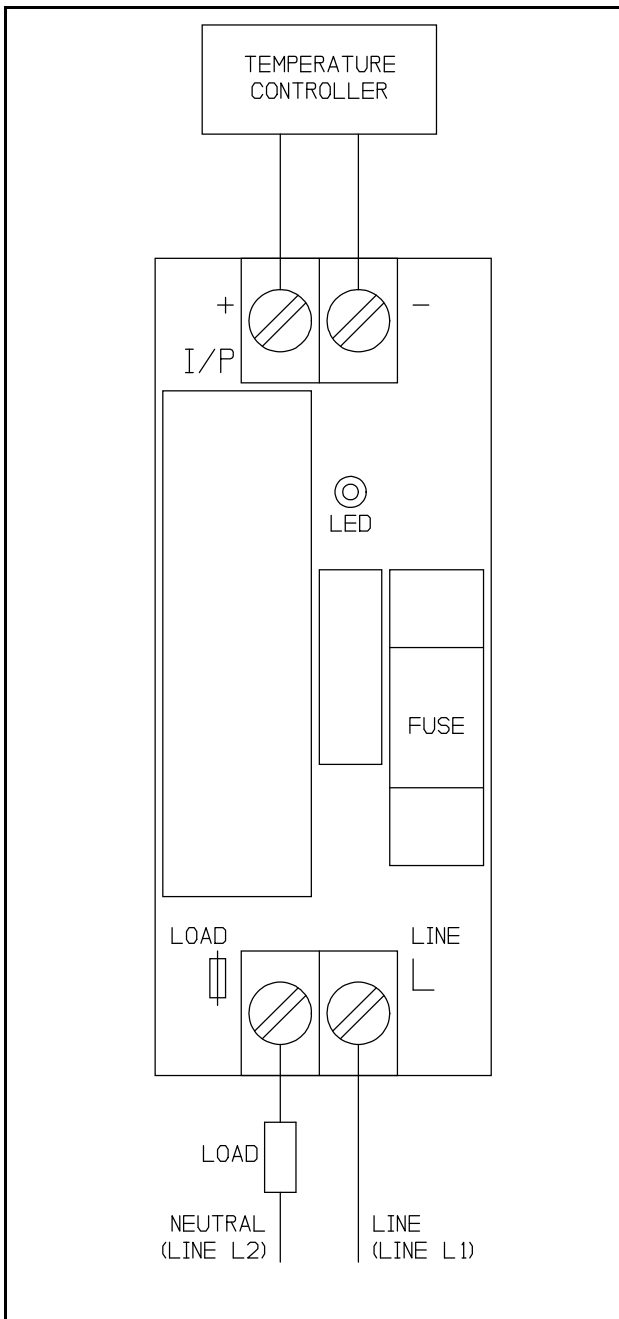


Figure 1a. Single phase 16 to 25A wiring.

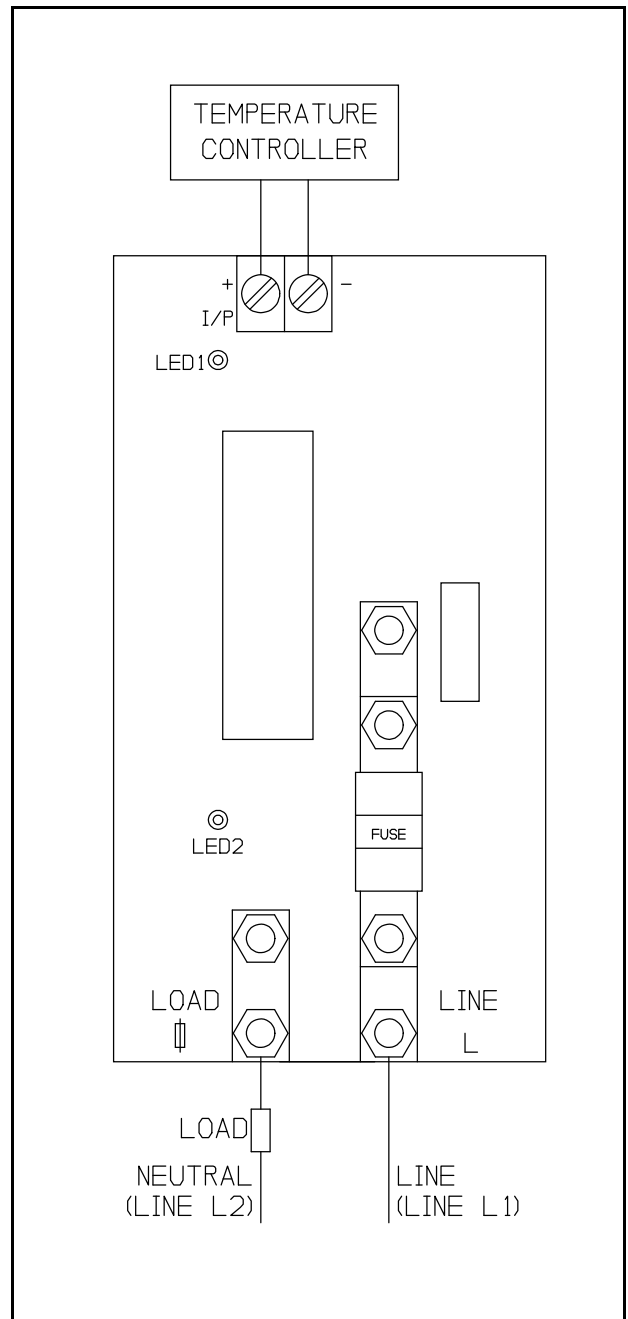


Figure 1b. Single phase 40 to 55A wiring.

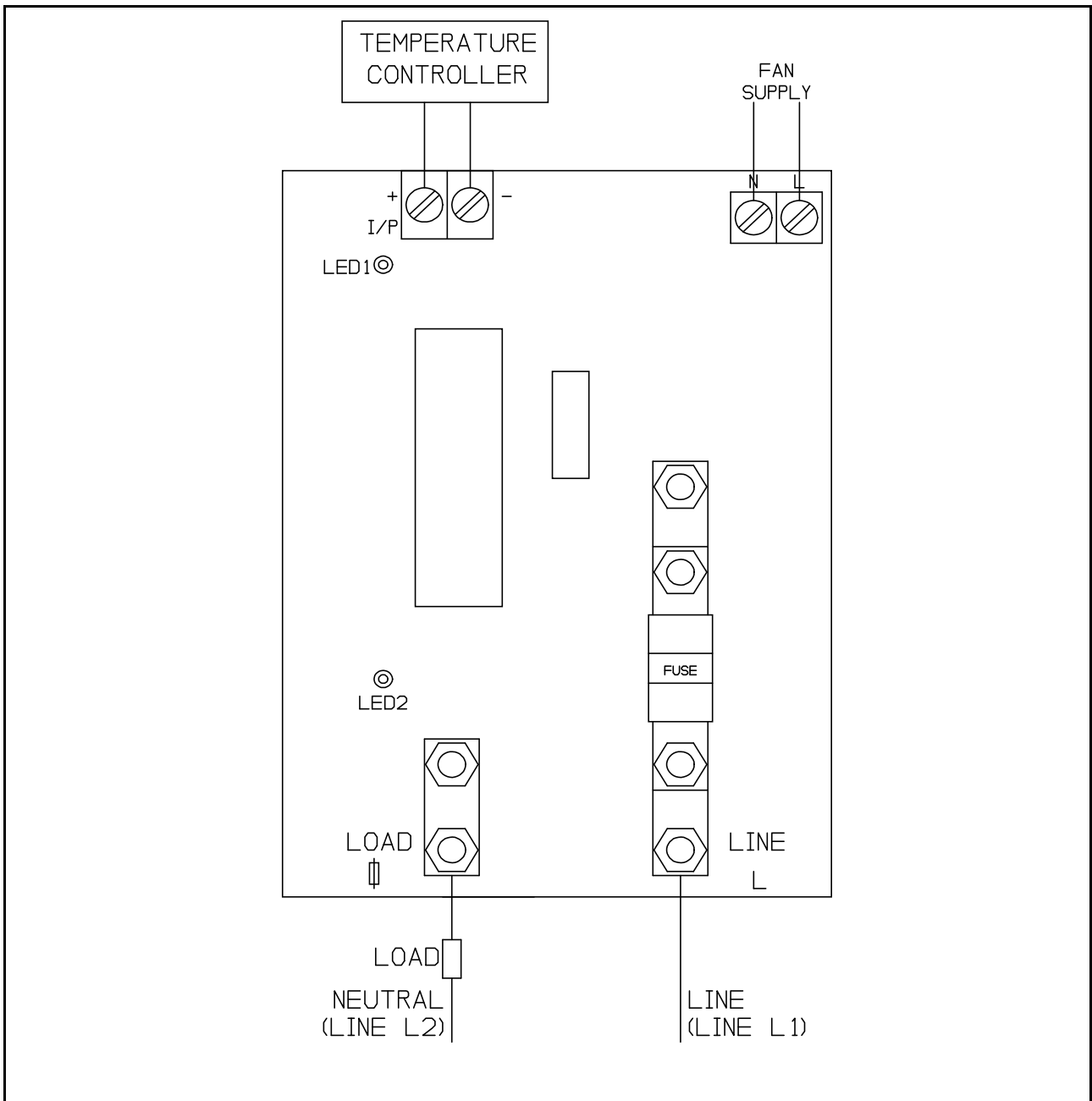


Figure 1c. Single phase 75 to 155A wiring.

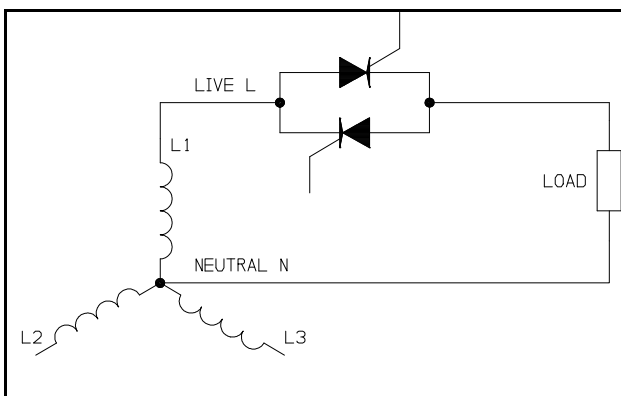


Figure 1d. Single phase line to neutral connection

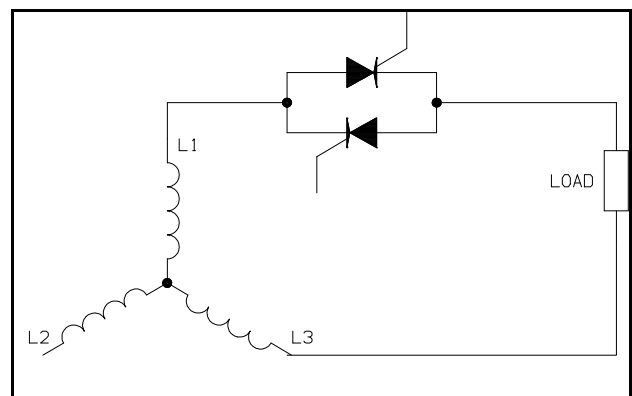


Figure 1e. Single phase line to line connection

## DIAGNOSTIC AID - LEDs

The light emitting diode, LED 1 near to the input terminals is used to indicate the input status. When the input is 0V, LED 1 is 'OFF' and when the input is greater than 5Vdc, LED 1 is 'ON'.

Illumination of the light emitting diode LED 2 indicates that neither the fuse, nor load are open circuit. When the input signal is 0V, LED 2 should be 'ON'. When the input is high (5 to 30 Vdc), LED 2 is 'OFF'. Under normal operation, at any instant either LED 1 or LED 2 is 'ON'.

Combinations of the states of LEDs 1 and 2, together with the state of the input logic signal, which switches between 'HIGH' and 'LOW', provide a valuable diagnostic aid to fault finding; a summary of conditions and effects is given in Table 2.

A block diagram showing the diagnostic LEDs 1 and 2, is given in figure 2.

Only LED1 is fitted to 16A and 25A units.

**Note 1**

With the load supply 'ON', the possible faults are:

- a) fuse-blown or
- b) open-circuited load or
- c) short-circuited thyristor (power to load permanently 'ON').

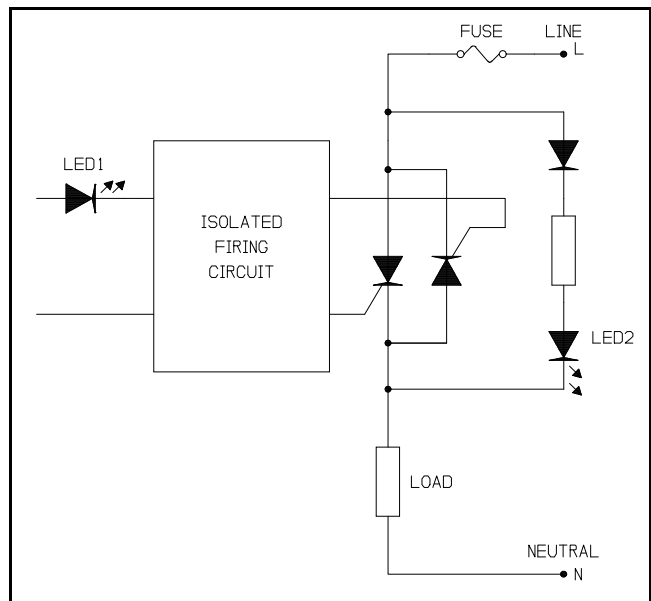
**Note 2**

Thyristor fails to switch on indicated by LED 2 permanently 'ON'. The possible faults are:

- a) insufficient input logic drive signal ( must be greater than 5Vdc) or
- b) faulty open-circuited thyristor or
- c) faulty drive circuitry

**Note 3**

Check for reversal of input signal leads.



W3C AC/AC full control wiring diagram.

Table 2. Use of LEDs 1 and 2 - a diagnostic aid.

**INPUT/LED STATE COMBINATIONS**

INPUT	LED1	LED2	CONDITION
HIGH	on	off	normal and with load supply on
LOW	off	on	load supply on
HIGH	on	off	normal and with load supply off
LOW	off	off	load supply off
HIGH	on	off	faulty but see Note 1
LOW	off	off	see Note 1
HIGH	on	on	faulty but see Note 2
LOW	off	on	see Note 2
HIGH	off	on	faulty but see Note 3
LOW	off	on	see Note 3

# TECHNICAL SPECIFICATION

## INPUT

Logic	5 - 30 Vdc	
Must operate at	>4.5 Vdc	
Must release at	<1.5 Vdc	
Constant current	12 mA typical	
Process inputs	4-20 mA	0-10 V
Input impedance	100 ohm	100 Kohm

## OUTPUT

Supply voltage	100 to 660 Vrms (+10 -15%)
Current rating	16 to 155 A.
Input/Output isolation	2500 Vrms.
Supply frequency	40 to 70 Hz.
Ambient operating temp.	0 to 50 Deg.C
Storage temperature	-20 to 70 Deg.C

# ORDERING INFORMATION

The TC210 range can be ordered by description or by the following code.

210 - - - - -00  
 INPUT .....: : : : :  
 CURRENT RATING.....: : : : :  
 VOLTAGE RATING.....: : : : :  
 FAN VOLTAGE.....: : : : :  
 OPTIONS.....: : : : :

For applications other than constant resistive loads, or any other currents and voltage ratings, not listed above, please contact our sales office.

### INPUT

Logic	
5-30 Vdc	1
Process inputs	
4-20 mA	3
0-10 V	4

### CURRENT RATING

16 A	16
25 A	25
40 A	40
55 A	55
75 A	75
100 A	100
125 A	125
155 A	155

### VOLTAGE RATING

240 V	240
440 V	440
500 V	500
660 V	660

### FAN VOLTAGE

110 Vrms	110
240 Vrms	240

### Options

Protective cover PC

End of code 00

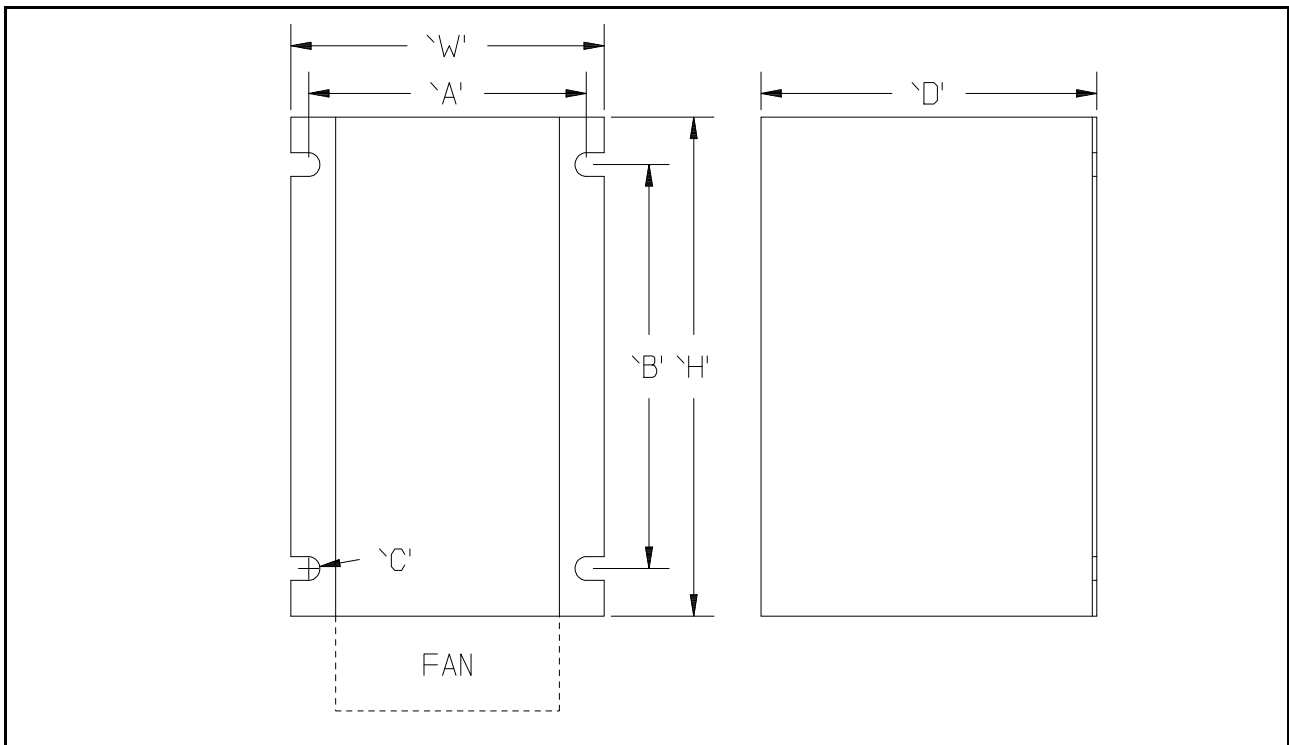


Figure 3. Dimensions.

### DIMENSIONS

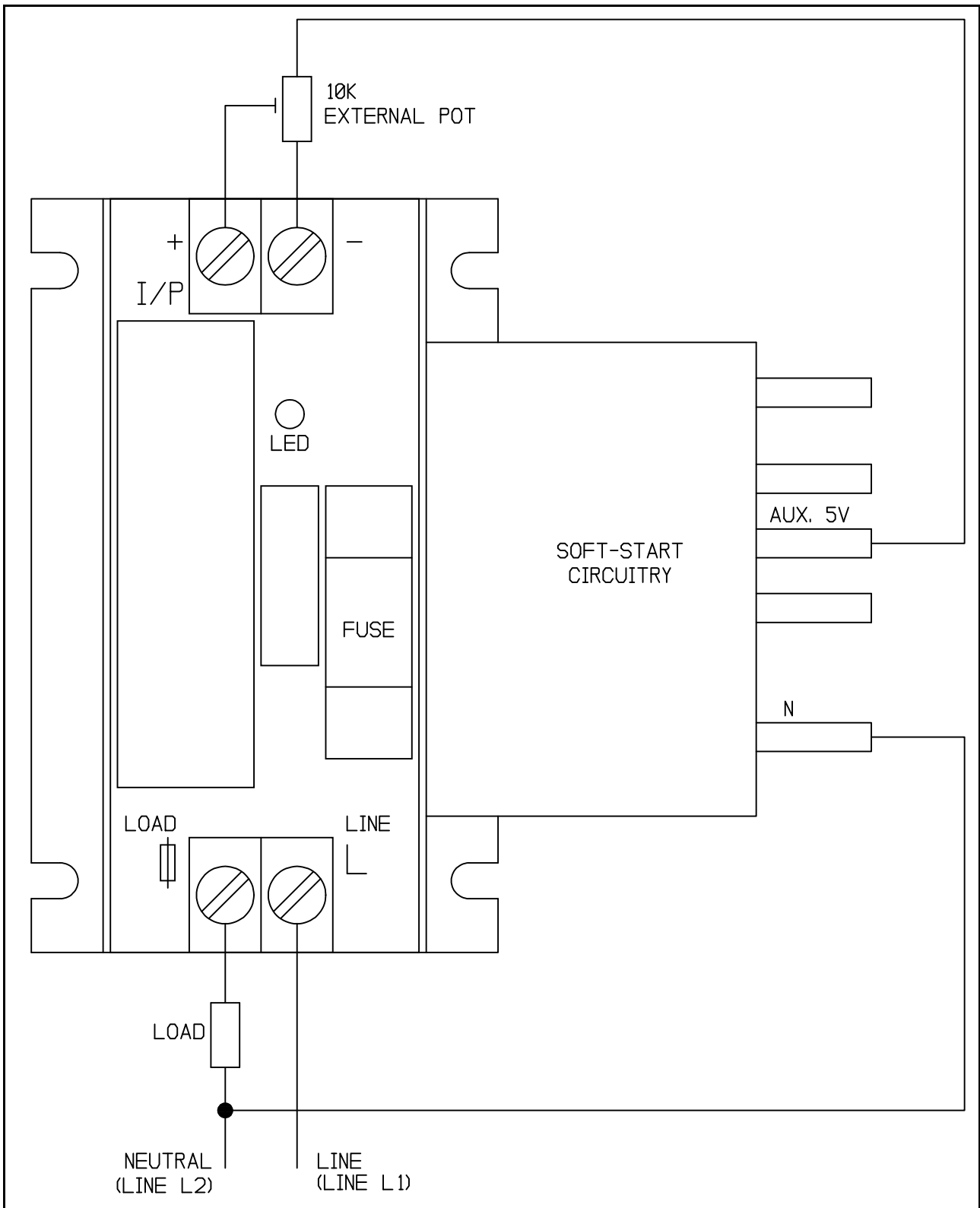
Current rating	Width "W"	Height "H"	Depth "D"	Fixing centre "A"	Fixing centre "B"	Fixing holes "C"
16-25A	70	106	106	62	85	5
40-55A	124	170	170	110	110	6
75	154	170	170	141	110	6
100-155A	154	170 <sup>1</sup>	200	141	110	6

All dimensions are in mm.

1. Due to the fan, the overall height is increased by 40 mm.

### SUPPLIER INFORMATION

Tactical Controls Limited  
 Unit 4, Parkland Business Centre  
 Chartwell Road, Lancing  
 West Sussex BN15 8UE  
 England  
 Tel: (01903) 750800  
 Fax: (01903) 750678  
 Email@TacticalControls.co.uk



TC210-25A with soft-start wiring diagram.