

4100 and 4100/R Controllers

The TR TASC Unit speed controller is available in two formats:

- **4100** for panel mounting
- **4100/R** for rack mounting

Facilities are identical for the two models.

Construction

The p.c.b. card is 0.0625 in flame retardant fibreglass with a single-sided printed-circuit.

Terminations

The **4100** control card has two multiple plugs, one for power connections and one for control signals, soldered to the card. They are supplied with non-interchangeable sockets which clip firmly to the plugs. All external connections are made to the sockets by screw-clamp terminals. The **4100/R** has a single Eurorack plug soldered to the card and is supplied with a clip-on socket strip with solderable pins for external wiring.

Front plate on 4100/R

A brushed aluminium 3U 1 12E plate is fixed to the control card and is earthed to the printed-circuit earth. It has four screws for secure fixing to the rack and a pull handle.

Mounting

The card must be mounted vertically. It is arranged so that the long sides are at the top and bottom.

Prevention of misuse

The control card must always be switched on through the motor starter. This ensures that the coil in the TR TASC Unit cannot be energised without the cooling fan running. Damage will occur to the TR TASC Unit if the controller is left on with the motor not running.

Input Signals

Speed Demand Inputs

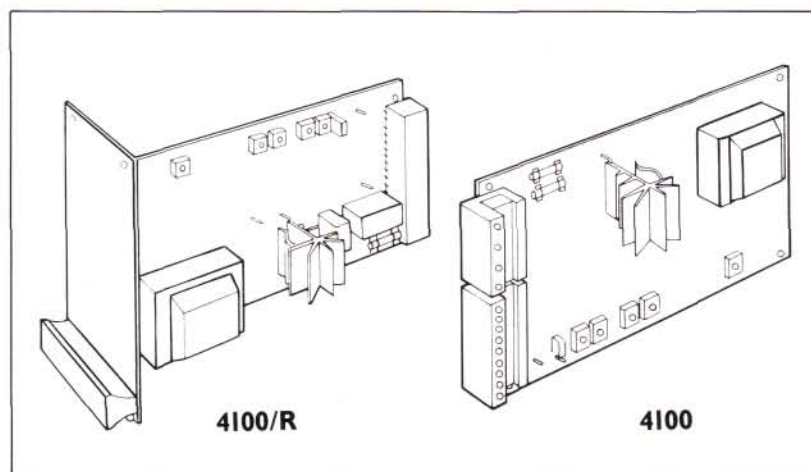
The standard speed reference is 0-12 Vdc with a manual 1 KO potentiometer.

Options are also available of:

- 0-10 Vdc
- 0-20 mA
- 4-20 mA
- 0-10 mA

Auxiliary Input

An additional reference input of ± 12 Vdc with 390K ohms input impedance is provided for subsidiary signals. One example is a synchronising input. Another is a saw-tooth speed variation as used on anti-patterning textile drives.



External Torque Limit Input

The available torque limitation on the **4100** control card can be replaced by an external signal of 0-4 Vdc or from standard plc or transducer signals.

Start/Stop

The supply to the control card can be automatically connected as the TR TASC Unit drive motor is started, or can be by an On/Off switch on the Remote Control. In either case it must be interlocked with the motor supply.

Output Signals**Speed Related Output**

An output of 0-7 Vdc proportional to speed is available for operating a Tachometer. Alternatively the frequency of the tachogenerator, 200 Hz per 1000 rpm, can be sensed at the drive or at the control card.

Overspeed Braking

An output signal proportional to coil current is available for use with a controlled brake demand supply. The brake will then operate to reduce speed when the speed demand is lowered, for instance.

Computer Compatibility

The system is compatible with analogue signals from computers and plc's. Digital signals such as from RS232 or RS485 Serial Link systems, can be used with an optional digital/analogue interface module.

Protection**Overcurrent**

The TR TASC Unit control card is fused to prevent overcurrent.

Status Diagnostic System

A monitoring system is available which interrogates up to 21 drives and transmits the information. It can be used with computer control systems, message display systems or, using an interface module, with link systems such as RS232 and RS485.

Its main uses are in —

- Process Control
- Inaccessible Drives
- Remote Operation

The diagnostic system monitors supplies, controller output and speed. It detects faults, and signals them by a light indicating the type of fault, by a drive identification number, and by an output signal.

The system is housed in a 6U x 42E rack. Full details are available on request.

Customer Controls

The **4100**, and its rack mounting equivalent **4100/R**, has seven customer adjustable controls. These are factory pre-set so that the drive can be installed and immediately operated. The only initial adjustment necessary is to select the drive speed for 2-pole drive by moving a small plug. Fine tuning of other functions may be made to obtain the optimum dynamic conditions for a particular application. The adjustable controls are:

Maximum Speed, adjustable from 3400 rpm to 1000 rpm, dependent on motor speed and supply frequency

Minimum Speed, adjustable from zero to 300 rpm

Acceleration/Deceleration. Exponential ramp adjustable from 0 to 30 seconds

Torque Limit, adjustable from 100% to 1%

Regulation. Can be used to increase drive response or to reduce it when used with an unstable load

Integral. Increasing integral will reduce the drive response to rapid load changes

Differential. Increasing differential will reduce overshoot and undershoot when speed demand is rapidly changed.

C.S.A. — Canadian Standard Association

Both the **4100** and **4200** (240 Volt version) have been given C.S.A. approval.

C.S.A. approval has also been given to the whole range of TR TASC Units.

Controller Designation

4100 is the standard panel-mounting speed controller for 110V supplies.

4100/R is the standard rack-mounting speed controller for 110V supplies.

4200 is the 220/240V version of the **4100**.

4200/R is the 220/240V version of the **4100/R**.

5200 is derived from the **4200** and includes a filter to reduce R.F.I. It conforms to the current EMC standards (BS800, 1988), EN 55014 and VDE 0875, level "N") for conducted and radiated R.F.I.

5200/R is the rack mounted version of the **5200**.

4280 is the standard panel-mounting load-sharing controller for 220/240V supplies.

4110 is the standard panel-mounting torque controller for 110V supplies.

4200 is the 240V version of the **4210**.

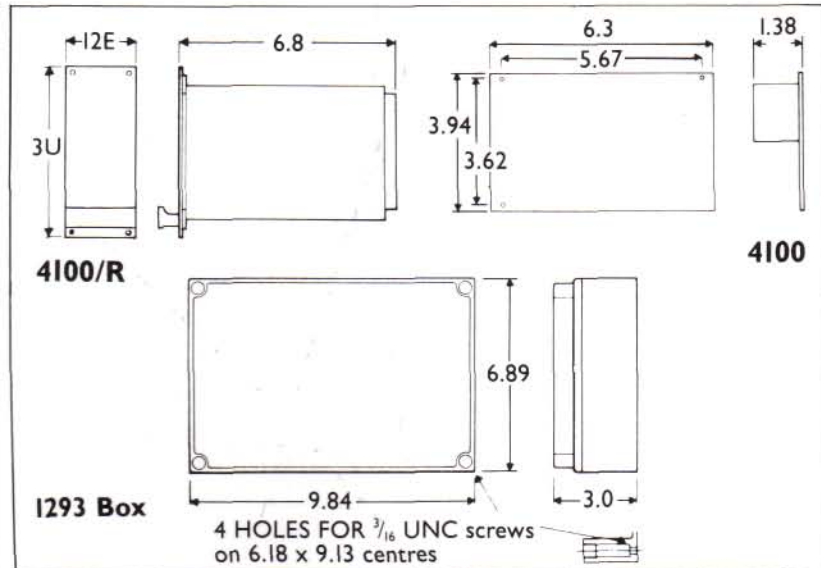
4030 is the multi-function panel with five modes of operation:

- Multi-Reference supply
- Maintained Ramp
- Unmaintained Ramp
- Ramp Generator
- Set-Point Control

**Dimensions and Enclosures for
4100 and 4100/R series**

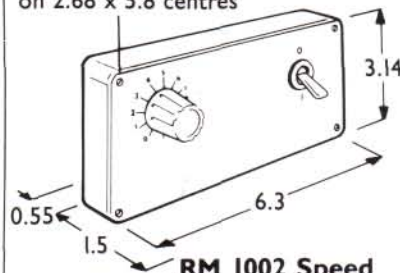
Controllers

4100 series controllers can be mounted in the 1293 box shown below. The box is protected to IP55 when suitably mounted. It has a clear front which is removed for adjustments of pre-set controls. **4100/R** series controllers are suitable for standard Eurorack systems. Seven controllers will fit in one 19" x 3U rack.

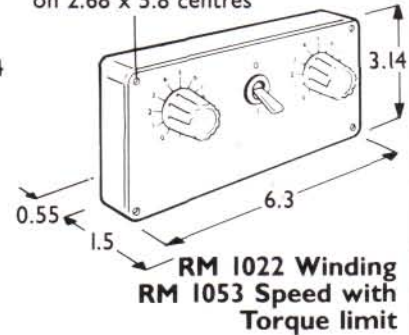


REMOTE CONTROLS

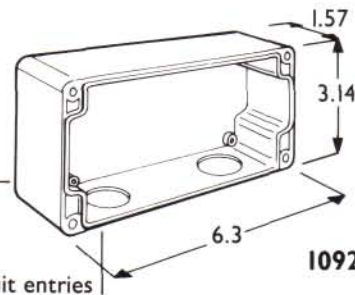
4 holes for $\frac{3}{16}$ UNC screws on 2.68 x 5.8 centres



4 holes for $\frac{3}{16}$ UNC screws on 2.68 x 5.8 centres



4 holes for $\frac{3}{16}$ UNC screws on 1.97 x 5.8 centres



Speed Controller Model 5200 for TR TASC Unit

This panel conforms to EEC Electromagnetic Compatibility Directive 89/336/EEC, BS800 (1988), EN55014 and VDE0875, level "N" for both conducted and radiated radio-frequency interference (R.F.I.).

The **5200** controller, which is fitted with an RFI filter, is derived from, and retains all of the outstanding features of, the highly successful speed controller, model **4200**.

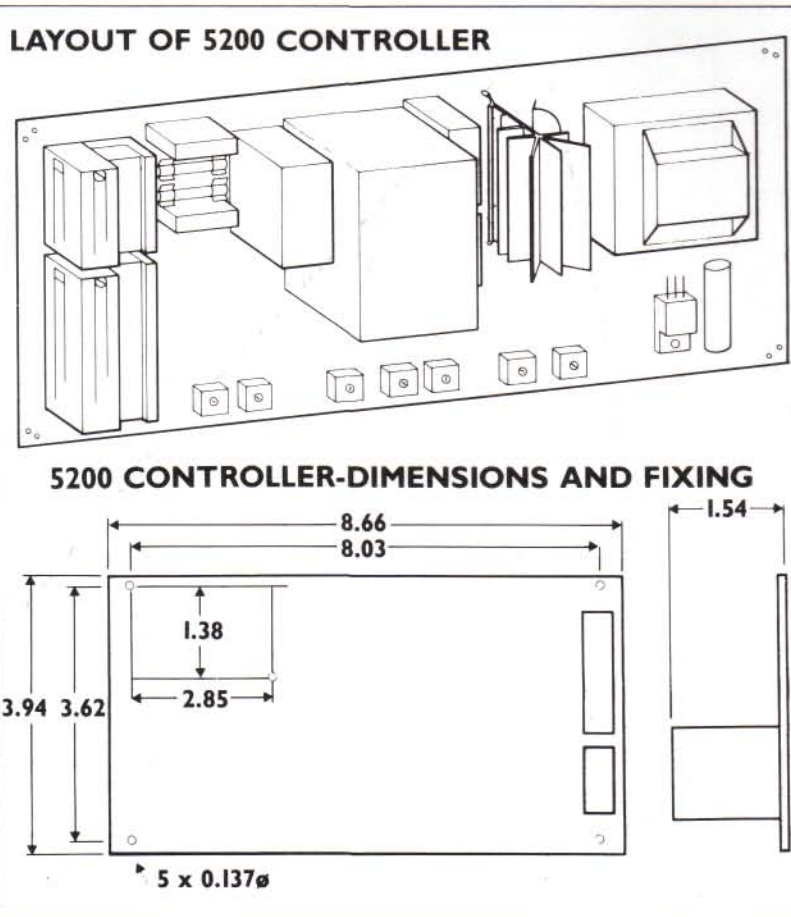
An independent test authority has carried out RFI tests on the TR TASC Unit and **5200** controller. The results show that together they conform to the above internationally recognised standards. Radiated emissions were measured at a distance of two metres. In all cases, the radiated levels

detected were less than 10 dB μ V/m between 30 MHz and 300 MHz. The limit for VDE0875, level "N" is 40 dB μ V/m, at 10 metres. The requirements of this standard are therefore, easily met for radiated emissions.

Mains-borne emissions compared with international standards are shown on the graph, FIG x.

The TR TASC Unit will, with **5200** controller, produce negligible conducted and radiated RFI over a wide frequency range.

Unlike other variable speed drive systems that employ electronic power switching devices, the TR TASC Unit, with its squirrel-cage motor directly connected to the power supply, does not corrupt the sinusoidal wave form.



4200 Speed Controller for TR range

Installation and Setting up Manual for 220V/240V supplies

09-1994

Introduction

The Controller model 4200 provides closed loop speed control of the 'TR' range of TASC Units from 90TR to 225TR.

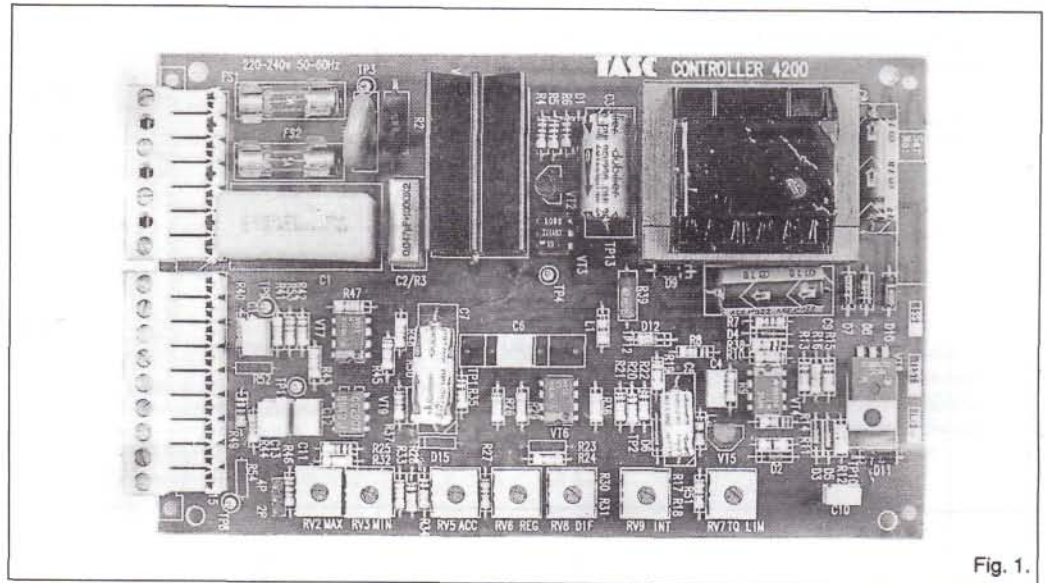


Fig. 1.

4200 Circuit Board

A single-sided printed circuit board of epoxy glass carries all the components on one side. All parameter adjustable potentiometers and terminals are clearly identified and grouped. Multiple plug terminal blocks are fitted to the board, matching sockets being provided.

Speed Control

Speed control is achieved by comparing a speed demand reference signal with the actual speed feedback signal from the tachogenerator mounted on the output shaft of the TASC Unit. The difference, or error, between the two signals controls the triac output stage which automatically adjusts the coil excitation level of the TASC Unit. By this method, speed is held reasonably constant regardless of changes in load.

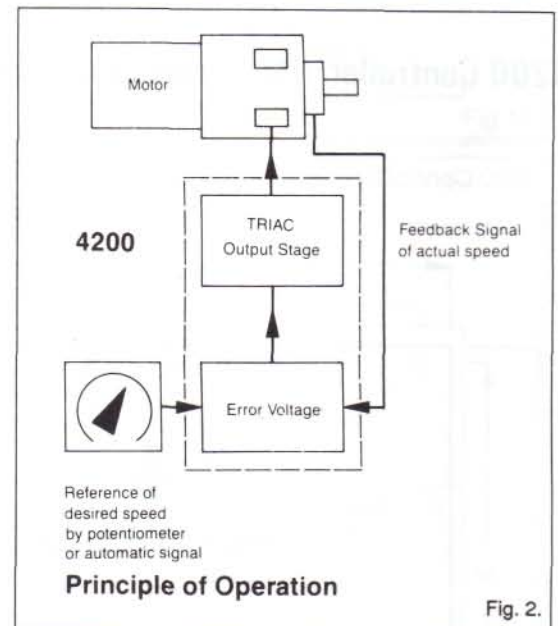


Fig. 2.



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7900 Durand Avenue, P.O. Box 0361,
Sturtevant, Wisconsin, U.S.A. 53177
Tel.: 262.554.7977 • Fax: 262.554.7041
Toll Free: 800.548.2169

SPECIFICATION AND TECHNICAL DATA

GENERAL

To control TASC Unit: 90TR, 100TR, 132TR, 160TR, 180TR, 225TR (Not Code L1)

Maximum Input: 840VA

Maximum Nominal Output Volts: 240V a.c.

Maximum Output Current: 3.5 A a.c.

Fuse Rating: 5 A

Fuse Size: 5 x 20 mm

Permissible Temperature Range:

Ambient around controller when correctly mounted: 0–60°C (140°F)

Ambient outside 1293 Box: 0–45°C (113°F)

Controller Heat Loss: \leq 10W

Standards Conformity: BS & IEC

Weight: 0.33 kg

CONTROL

Speed Control Range: Down to 60 rpm

Torque Limit Range: From 100% rated torque down to 0.5%

Maximum Speed Adjustment: 3300 rpm to 1000 rpm

Minimum Speed Adjustment: 0 to 300 rpm

Regulation: Better than 1% for change from half to rated torque

Response to Mains Variation: 0.3 rpm/volt between 207 and 256V a.c. mains

MAINS CONNECTION

Supply Voltage: 220V – 6% to 240V + 6%, 1 phase or 2 phase

Supply Frequency: 50 Hz or 60 Hz

REFERENCE INPUTS

Control circuit of 4200 Controller is internally isolated from the mains by an opto-coupler rated at 2 kV

Potentiometer RV1 (see fig 5): From 1k Ohm up to 10k Ohm

Voltage Reference (see fig 7): 0–10V d.c. or 0–12V d.c.

Current Reference (see fig 6): 0–20 mA d.c. or 4–20 mA d.c.

Reference Voltage Trim (see fig 9): –12V to +12V d.c., to terminals 15 and 12

Input Impedance:

Potentiometer, Voltage Reference & Current Reference: 150k Ohm

Reference Voltage Trim: 390k Ohm

OUTPUT SIGNALS

Tacho-indicator: 0–1 mA d.c. proportional to speed (7V d.c. \pm 20% at 2400 rpm into a 10k Ohm load), to terminals 13 and 12 (see fig 10)

A digital meter can be used (see figs 11 and 12)

Overspeed Braking: –10V to +10V d.c. across terminals 14 and 12 (voltage proportional to speed error)

PARAMETER ADJUSTMENTS

Trimmer Potentiometer: Parameter

RV7: Internal Torque Limit Control

RV8: Differential Control

RV9: Integral Control

RV6: Regulation Control (speed change with load)

RV5: Acceleration and Deceleration Time (up to 30 seconds)

RV2: Maximum Speed

RV3: Minimum Speed

2-Pole/4-Pole Link:

2-Pole Drives: Put link in 2-pole position

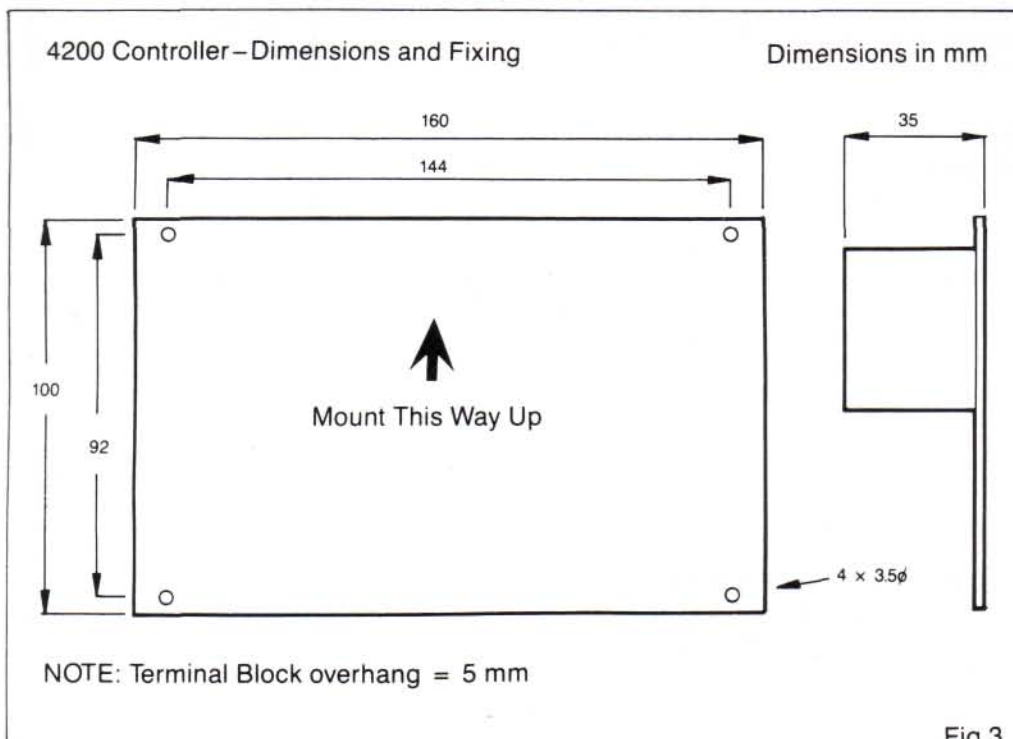
4-Pole Drives: Put link into 4-pole position (and 6-pole or 8-pole)

NOTE

Controller Bypass:

A significant feature of the control system is that, in the event of a Controller or reference input failure the TASC Unit can be supplied with 220V–240V mains and will continue to operate at full speed. Critical processes can thus be continued at maximum speed even if a spare Controller is not immediately available.

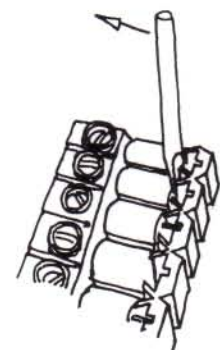
4200 Controller – Dimensions and Fixing



Instructions to remove Terminal Sockets

"To remove terminal sockets insert an insulated screwdriver between the terminal blades and push towards the socket. Do not lever the screwdriver the opposite way as it can cause the socket to be difficult to extract"

CAUTION: Ensure that the mains supply is disconnected before attempting to remove sockets."



Terminal sockets