EUROTHERM CHESSELL

Remote CJ option 180/250mm recorders

1 INTRODUCTION

This document is intended to explain the installation and use of 'Remote' Cold Junction Compensation (CJC) for those users who require a greater accuracy and rejection ratio than are supplied by the recorder's internal CJC.

The option is available either as a complete unit fitted by the manufacturer and ready to use, or as a retrofit kit. For this reason, this document is written as a number of 'stand-alone' sections, which the user may make use of as necessary

As explained in the installation and operation manual supplied with the recorder, each input channel can be configured to have internal, external or remote CJC (section 4.4.2). In the case of 'remote' one or more input channels are set up (in 'Instrument configuration - section 4.2.1) to measure the temperature of the cold junction (CJ). With this option, channel 1 is used to measure the CJ temperature for channels 2 to 24.

Channel 1 uses a platinum resistance thermometer to measure the CJ temperature. For this reason, channel 1 must be related to an 8-channel universal input board because the 16-channel board does not support resistance inputs.

2 SPECIFICATION

The following specification is additional to or replaces parts of the specification given in Annex A of the Installation and Operation Manual.

Warning!
This unit is for use with isolation voltages of <30V RMS or < 60V dc only

Remote CJ option specification

CJC rejection ratio	100:1
CJC accuracy (after calibration)	± 0.2 ˚C
CJC stability	±0.06 ˚C at 1 ˚C/hr rate-of-change in ambient temperature
Total T/C repeatability under normal operating conditions	
	± 0.2 ˚C over an ambient range of 20 ˚C to 30 ˚C.
Resistance thermometer type	Pt_{100}
Start-up time	
Recorder at ambient:	to within 0.1˚C of final value within 2 mins.
Recorder at 20˚C above/below ambient:	to within 0.1˚C of final value within 30 mins.

2.1 COLD JUNCTION REJECTION RATIO, ACCURACY AND STABILITY

The performance of a remote CJ can be described as the response to a change in steady-state temperature, and to the speed at which the temperature is changing. the following example attempts to explain the CJ figures given in the specification above.

An instrument is 'adjusted' * (section four of the installation and operation manual) at an ambient temperature of 25˚C. This adjust procedure removes the effects of individual thermocouple errors and of the CJC accuracy (± 0.2˚C) at the adjust temperatures.

The ambient temperature then rises to 30˚C over a period of two hours - a change of 5˚C at a rate of 2.5˚C/hour,

The new reading error is the total change multiplied by the rejection ratio (5 x 1/100) = 0.05˚C when the temperature stabilises at 30˚C.

DURING the change, there is an additional error calculated by multiplying the rate of change by the CJC Stability value i.e. 2.5 x 0.06 = 0.15˚C.

In a real environment, the temperature is always changing, and in an office-type area, it is reasonable to assume a 1˚C/hour change in ambient, resulting in an error of 0.06˚C which is present at all temperatures, even during the adjust procedure.

The unit has been designed to 'filter' short term rapid changes in temperature, but to minimise ambient-related errors consideration should be given to the location of the recorder. For example, it is not advisable to place the unit near the door to a cold room.

* Channel 1 must be adjusted before other channels. Channel 1 is adjusted by disconnecting one of the RTD leads from the instrument terminal block and connecting a standard resistance box across the terminals. Values of 0˚C (100Ω) and 100˚C (138.5Ω) should be used.

Note: If the software version of your recorder is 4.2, it is necessary to add a one minute delay to the adjust procedure. I.E. when the instrument asks for a high value to be set, wait for one minute before doing so. Failure to wait will result in incorrect adjustment of channels 7 and 8 of each card. Other software versions have a built-in delay.

3 DIMENSIONS

The overall length of the recorder is increased as shown in figure 3. When calculating available depths, remember to leave sufficient room for the thermocouple cables.

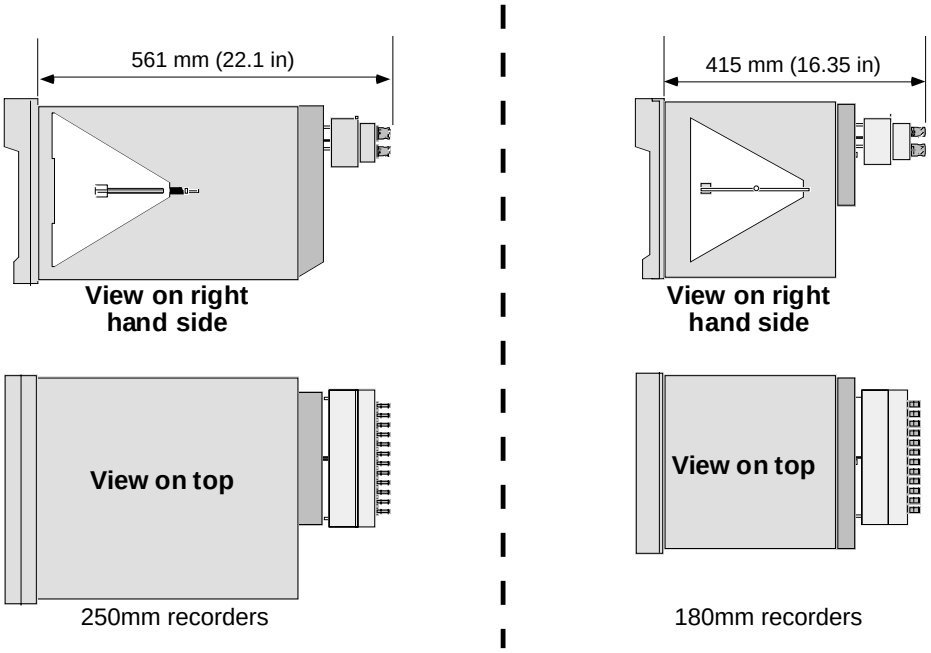

Figure 3 Overall dimensions

4 WIRING

4.1 Thermocouple connectors

Figure 4.1 shows channel wiring information for a full set of T/C connectors. Where only 8 or 16 channels are used, blanking plates cover the remaining space.

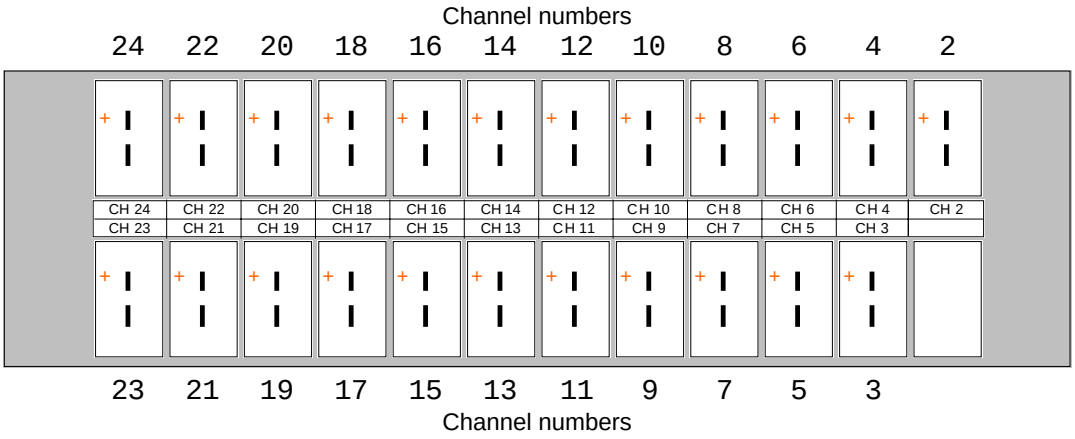

Figure 4.1 Channel layout for T/C connectors.

4.2 TERMINAL BLOCK ACCESS

To gain access to the terminal blocks, the 'U'-shaped back/side cover must be removed by undoing the 4 securing screws (two on each side), as indicated in figure 4.2a. Once the cover is removed, access can be gained to the terminal blocks, the channel layout of which is shown in figure 4.2b. Channel 1 is not available to the user.

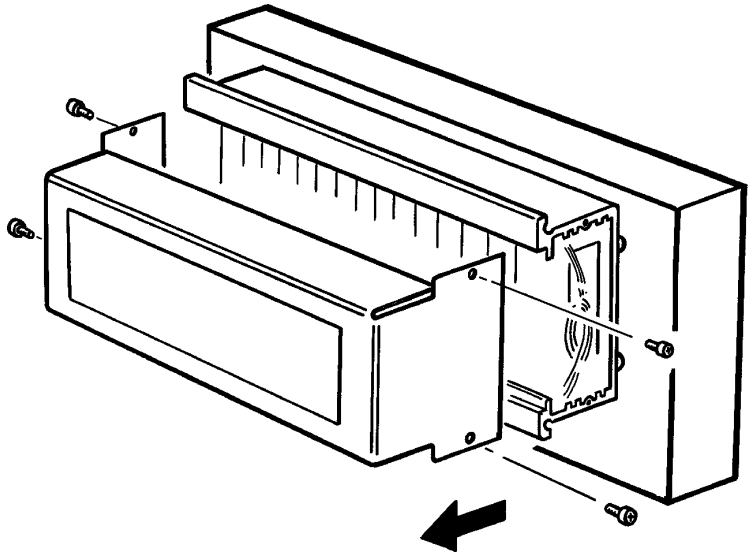

Figure 4.2a Cover removal

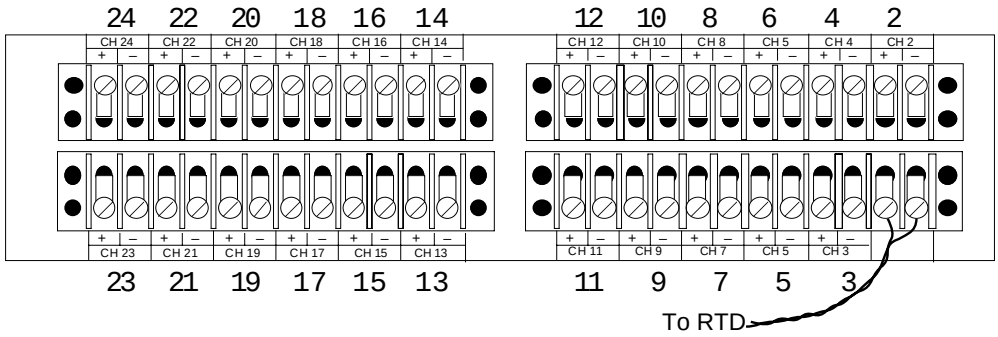

Figure 4.2b Channel wiring

5 CONNECTOR REMOVAL

After first releasing the RFI grounding tag, the connectors are removed from the recorder rear panel, using two screwdrivers (or similar) to depress the catches at each end and to prise the connector out.

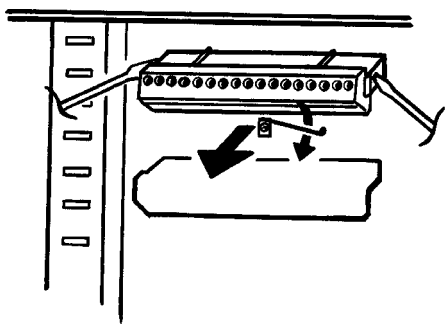

Figure 5a Connector removal (180mm recorders)

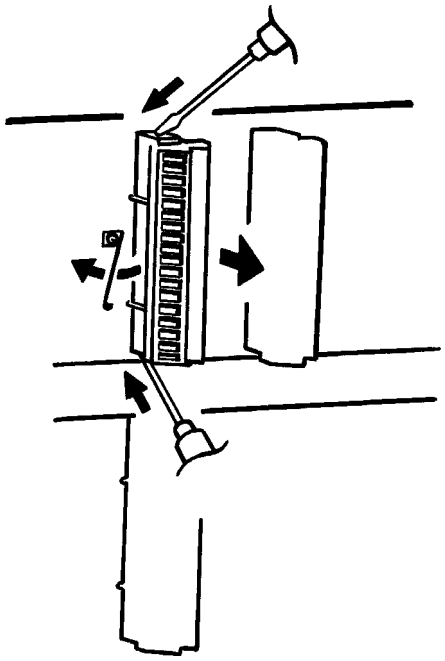

Figure 5b Connector removal (250mm recorders)

6 FITTING THE REAR CONNECTORS

The connectors are fitted (usually) at slots 1 and 2 of the recorder. Figure 6 shows a typical arrangement for a 250 mm recorder. 180mm recorders are similar, but the slots are horizontal with connector 1 at top right (connectors 3 and 5 below) and connector 2 at top left (connectors 4 and 6 below).

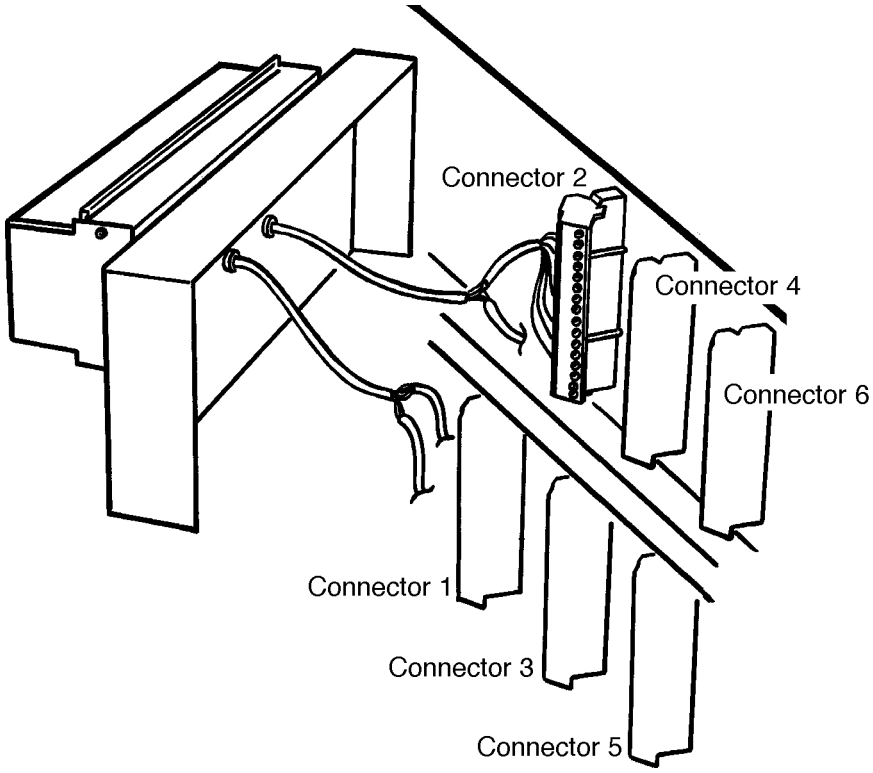

Figure 6 Connector fitting (250mm recorders)

7 WIRING SKETCHES

The retrofit unit comes with connectors for three 8-input channel boards, and figure 7.1 below shows wiring from the T/C sockets to three 8-channel Universal input boards, using six connectors and two cable harnesses.

For fewer 8-channel input boards, only the connectors/harness(es) which are relevant should be used.

To use one 8-channel input board and one 16-channel input board, the user has to re-wire the connectors as shown in figure 7.2 on pages 8 and 9.

With such a configuration, channel one to eight must be associated with the 8-channel board, and channels nine to 24 with the 16-channel board.

7 WIRING SKETCHES (Cont.)

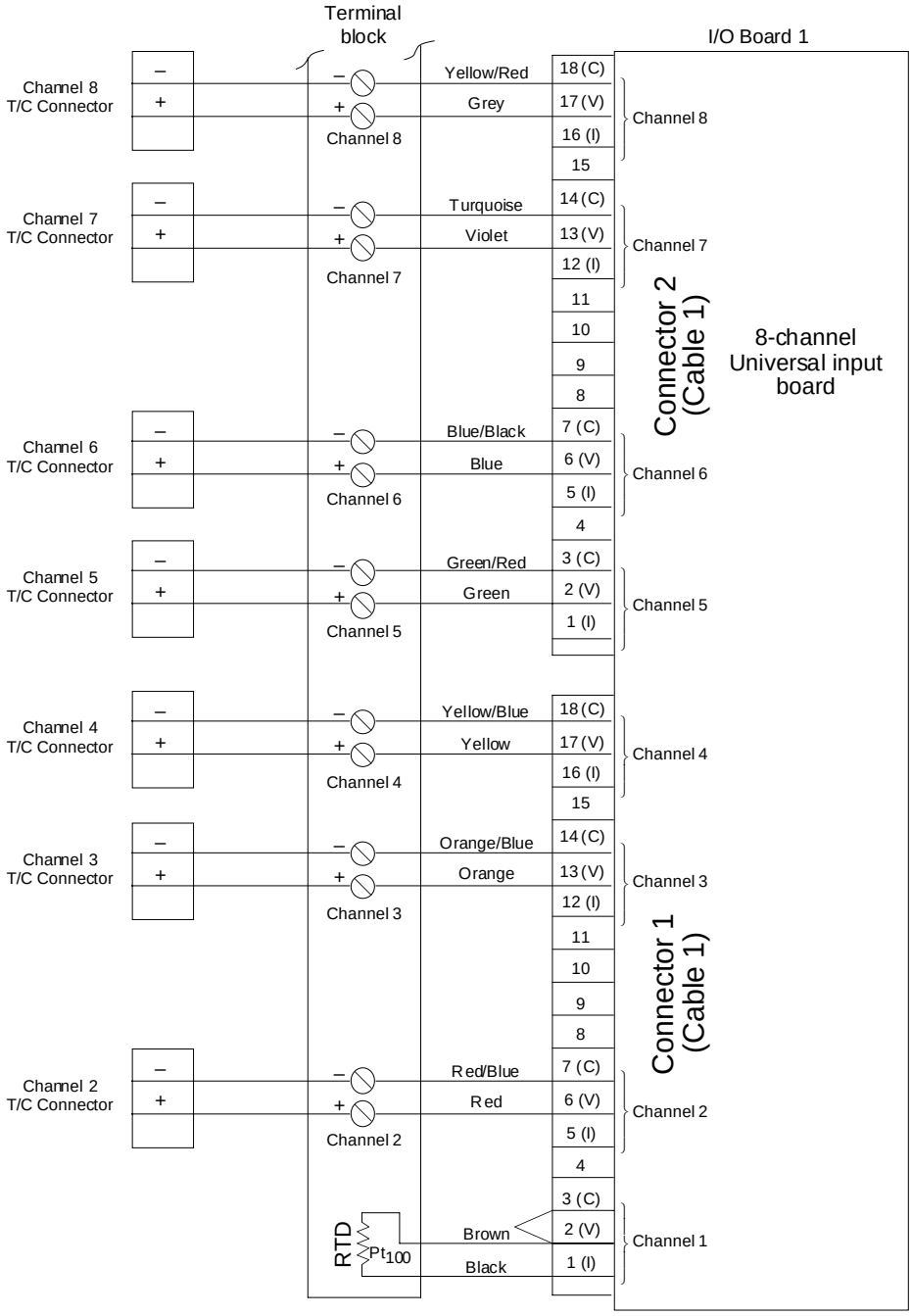

Figure 7.1 Sheet 1. Wiring details for channels 1 to 8 using three 8-channel input boards

7 WIRING SKETCHES (Cont.)

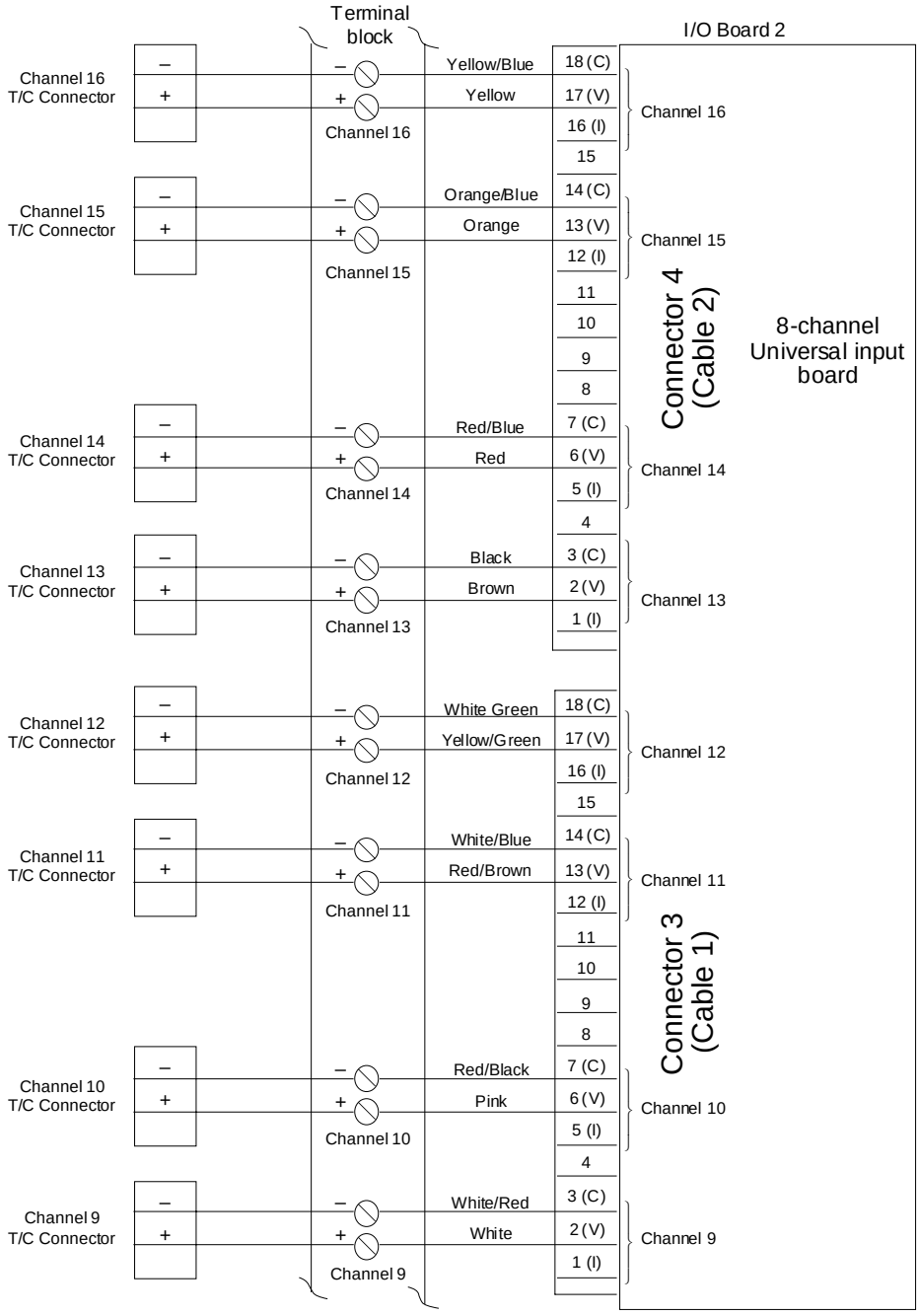

Figure 7.1 Sheet 2. Wiring details for channels 9 to 16 using three 8-channel input boards

7 WIRING SKETCHES (Cont.)

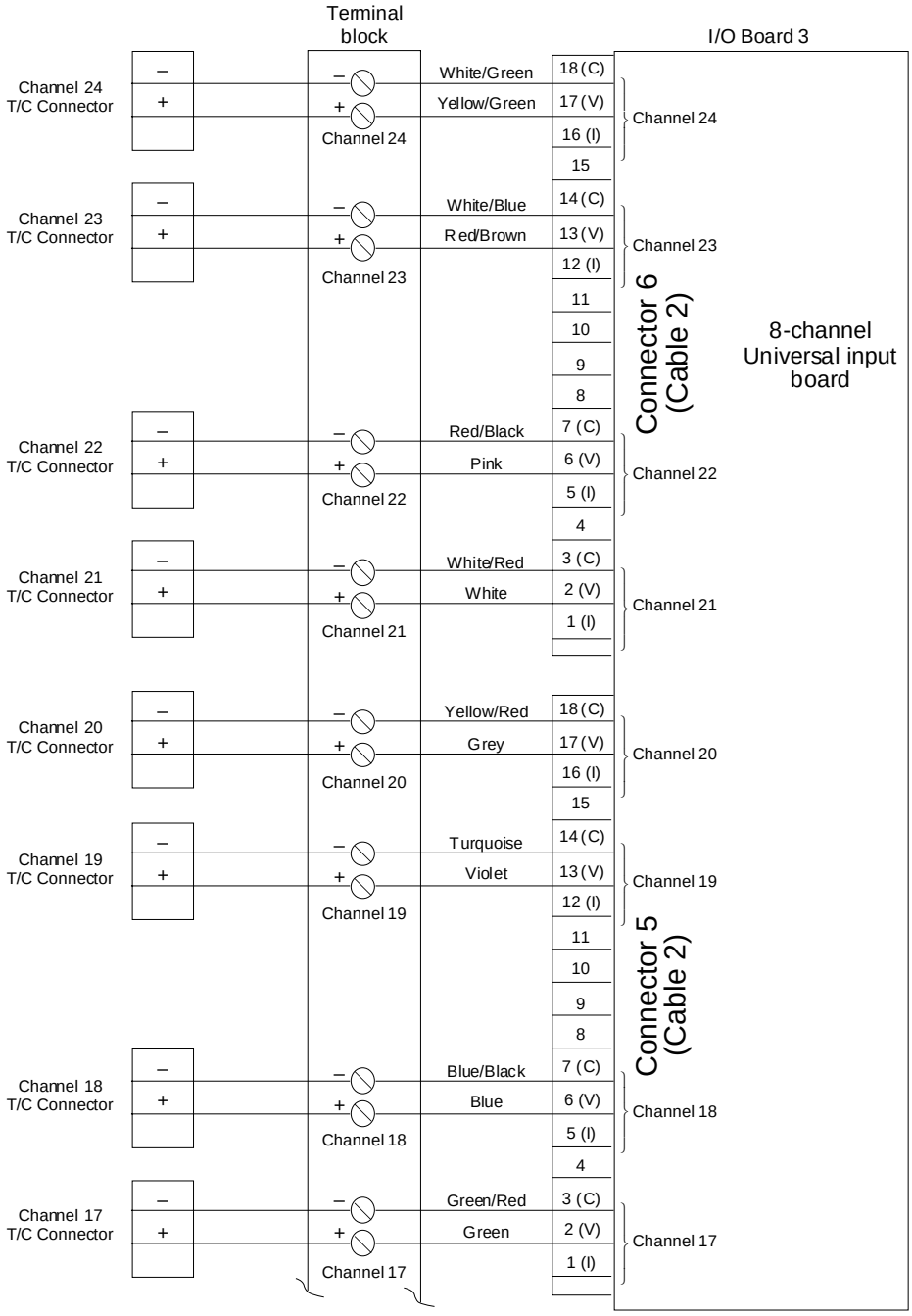

Figure 7.1 Sheet 3. Wiring details for channels 17 to 24 using three 8-channel input boards

7 WIRING SKETCHES (Cont.)

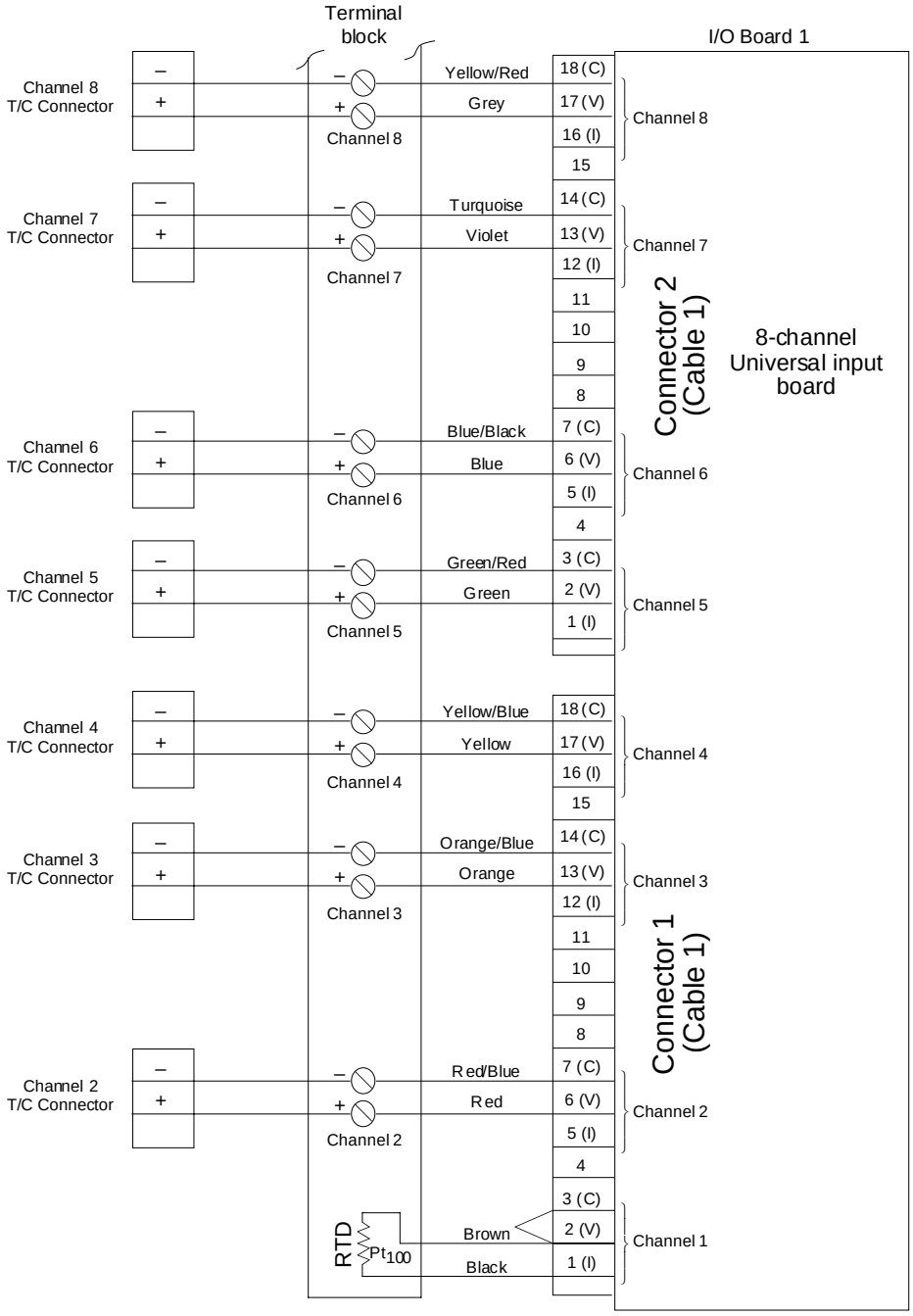

Figure 7.2 Sheet 1. Wiring details for channels 1 to 8 using one 8-channel and one 16-channel input board

7 WIRING SKETCHES (Cont.)

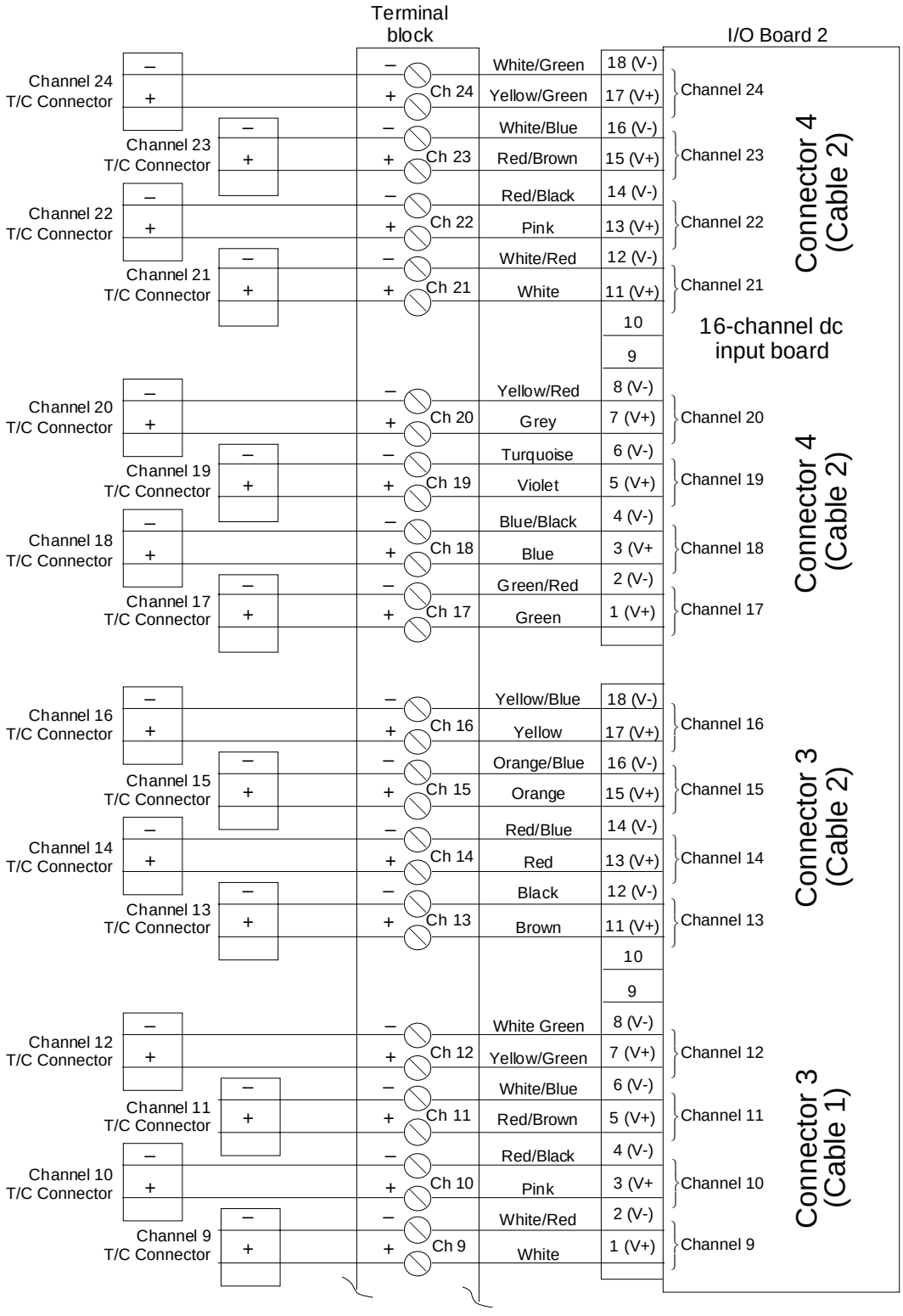

Figure 7.2 Sheet 2. Wiring details for channels 9 to 24 using one 8-channel and one 16-channel input board

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