

WOSS 850/10

British Railways Board

Director of Mechanical and Electrical Engineering

OVERHAUL OF TRAFAG TYPE THERMOSTATS

WORKSHOP OVERHAUL STANDARD SPECIFICATION



This is a proprietary specification issued by:

Director of Mechanical and Electrical Engineering
British Railways Board
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REVISION RECORD

This specification will be updated when necessary by the issue of amended pages accompanied by revision letters. The amended or additional part of re-issued pages will be marked with a vertical black line.

Revision No	Date	Inserted by

Revision	Date	Inserted by

This Specification applies to equipment fitted to the vehicle types indicated 'X' below. The specification shall only be implemented when authorised by the appropriate WOSS or by the Business Engineer in the case of special application.

LOCOMOTIVES

03	---	73	---
08	---	86	---
09	---	87	---
20	---	88	---
25	---	89	---
26	---	90	---
27	---	91	---
31	---	92	---
33	---	---	---
37	---	---	---
43	X	---	---
45	---	---	---
47	---	---	---
50	---	---	---
56	X	---	---
58	X	---	---
59	---	---	---
60	---	---	---

DMU's

101	X
104	---
107	---
108	X
110	---
111	---
114	---
115	---
116	X
117	---
118	---
119	---
120	---
121	---
122	---
127	---
128	---
140	---
141	---
142	---
143	---
144	---
150	X
151	---
154	X
156	X
157	---
158	---
165	---

EMU's

302	X	411	---
303	X	412	---
304	---	413	---
305	X	414	---
307	X	415	---
308	X	416	---
309	X	419	---
310	---	421	---
311	X	422	---
312	X	423	---
313	X	432	---
314	X	438	---
315	X	442	---
317	X	455	X
318	---	465	---
319	---	466	---
320	---	485	---
321	---	486	---
504	---	487	---
507	X	488	X
508	X	489	---
510	X	---	---

COACHING STOCK

Mk 1	---
Mk 1 Catering	---
Mk 2, 2a - c	X
Mk 2d - e	X
Mk 2f	X
Mk 2 DBSO	X
Mk 3a	X
Mk 3b	X
Mk 3 Catering	X
Mk 3 (HST)	X
Mk 3 (HST) Catering	X
Mk 3 SLE and SLEP	X
Mk 4 IC225	---
DVT IC225	---
DVT 125	---
Non Passenger	---

WAGONS

DEMU's

201	---
202	---
203	---
204	---
205	---
207	---
210	X

PRIVATE OWNER VEHICLES

DEPARTMENTAL VEHICLES

OVERHAUL OF TRAFAG TYPE THERMOSTATS.

Document Contents:

Part 1. Overhaul of Multistats.

Section 1. Repair procedure.
Section 2. Test Specification.
comprising:
 Calibration Procedure: a (Section 1 and 2)
 Calibration procedure: b, which details:
 Calibration as a single stage overheat protection
 device for driving cabs which have been converted
 to manual air conditioning system control.
Figs 1 to 5.

Part 2. Overhaul of Single Stage Thermostats, Laborstats & Duostats

ie. ministats, industats, and some alterostats.
Section 1 Repair Procedure.
Section 2 Test Specification.
comprising:
 Calibration Procedure: c.
Figs 6 to 8.

Part 3. Overhaul of Two Stage Thermostats.

ie. some alterostats.
Section 1 Repair Procedure.
Section 2 Test Specification.
comprising:
 Calibration Procedure: d.
Figs 9 to 11.

Part 4. Overhaul of Adjustable Thermostats.

ie. some alterostats.
Section 1 Repair Procedure.
Section 2 Test Specification.
comprising:
 Calibration Procedure: e.
Figs 12 to 14.

NB. Cost emerging against items identified as "ABNORMAL" to
be costed separately to the cost of this WOSS.

Part 1. Overhaul of Multistats.

Contents:

Tools and Equipment

Section 1. Repair Procedure.

1.1. Dismantling.

1.2. Cleaning.

1.3. Examination.

Section 2. Test Specification.

2.1. Preparation.

2.2. Calibration Procedure: a.

2.2.1. Adjustment.

2.2.2. Air Bath Test.

2.3. Calibration Procedure: b.

Illustrations.

Figure 1. Test Bath.

Figure 2. Test Lamp Connection.

Figure 3. Thermostat Settings.

Figure 4. Thermostat (Pictorial).

Figure 5. Thermostat (Pictorial).

Tools and Equipment

A room which is reasonably dust free, in which the temperature can be held constant ie. draught free, for the duration of the first and second parts of the test and adjustment.

An air bath as shown in figure 1
(Rate of temperature change to be 1°C in 3 minutes).

An upright stand to which the Multistat will be fixed during the testing and adjusting in the air bath.

Low powered indication test lamps as shown in figure 2.

A mercury-in-glass or electronic thermometer with a resolution of 0.1°C, calibrated between 15 - 30°C.

A 5mm broad bladed screwdriver.

A 2mm broad bladed watchmakers screwdriver.

An Allen key 1.5 mm across the flats.

A clean dry cloth and paint brush (approx. 25mm wide).

Sealing tape/lable. (Calibration void if broken)

Allen screws B.R. Cat. No.64/70027.

Backing plate and flying leads. (Supplied from vehicle with thermostat.)

NOTE.

Calibration Procedures.

WHEN MORE THAN ONE MICRO-SWITCH IS BEING USED NO ATTEMPT SHALL BE MADE TO ADJUST THE THERMOSTAT IN SITU ON THE VEHICLE.

For Trafag Multistats used on all Inter City Coaches ie. BR1, BR2, BR3 & BR3C calibration Procedure a (Section 1 and 2) shall be used.

For Trafag Multistats used on all Suburban Stock ie. BR11, BR16, BR26 & BR27, calibration Procedure a (Section 1) only shall be used.

For Trafag Multistats used for driving cabs, (after conversion to manual control) use procedure b.

Section 1. Repair Procedure.

1.1. Dismantling.

1.1.1. If the thermostat is situated in a box remove the top cover.

1.2. Cleaning.

1.2.1. Clean carefully and thoroughly using the clean dry cloth and paint brush.

1.3. Examination.

1.3.1. Examine the thermostat capillary and sensing phial for fractures.

ABNORMAL (If a fracture has occurred then the thermostat shall be discarded).

1.3.2. Examine/test microswitches for continuity on switched contacts and differential. Replace defective microswitches.

Section 2. Test Specification.

2.1. Preparation.

NOTE: Thermostats used on air conditioned vehicles require the accuracy of the air bath procedure (Fig 1), multistats must be fitted on a backing plate and flying leads fitted.

2.1.1. Note the thermostat type i.e. BR.2, BR.3, etc. Using figure 3 make a note of its correct switch temperature settings and its switch temperature differences a, b and c°C, (Fig.3) and record on the test sheet.

2.1.2. The thermostat shall be kept in the setting environment for NOT LESS than TWO HOURS before attempting any adjustment.

2.1.3. The indication test lamps shall be connected to the thermostat (see figure 2).

2.1.4. The thermostat shall be positioned so that its sensing phial faces away from the body of the person carrying out the calibration.

2.1.5. The temperature measuring device shall be placed alongside the thermostat sensing phial.

2.2. Calibration Procedure: a (Section 1).

2.2.1. Switch Adjustment.

NOTE. It is imperative that the thermostat be kept at a constant temperature and free from draughts during this part of the test procedure.

2.2.1.1. Using a 2mm broad bladed screwdriver unlock the main adjustment locking screw (see figure 4).

- 2.2.1.2. Using a 5mm broad bladed screwdriver turn the main adjusting screw (see figure 5) fully clockwise, then anticlockwise until the indicated temperature is equal to the minimum temperature setting of the thermostat being calibrated.
- 2.2.1.3. Slacken off the four red knurled switch adjustment locking screws, (see figure 4).
- 2.2.1.4. Start with switch No.1, turn all four red knurled switch adjusters (see figure 5) until all the test lamps just switch ON. Lightly tighten their locking screws.
- 2.2.1.5. Turn the main adjusting screw fully clockwise, (all test lamps should be ON).
- 2.2.1.6. Turn the main adjusting screw anticlockwise until the indicated temperature is equal to the maximum temperature setting of the thermostat being calibrated.

NOTE. When turning the main adjusting screw NO downward pressure must be exerted on the screwdriver and the movement must be slow and steady.

- 2.2.1.7. Turn the red knurled switch adjuster number 4 (see figure 5) anticlockwise until the switch just operates and the test lamp goes OFF.
- 2.2.1.8. Turn the main adjusting screw anticlockwise to bring the indicated temperature down by a°C, (Fig.3).
- 2.2.1.9. Turn the red knurled switch adjuster number 3 (see figure 5) anticlockwise until the switch just operates and the test lamp goes OFF.
- 2.2.1.10. Turn the main adjusting screw anticlockwise to bring the indicated operation temperature down by b°C, (Fig.3).
- 2.2.1.11. Turn the red knurled switch adjuster number 2 (see figure 5) anticlockwise until the switch just operates and the test lamp goes OFF.
- 2.2.1.12. Turn the main adjusting screw anticlockwise to bring the indicated operation temperature down by c°C, (Fig.3).
- 2.2.1.13. Turn the red knurled switch adjuster number 1 (see figure 5) anticlockwise until the switch just operates and the test lamp goes OFF.

NOTE. Due to the spring loaded action of the red knurled adjusters, when one is adjusted its spring tension and hence its indicated operation temperature is either increased or decreased, likewise at the same time all the other red knurled adjusters spring tensions will be altered. Therefore the adjustment procedure must be repeated over and over from the beginning until the correct switch indicated operation temperature differences i.e. a, b or c°C are obtained.

- 2.2.1.14. Repeat clauses 2.2.1.5. to 2.2.1.13. until the switches operate (test lamps go OFF) to give the correct indicated operation temperature differences, a, b and c°C.

- 2.2.1.15. Securely tighten the four nylon red switch adjustment locking screws (see figure 4).
- 2.2.1.16. Repeat clauses 2.2.1.5. to 2.2.1.14. until the main adjusting screw can be turned anticlockwise in one motion through its indicated operational temperature range and each switch in turn operates (test lamps go OFF) to give the correct operation temperature differences, a, b, c°C.
- 2.2.1.17. With the indicated temperature equal to the minimum temperature setting for the thermostat being calibrated, securely tighten the main adjusting locking screw.
- 2.2.1.18. Using the 1.5 mm Allen key slacken off the temperature indicator locking grub screw (see figure 4). Set the inside red indicator (see figure 5), to the same temperature as that adjacent to the thermostat sensing phial. Securely tighten locking grub screw.
- 2.2.1.19. Slacken off the main adjuster locking screw, (see figure 4) and turn the main adjusting screw (see figure 5) fully clockwise, and then anticlockwise until the indicated temperature is at the highest temperature setting for the thermostat being calibrated (see figure 3). Securely tighten the locking screw.
- 2.2.1.20. Disconnect the test lamps.

2.2.2. Calibration Procedure: a (Section 2).
Air Bath Test.

NOTE: The use of an air bath (Fig 1) to cycle the thermostat through its operating points is required to achieve the tolerance specified. This part of the calibration procedure shall only be carried out if and when part 1 has been completed satisfactorily.

- 2.2.2.1. Connect the test lamps to the thermostat (see figure 2).
- 2.2.2.2. Final adjustment is made via the red knurled switch adjusters.

NOTE. If the switch operating temperature is too HIGH turn the red knurled switch adjuster anticlockwise, if it is too LOW turn the red knurled switch adjuster clockwise.

Adjust as necessary so that the thermostat gives constant repetitive results at the correct switch settings (see figure 3) for the thermostat being tested, within the limits stated below.

Switch temperature limits.
 Switch Nos. 1, 2 & 3. +/- 0.2°C.
 Switch No. 4. +/- 0.5°C.

- 2.2.2.3. When the thermostat has been tested satisfactorily, remove from bath and disconnect test lamps.

- 2.2.2.4. Where slotted head cover retaining screws are fitted replace with allen screws BR Cat No.64/70027.
- 2.2.2.5. Refit cover and seal each retaining screw with a self adhesive lable which will advise that the cover must not be removed.
The lable design to be subject to approval by the Board.

2.3. Calibration Procedure: b.

Note. If the thermostat is easily accessible this procedure may be carried out with the thermostat in situ on the vehicle.

- 2.3.1. Note the thermostat type i.e. BR.2, BR.3, etc. Using figure 3 make a note of its correct switch temperature setting and record on the test sheet.
- 2.3.2. If fitted remove and discard the 3 red knurled switch adjusters (see figure 5) which are not being used.
- 2.3.3. Connect a test lamp to the switch being used (see figure 2).
- 2.3.4. Using a 2mm broad bladed screwdriver unlock the main adjustment locking screw (see figure 4).
- 2.3.5. Using a 5mm broad bladed screwdriver turn the main adjusting screw (see figure 5) fully clockwise, then anticlockwise until the indicated temperature is equal to the temperature measured at the sensing phial.
- 2.3.6. Turn the red knurled switch adjuster (see figure 5) until the switch just operates and the test lamp goes OFF.
- 2.3.7. Turn the main adjusting screw (see figure 5) fully clockwise, and then anticlockwise until the indicated temperature is equal to the thermostat setting temperature (see figure 3). Securely tighten the locking screw.
- 2.3.8. Remove thermometer and replace cover.

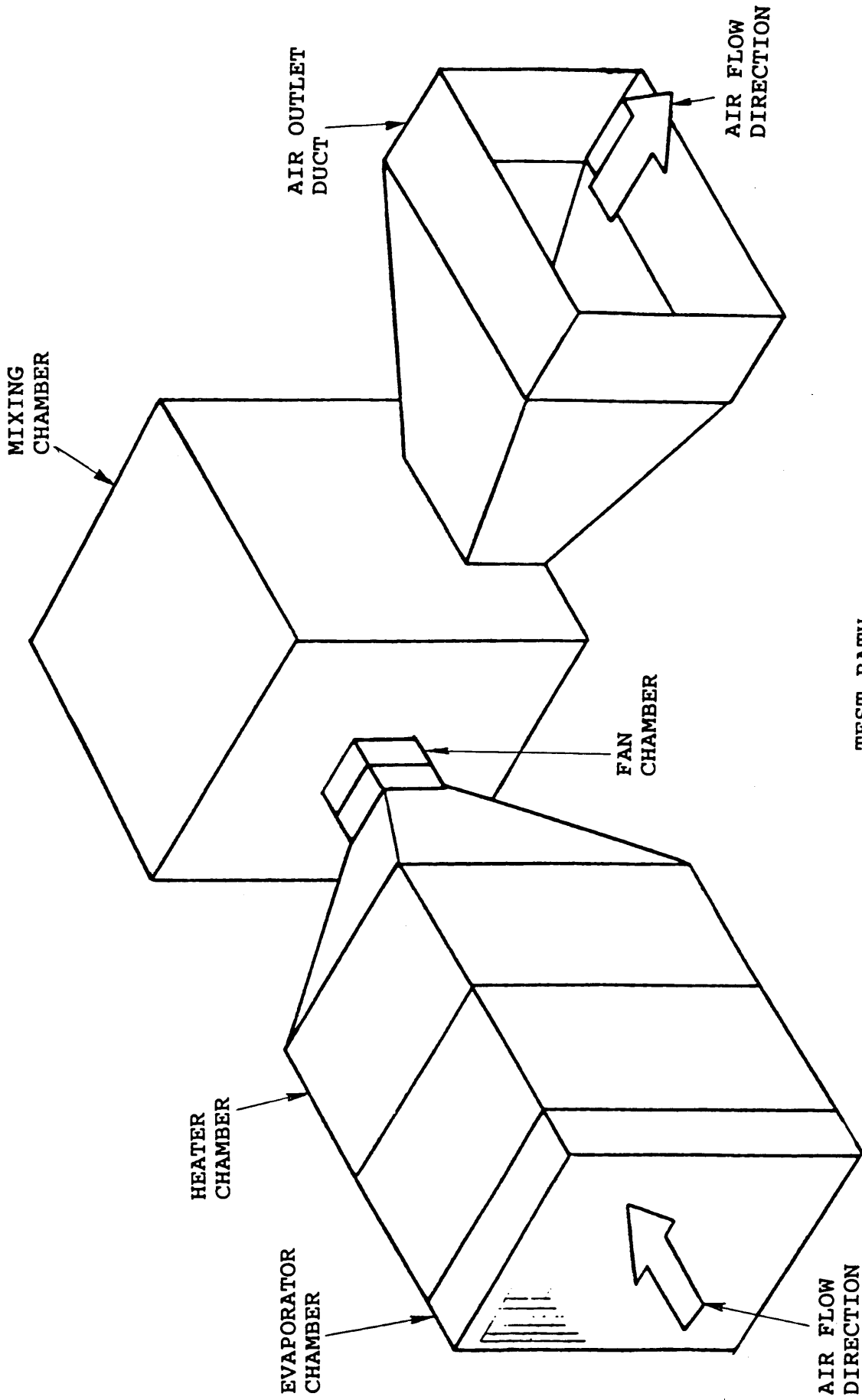
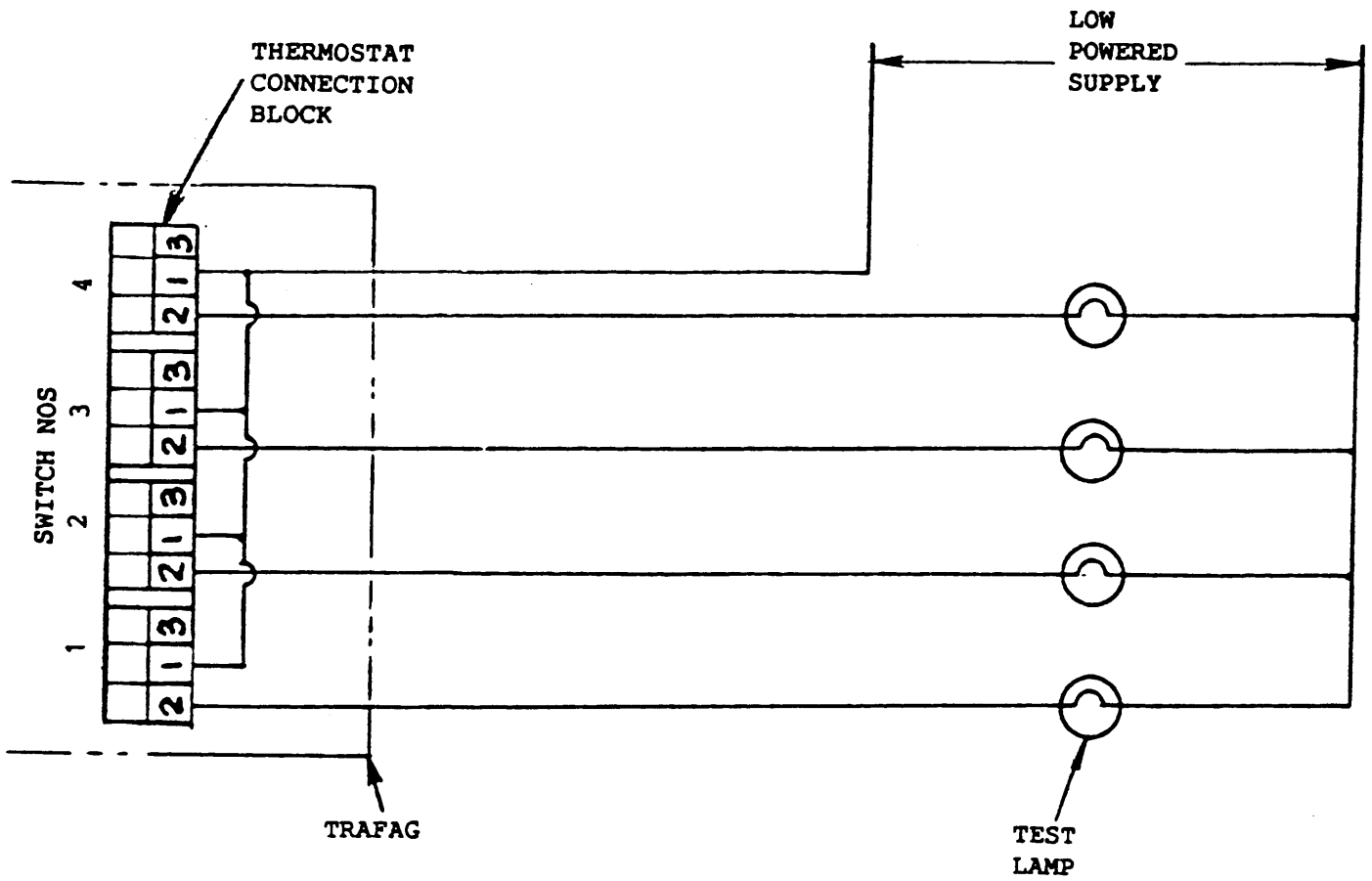


FIG 1.



TEST LAMP CONNECTION

FIG 2.

Figure 3

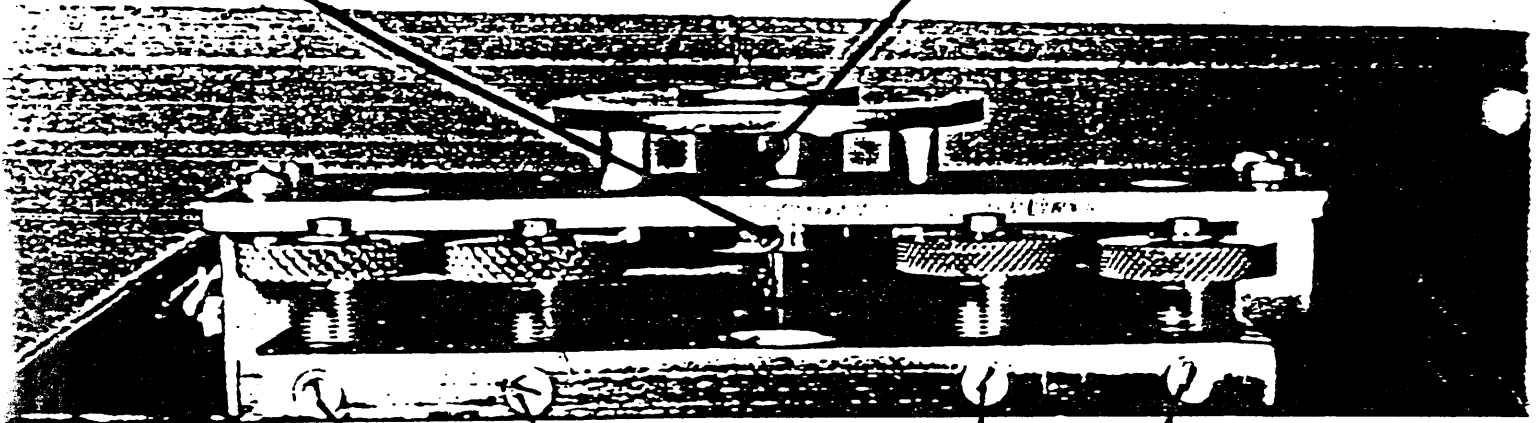
Temperature Settings for Trafag Multistats

Vehicle fitted	Type No.	BR Cat No.	Temperature (°C)						
			Switch Settings				Switch Diffs		
			4	3	2	1	a	b	c
Mk II Edinburgh Glasgow Stock	BR1	52/944	18	19	20	21	1	1	1
Mk II D, Class 488 (Temp Ltd Equip) & F's Coaches	BR2	52/2386	18	20	21	23	2	1	2
Mk III Locomotive Hauled Coaches	BR3	64/441	18	20	21	22	2	1	1
Mk III HST Coaches	BR3C	64/1038	18	20	21	22	2	1	1
Class 56 (lot 1507 & 1508) & Class 43	BR8	72/687	--	28	--	--	-	-	-
Class 313 & 507 Saloons	BR11	98/580	18	20	21	26	2	1	5
Class 507/1 Saloon	BR16	98/605	--	32	37	58	-	5	21
Class 508, 455 (ex 510), 314 and 315 Saloons	BR26	98/3189	18	20	21	26	2	1	5
Class 210 & 317 Saloons	BR27	98/3746	14	16	17	22	2	1	5

Figure 4.

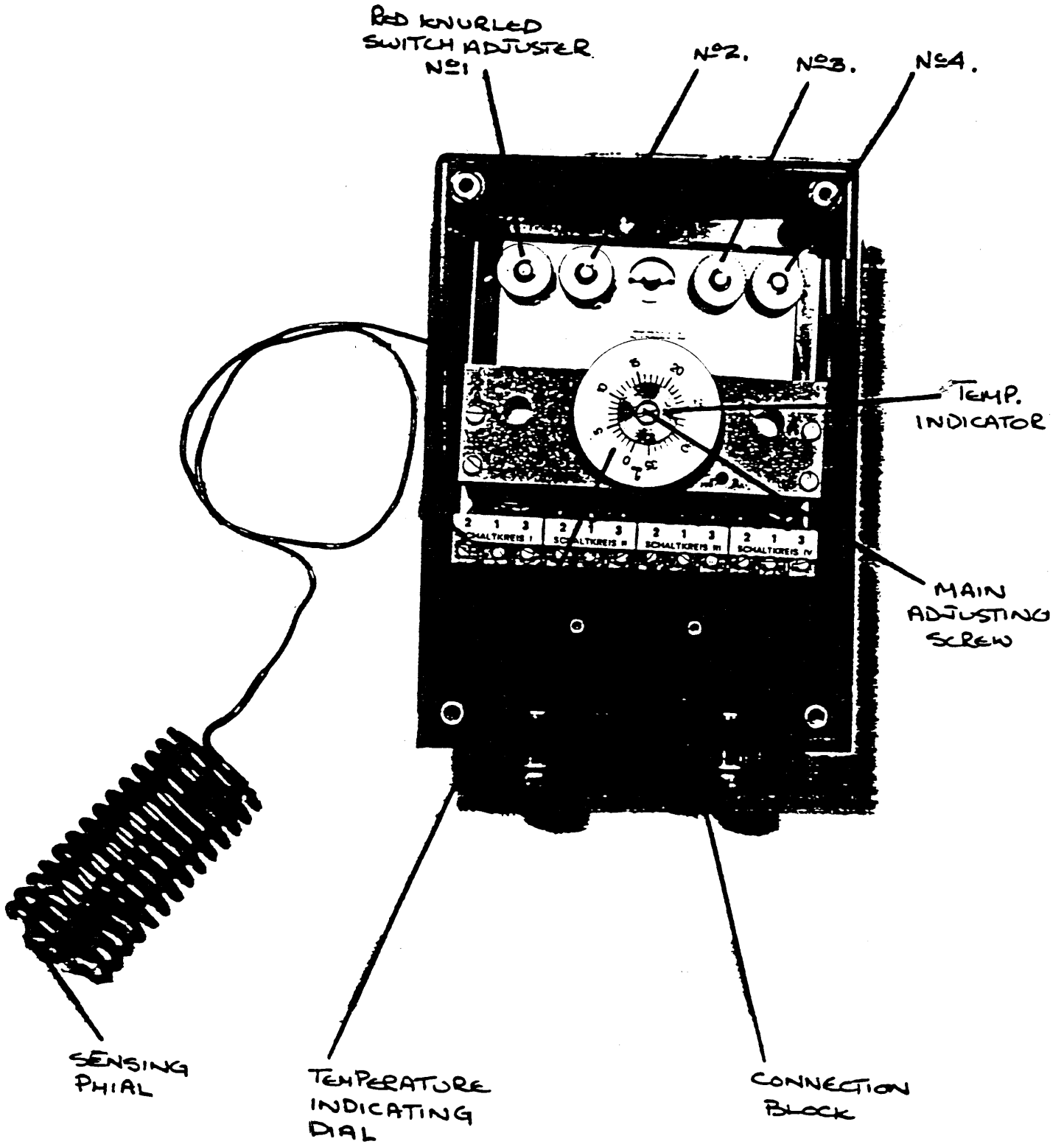
MAIN ADJUSTMENT
LOCKING SCREW.

TEMPERATURE INDICATOR
LOCKING GRUB SCREW



RED KNURLED
SWITCH ADJUSTMENT
LOCKING SCREWS

Figure 5.



THERMOSTAT-PICTORIAL

Part 2. Overhaul of Single Stage Thermostats.

Contents:

Tools and Equipment

Section 1. Repair Procedure.

1.1. Dismantling.

1.2. Cleaning.

1.3. Examination.

Section 2. Test Specification.

2.1. Preparation.

2.2. Calibration Procedure: c.

Figure 6. Thermostat settings.

Figure 7. Test Lamp Connection.

Figure 8. Thermostat (Pictorial).

Tools and Equipment

A low powered indication test lamp as shown in figure 7.

A mercury-in-glass or electronic thermometer with a resolution of 0.1°C, calibrated between 15 - 30°C.

A 3.8mm broad bladed screwdriver.

A 1.5mm broad bladed screwdriver.

A clean dry cloth and paint brush (approx 25mm wide).

Section 1. Repair Procedure.

1.1. Dismantling.

1.1.1. If the thermostat is situated in a box remove the top cover.

1.2. Cleaning.

1.2.1. Clean carefully and thoroughly using the clean cloth and paint brush.

1.3. Examination.

1.3.1. Examine the thermostat capillary and sensing phial for fractures.

ABNORMAL (If a fracture has occurred then the thermostat shall be discarded.)

1.3.2. Examine/test microswitch for continuity on switched contacts and differential. Replace defective microswitch.

Section 2. Test Specification.

Note. If the thermostat is easily accessible this procedure may be carried out with the thermostat in situ on the vehicle.

2.1. Preparation.

2.1.1. Note the thermostat type i.e. BR.2, BR.3, etc. using figure 6 make a note of its correct switch temperature setting.

2.1.2. The thermostat shall be kept in the setting environment for NOT LESS than TWO HOURS before attempting any adjustment.

2.1.3. The indication test lamp shall be connected to the thermostat (see figure 7).

2.1.4. The thermostat shall be positioned so that its sensing phial faces away from the body of the person carrying out the calibration.

2.1.5. The temperature measuring device shall be placed alongside the thermostat sensing phial.

2.2. Calibration Procedure: c.

NOTE. It is imperative that the thermostat be kept at a constant temperature and free from draughts during this part of the test procedure.

A Duostat is two single stage thermostats housed in the same casing and the following calibration procedure must be carried out for both individual switches.

2.2.1. Using a 1.5mm broad bladed screwdriver, slacken off the main adjustment locking screw (see figure 8).

- 2.2.2. Using a 3.8mm broad bladed screwdriver turn the main adjuster (see figure 8) fully clockwise, then anticlockwise until the switch operates and the lamp just goes out.
- 2.2.3. Securely tighten the main adjustment locking screw.
- 2.2.4. Using a 1.5mm broad bladed screwdriver, slacken off the temperature indicator locking screw (see figure 8).
- 2.2.5. Turn the temperature indicator until the indicated temperature is equal to that measured adjacent to the thermostat sensing phial, securely tighten the locking screw.
- 2.2.6. Using a 1.5mm broad bladed screwdriver, slacken off the main adjustment locking screw (see figure 8).
- 2.2.7. Using a 3.8mm broad bladed screwdriver turn the main adjuster (see figure 8) fully clockwise, then anticlockwise until the indicated temperature is equal to the temperature setting for the thermostat being calibrated (see figure 6).
- 2.2.8. Securely tighten the main adjustment locking screw.
- 2.2.9. Disconnect the test lamp, remove thermometer and replace front cover (where necessary).

Figure 6.

Temperature Settings for Trafag Industats:

			Temperature (°C)
Vehicle fitted	Type No.	B.R. Cat. No.	Switch Setting
Mk.II Edinburgh Glasgow Stock.	BR4	64/5356	50
Class 312 Saloons.	BR6	52/2444	20
Class 56 Coolant Heater.	BR36	72/4191	55
Class 303,307,311 & Refurbished 302, 305 & 308 Saloons.	BR38	52/3828	21
Class 309 saloons.	BR48	52/4071	21

Figure 6. Cont.

Temperature Settings for Trafag Ministats:

Vehicle fitted	Type No.	B.R. Cat. No.	Switch Setting Temp. (°C)
Cl.150&154 Toilet Water Heater.	BR46	15/78634	55
Mk.III HST and Class 56 Cabs.	BR52	72/7624	28

Temperature Settings for Trafag Duostats:

Vehicle fitted	Type No.	B.R. Cat. No.	Temperatures (°C)	
			Switch Settings	
			System 1	System 2
Class 58 & 210 Cab Heater Unit.	BR30	23/5031	50	125

Temperature Settings for Trafag Laborstats:

Vehicle fitted	Type No.	B.R. Cat. No.	Switch Setting Temp. (°C)
MkII D FK's.	BR31	52/1439	18
Class 510 & Refurbished 307 Cab Fan Heaters.	BR37	52/3905	18

Figure 6. Cont.

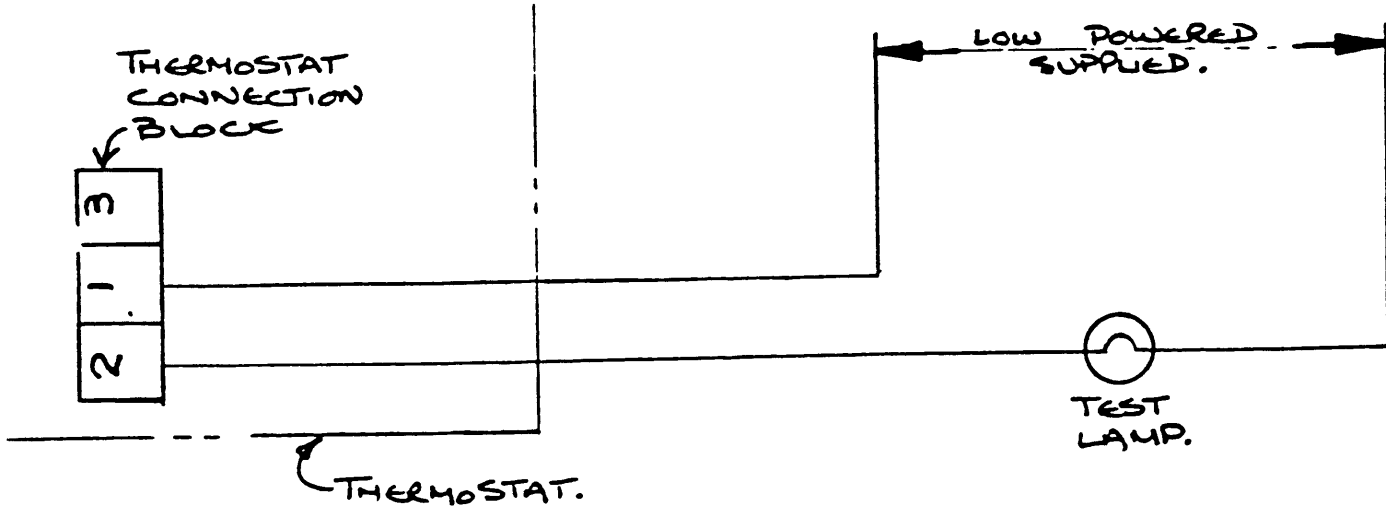
Temperature Settings for Trafag Ambistats:

Mk.III HST & Loco. Hauled Fridges.	BR45	64/3875	see details below
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Buffet Vehicle Refrigerator Thermostat Settings:

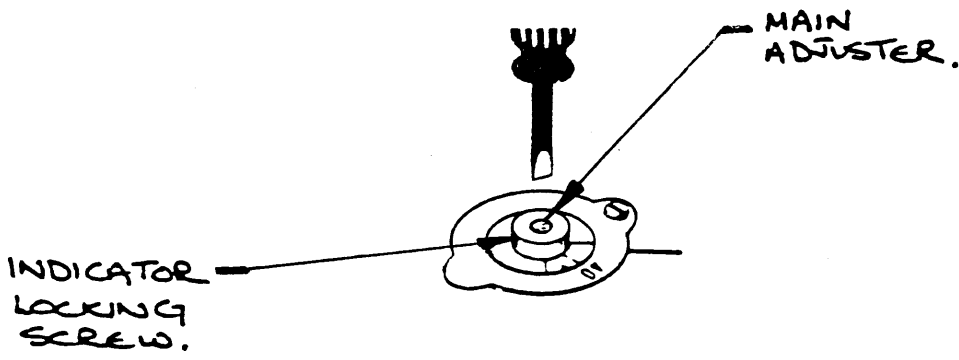
	Temps. (°C)
Bottle Coolers.	7
Display Cases.	2
Frige Compt's.	1
Freezer Compt's.	-6

Figure 7.



TEST LAMP CONNECTIONS

Figure 8.



THERMOSTAT (PICTORIAL)

Part 3. Overhaul of Two Stage Thermostats.

Contents:

Tools and Equipment

Section 1. Repair Procedure.

1.1. Dismantling.

1.2. Cleaning.

1.3. Examination.

Section 2. Test Specification.

2.1. Preparation.

2.2. Calibration Procedure: d.

Section 3. Illustrations.

Figure 9. Thermostat Settings.

Figure 10. Test Lamp Connections.

Figure 11. Thermostat (Pictorial).

Tools and Equipment

Low powered indication test lamps as shown in figure 10.

A mercury-in-glass or electronic thermometer with a resolution of 0.1°C, calibrated between 15 - 30°C.

An air bath as shown in part 1, figure 1.

A 3.8mm broad bladed screwdriver.

A 1.5mm broad bladed screwdriver.

A 2mm Allen key.

A clean dry cloth and paint brush (approx 25mm wide).

Section 1. Repair Procedure.

1.1. Dismantling.

1.1.1. If the thermostat is situated in a box remove the top cover.

1.2. Cleaning.

1.2.1. Clean carefully and thoroughly using the clean cloth and paint brush.

1.3. Examination.

1.3.1. Examine the thermostat capillary and sensing phial for fractures.

ABNORMAL (If a fracture has occurred then the thermostat shall be discarded).

1.3.2. Examine/test microswitches for continuity on switched contacts and differential. Replace defective microswitches.

Section 2. Test Specification.

2.1. Preparation.

2.1.1. Note the thermostat type i.e. BR.2, BR.3, etc. using figure 9 make a note of its correct switch temperature setting.

2.1.2. The thermostat shall be kept in the setting environment for NOT LESS than TWO HOURS before attempting any adjustment.

2.1.3. The indication test lamps shall be connected to the thermostat (see figure 10).

2.1.4. The thermostat shall be positioned so that its sensing phial faces away from the body of the person carrying out the calibration.

2.1.5. The temperature measuring device shall be placed alongside the thermostat sensing phial.

2.2. Calibration Procedure: d.

NOTE. It is imperative that the thermostat be kept at a constant temperature and free from draughts during this part of the test procedure.

System 2 can be made to operate either before (-) or after (+) system 1, by using a 2mm Allen key and turning the switch temperature difference adjuster (see figure 11).

The positive (+) difference between the systems can be increased (once the central point at which both switches operate together has been passed) by turning the Allen key anticlockwise and vice versa.

2.2.1. Note the thermostat type i.e. BR.17, BR.19, etc. Using figure 9 make a note of its correct switch temperature settings and its switch temperature difference °C, and record on the test sheet.

- 2.2.2. Using a 1.5mm broad bladed screwdriver, slacken off the main adjustment locking screw (see figure 11).
- 2.2.3. Using a 3.8mm broad bladed screwdriver to turn the main adjuster (see figure 11) fully clockwise and then anticlockwise noting its indicated operational temperatures and operation sequence of the switches.
- 2.2.4. Using the 2mm Allen key correct the switch temperature difference as necessary (see figure 11).
- 2.2.5. Repeat clauses 2.2.3. and 2.2.4. until the temperature difference between the switches is correct.
- 2.2.6. Turn the main adjusting screw fully clockwise then anticlockwise until the switch of System 1 operates and the lamp just goes off.
- 2.2.7. Securely tighten the main adjustment locking screw.
- 2.2.8. Using a 1.5mm broad bladed screwdriver, slacken off the temperature indicator locking screw (see figure 11).
- 2.2.9. Turn the temperature indicator until the indicated temperature is equal to that measured adjacent to the thermostat sensing phial, securely tighten the locking screw.
- 2.2.10. Using a 1.5mm broad bladed screwdriver, slacken off the main adjustment locking screw (see figure 11).
- 2.2.11. Using a 3.8mm broad bladed screwdriver turn the main adjuster (see figure 11) fully clockwise, then anticlockwise until the indicated temperature is equal to the on scale temperature for the thermostat being calibrated (see figure 9).
- 2.2.12. Securely tighten the main adjustment locking screw.
- 2.2.13. Disconnect the test lamp, remove thermometer and replace front cover where necessary.

Figure 9.

Temperature Settings for Trafag Alterostats:

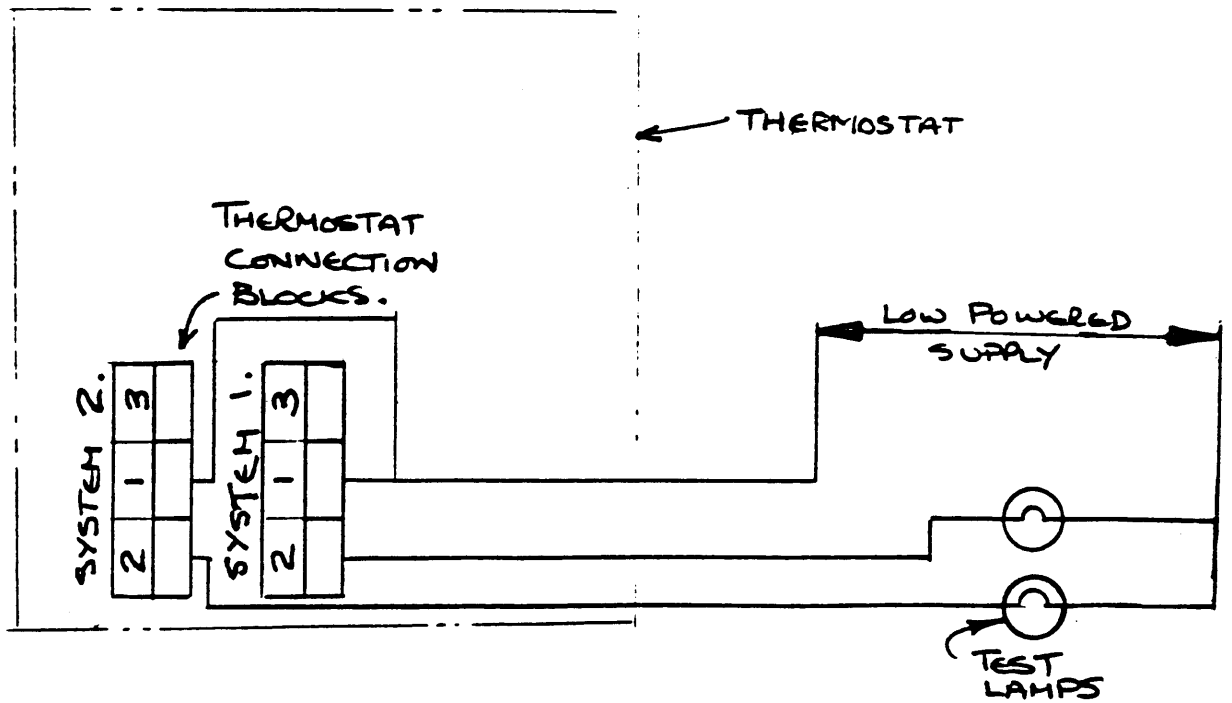
Vehicle fitted	Type No.	B.R. Cat. No.	Temperatures (°C)	
			On Scale	Switch Difference
Class 507/1 P.V. Unit (waste heat)	BR17	98/516	34	--
Class 56 Cabs.	BR29	72/3910	24	+2
Mk.III Sleepers (Corridors)	BR33	64/2810	19	-1
Class 56 Cabs.	BR39	72/5316	24	+2
Cl.150&154 Saloons	BR42	15/78112	18	+3
Class 101, 108 & 116 Saloons.	BR43	14/2865	18	+4
Class 317/2 Saloon	BR47	98/7201	18	+1
Class 156 Saloon			19	+1

Temperature Settings for Trafag Two Stage Thermostats:

Vehicle fitted	Type No.	B.R. Cat. No.	Temperatures (°C.)	
			Switch Setting or Temp Range	Switch Diff.
MK111 HST & Loco Hauled A/C Modules	BR9	64/581	13 & 19	6
Mk.III Sleepers A/C Modules.	BR34	64/2809	8 & 16	8

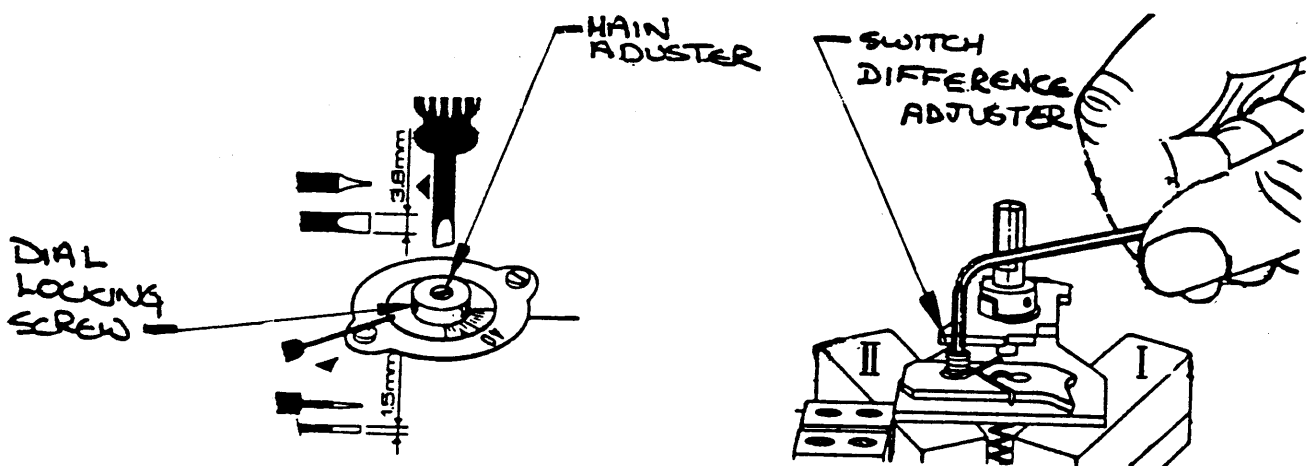
Figure 10.

WOSS 850/10



TEST LAMP CONNECTIONS

Figure 11.



THERMOSTAT (PICTORIAL)

Part 4. Overhaul of Adjustable Thermostats.

Contents:

Tools and Equipment

Section 1. Repair Procedure.

1.1. Dismantling.

1.2. Cleaning.

1.3. Examination.

Section 2. Test Specification.

2.1. Preparation.

2.2. Calibration Procedure: e.

Figure 12. Thermostat settings.

Figure 13. Test Lamp Connections.

Figure 14. Thermostat (Pictorial).

Tools and Equipment

Low powered indication test lamps as shown in figure 13.

A mercury-in-glass or electronic thermometer with a resolution of 0.1°C, calibrated between 15 - 30°C.

A 3.8mm broad bladed screwdriver.

A 1.5mm broad bladed screwdriver.

A 2mm Allen key.

A clean dry cloth and paint brush (approx 25mm wide).

An air bath as shown in figure 1 (page 10).

Flying leads, brackets and quadrants (sleepers only).

Section 1. Repair Procedure.

1.1. Dismantling.

1.1.1. If the thermostat is situated in a box remove the top cover.

1.2. Cleaning.

1.2.1. Clean carefully and thoroughly using the clean cloth and paint brush.

1.3. Examination.

1.3.1. Examine the thermostat capillary and sensing phial for fractures.

ABNORMAL (If a fracture has occurred then the thermostat shall be discarded).

1.3.2. Examine/test microswitches for continuity on switched contacts and differential. Replace defective microswitches.

Section 2. Test Specification.

Note. If the thermostat is easily accessible this procedure may be carried out with the thermostat in situ on the vehicle.

2.1. Preparation.

For thermostats fitted to sleepers add flying leads, brackets and quadrants.

2.1.1. Note the thermostat type i.e. BR.2, BR.3, etc. using figure 12 make note of its correct switch temperature setting.

2.1.2. The thermostat shall be kept in the setting environment for NOT LESS than TWO HOURS before attempting any adjustment.

2.1.3. The indication test lamps shall be connected to the thermostat (see figure 13). If calibration being carried out on the vehicle listen for contactors operating and use the system to cycle the thermostat.

2.1.4. The thermostat shall be positioned so that its sensing phial faces away from the body of the person carrying out the calibration.

2.1.5. The temperature measuring device shall be placed alongside the thermostat sensing phial.

2.2. Calibration Procedure: e.

NOTE. It is imperative that the thermostat be kept at a constant temperature and free from draughts during this part of the test procedure.

System 2 can be made to operate either before (-) or after (+) system 1, by using a 2mm Allen key and turning the switch temperature difference adjuster.(see figure 14).

The positive (+) difference between the systems can be increased (once the central point at which both switches operate together has been passed) by turning the Allen key anticlockwise and vice versa.

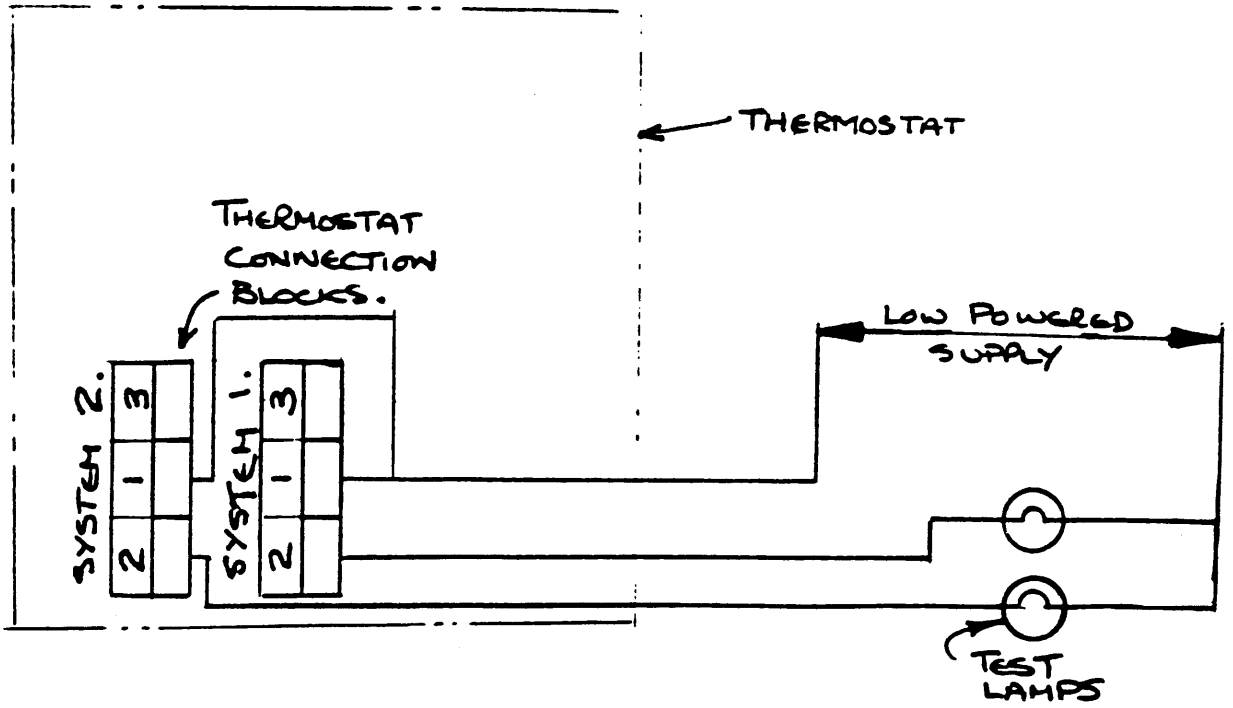
- 2.2.1. Note the correct temperature and temperature difference at which the thermostat should operate (see figure 12).
 - 2.2.2. Turn the main spindle fully clockwise and then anticlockwise noting its indicated operational temperatures and operation sequence of the switches.
 - 2.2.3. Using the 2mm Allen key correct the switch temperature difference as necessary (see figure 14).
 - 2.2.4. Repeat clauses 2.2.3. and 2.2.4. until the temperature difference between the switches is correct.
 - 2.2.5. Check that the mid range setting is in the middle of the angular rotating range, by using a 1.5mm screwdriver to adjust the position of the rotation limit collar relative to the mid range setting.
 - 2.2.6. For thermostats removed from the vehicle;
Place the thermostats sensing phial in the air stream of the air bath with the temperature measuring device alongside, or for in situ situations use the vehicle system to cycle the thermostat.
 - 2.2.7. Turn the main adjuster so that it is in the mid range position.
- NOTE. The heating and cooling rate of the air passing over the thermostat SHALL be NOT MORE than.1°C. in 3 minutes.
- NO ADJUSTMENT OF THE THERMOSTAT SHALL BE MADE UNTIL IT HAS SETTLED DOWN ie. when the switch operation temperatures are repetitive, after approximatley 3 - 4 cycles.
- 2.2.8. Adjust as necessary to ensure that system 1 operates in the mid-range position at the mid-range temperature quoted for the thermostat being calibrated.
 - 2.2.9. Position the quadrant in the mid position relative to the bracket for the mid temperature setting.
 - 2.2.10. Disconnect the test lamp, remove thermometer and replace front cover where necessary.

Figure 12.

Temperature Settings for Adjustable type Trafag Alterostats:

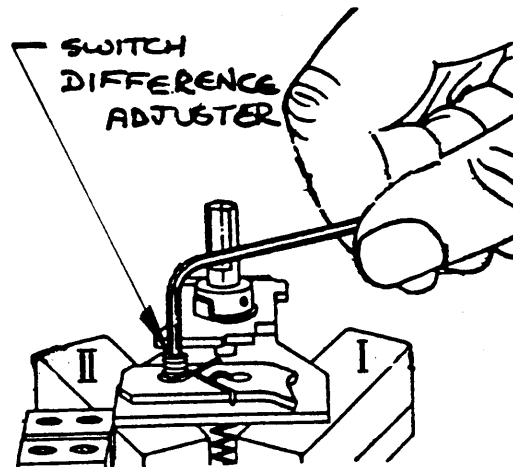
Vehicle fitted	Type No.	B.R. Cat No.	Temperatures (°C)		
			Switch Settings		Mid-Range
			System 1	System 2	
Class 312 and Edinburgh/Glasgow Cab Heater.	BR7	52/2418	on scale	-1	20.0
Mk.III Sleepers (Berths)	BR32	64/2811	on scale	-1	17.5
Class 210 & 317 Cab Heaters.	BR35	98/4186	on scale	-1	20.0

NOTE; BR32 is the original thermostat fitted to MK.3 Sleepers.
An electronic thermostat may have been fitted as a modification.



TEST LAMP CONNECTIONS

Figure 4



THERMOSTAT (PICTORIAL)