



TROUBLE SHOOTING POCKET DIARY

AC/DC, AC & 3 PHASE LOCOS



MUMBAI DIVISION
CENTRAL RAILWAY



Trouble Shooting Pocket Diary
For
AC & AC/DC Electric Locos

**(WCAM 3, WCAG 1,
WAG 5-7, WAM 4, WAP 1-4,
WAG 9, WAP 5, WAP 7)**

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Preface

I am delighted that Driver's Training Centre Kalyan is coming out with this pocket book for easy & prompt trouble shooting.

Loco Pilots working on goods & mail/exp trains in Mumbai division, C.R. play an important role therefore it is important to have adequate knowledge of conventional loco especially static inverter & micro processor provided locos & 3 phase locomotives. 3 phase technology locomotives have different tractive & braking operation of technology and different type of trouble shooting technique.

I am glad that this pocket book covers conventional as well as 3 phase loco trouble shooting as can be used as ready reckoner.

This pocket book will be of good assistance and confidence building step and all loco pilot should carry this book with him while on duty.

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Foreword

WCAM 3 loco is playing a vital role from DC to AC conversion. Simultaneously after AC charging upto LTT, AC conventional & 3 phase locos has been operated in this Mumbai Division of C.R. It is therefore necessary that loco pilot should have good knowledge about trouble shooting.

I am glad that Drivers Training Centre, Kalyan is come out with this pocket trouble shooting. Loco pilot play an important role in train operation and he should be aware of operating these AC locomotives. He should correctly trouble shoot in minimum time. This book is a tool for static inverter & micro processor based AC loco & 3 phase loco operations & trouble shooting is prepared in simple language.

I am confident this book will be of great help to loco pilot of Mumbai Division.

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Message

Loco pilots play an important role in train operations & hence loco pilots should be conversant about operations & he should be able to trouble shoot in minimum time and successfully.

I am glad Driver's Training Centre, Kalyan is publishing this pocket trouble shooting diary in simple language.

I firmly believe loco pilot will perform efficiently & will carry this diary with him while on duty. Any abnormality or correction if suggested for improvement of this pocket trouble shooting diary is welcome by this office.

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WCAM3/WCAG 1 LOCO

(AC Section)

Pantograph Not Going Up -

1. Try by raising emergency panto.
2. Check BA voltage, CCBA, CCPT, Addl CCBA, ER pressure, GR, SC A-B on '0' & LSGR/SC, LSSC-B are illuminating, COS 1-2 in AC, DS open & LSDJ/DS illuminating.
3. Check QDJ is de-energised, if not press QPPT AC manually, if not holding wedge it in energised condition & work upto destination.
4. Check VEPT AC, VEPT DC isolating cocks are open & its terminals are intact.
5. Try from rear cab.

SON sounding on operation of ZPT to AC/AC-E position -

1. Check relay QTADC, if wedged then remove wedging.
2. Check rear cab ZPT, check it is on '0' correctly, if not operate it to '0'.

VSD gets burst or Fire/Smoke on VSD -

1. If fire/smoke is noticed then extinguish it.
2. Disconnect inlet & outlet terminals of VSD & wedge QAAC relay in energised condition & work.
3. While passing AC to DC neutral section remove

wedging of QAAC & wedge relay QTADC.

DJ Not Closing -

1. Operate SC A-B, GR 2 to 3 notches & bring back to '0' & try.
2. Check panto is up & LSS extinguished, ER pressure, BA voltage, CCDJ, relay target & SI unit indication panel.
3. Check DJ isolating cock is open.
4. **If Q 118 is not energised after putting HBA 'ON'**
 - i. Check C 104, C 105, C 106, C 107, C 108, C 109, C 110 are open.
 - ii. Check HVMSR, HPH, HVSL, HVRH, HVMT-1/2 are on 'III' position.
 - iii. Operate Q 118 manually or wedge it.
5. **If Q 44 AC is not energising after putting BLDJ 'ON' -**
 - i. Check QOP 2 target, if not going, operate HQOP 2 to 'OFF'.
 - ii. Operate Q 44 AC manually or wedge.
 - iii. Try from rear cab.
6. **If Q 45 not energising after pressing BLRDJ -**
 - i. Check GR, SC A-B on '0'.
 - ii. Try by BP 2 DJ.
 - iii. Press Q 45 manually, release after closing DJ.
7. Try by operating HQPDJ to '0'.
8. Try from rear cab.

9. Try by draining pressure of DJ at once.

DJ Tripping -

1. **CCDJ fuse** - check, if blown replace it, if again blows then try by operating HOBA to 'OFF'.
2. **with QOP 2 target** - Check all BA frames. If fire/smoke noticed then extinguish it. If no fire/smoke, then set DJ & if again dropping - then keep HQOP-2 to 'OFF' & work by keeping watch on all BA frames.
3. **On 1st notch** -
 - i. Check C 104 closing & HVSI 1/2 on 'III'.
 - ii. Operate SMGR manually & try.
4. **On 6th notch** -
 - i. Check C 105, 106, 107 are closing, if not trouble shoot for the same.
 - ii. If MVMT 1-2 are not working then wedge Q 118 & work upto destination by giving maximum 600 A current. If MVRH is not working then ensure MPH is working & wedge Q 118, work the train upto destination by giving max. 500 A current.
 - iii. Wedge Q 118 & try.
5. **with LSS indication** -
 - i. Check panto is up & touches OHE.
 - ii. Wedge QAAC in energise & close DJ.
 - iii. If line volt meter reads & SI unit starts then work by wedging QAAC. While passing AC to DC neutral section remove wedging of QAAC.

- iv. If line volt meter does not reads & SI unit is also not working then contact LPC & confirm for OHE supply.
6. **with LSGR/SC indication extinguished -**
 - i. Check SMGR on '0'.
 - ii. If SMGR stuck up on notches, bring it to '0'.
 - iii. If again sticks up on notches, operate SMGR manually.
7. **with QLM target -**
 - i. Check fire/smoke, oil spray on TFWR, GR.
 - ii. If noticed, then do not reset target & fail the loco.
 - iii. If nothing is found then set target & work.
 - iv. If again dropping then do not reset target even though everything is normal & fail the loco.
 - v. Reset QLM only once.
8. **with target on QLM, QOP 1 -**
 - i. First trouble shoot for QOP 1 & then trouble shoot for QLM.
9. **with target on QLM, QOP 1, QRSI 1-2 -**
 - i. First trouble shoot for QOP 1 & then trouble shoot for QRSI 1-2, QLM.
10. **with QRSI 1-2 target -**
 - i. Try by giving less current.
 - ii. Iso. TM by HMCS 1-2 & try.
11. **with QRSI 3 target -**
 - i. Check SI unit, if everything is normal then reset target & close DJ.

ii. If tripping repeatedly then fail the loco.

12. **with QOP 1 target -**

- i. Check RSI 1-2, SL, SJ, RPS, COS 1-2, J 1, J 2, QD 14/36, Q 20, TM, line contactors, RC Network for fire/smoke.
- ii. If possible isolate defective equipment.
- iii. If on RC network, disconnect its terminals & clear the block section.
- iv. If no fire/smoke - iso. TM group one by one by HMCS 1-2 & try.
- v. If still tripping then operate HQOP 1 to 'OFF'. Apply loco brake & take 2-3 notches then check TM in undergear, if everything is normal then clear the section & work as per LPC instructions. If some unusual is noticed then isolate respective TM & work.

13. **DJ tripping without any indication -**

- i. Check all blower switches are on 'III' position.
- ii. Operate HQPDJ to '0' & try.
- iii. Wedge relay Q 118.
- iv. Operate SMGR manually.

SI unit not starting -

1. **Control OK not illuminating -** Check by pressing lamp test switch, HBA on 'I', BA 90 V.
 - i. Operate HBA to '0' for 30 seconds & again back to 'I' & try.

- ii. Ask for assisting engine.
- 2. **Input voltage not illuminating -**
 - i. Check by pressing lamp test switch, check DJ is closed & line volt meter is reading.
 - ii. Ask for assisting engine.
- 3. **Output voltage not illuminating -**
 - i. Check by pressing lamp test switch, trip & set DJ & try.
 - ii. Ask for assisting engine.

SI unit tripping -

1. **with OUTPUT FAULTY indication -**

Before pressing reset switch on SI unit check all auxiliaries & contactors for fire/smoke, if noticed then extinguish it & isolate that auxiliary if possible.

Check all 3 phase contactors are fully open. If found welded then release it & isolate that auxiliary. If everything is normal then -

- i. If trips on starting SI unit - check MPH, MVSL, MVSI 1-2, CHBA, TFPR, TFS 1-2, RA 1-2 & isolate defective auxiliary. If no defect is noticed then isolate all above auxiliaries & try, if still tripping then ask for assisting engine.

If not tripping, then start above auxiliaries one by one & isolate auxiliary which is causing SI unit to trip. If MVSI 1-2 are isolated then ask for assisting engine. If MVSL is isolated then clear the

section with max. 500 A current. If MPH is isolated then ensure MVRH is working & work upto destination with max. 500 A current.

- ii. On starting MCP - iso. defective MCP.
- iii. On starting MPV - iso. defective MPV.
- iv. On starting MVMT 1/2 - put HVMT 1-2 on '0', wedge relay Q 118 & work upto destination by giving maximum 600 A current.
- v. On starting MVRH - put HVRH on '0' & ensure MPH is working, wedge Q 118 and work upto destination with max. 500 A current.

2. **with Temp too high indication -**

- i. Operate HBA to '0' for 30 seconds & again back to 'I' & try.
- ii. Ask for assisting engine.

3. **with Converter Faulty indication -**

- i. Try by pressing reset button.
- ii. Operate HBA to '0' for 30 seconds & again back to 'I' & try.
- iii. Ask for assisting engine.

4. **with Earth Fault AC indication -**

- i. Check SI unit for fire/smoke. If noticed then ask for assisting engine.
- ii. If no fire/smoke then try by pressing reset button.
- iii. Operate HBA to '0' for 30 seconds & again back to 'I' & try.
- iv. Ask for assisting engine.

Note - While trouble shooting if HBA is operated to '0' position then first close cocks of IP, E3W valve due to which BP will not drop and open after above mentioned trouble shooting.

SI unit working but all auxiliaries machines are not working -

1. Check Output OK indication is illuminating on SI unit.
2. Check Q 100 is energised, tap, wedge it.
3. Check CCA fuse - if blown replace it.

SMGR not operating by MP/EEC (LSGR/SC not extinguishing) -

1. Isoalte VCD and try.
2. Operate GR 2 to 3 notches & bring to '0' and try.
3. If after passing DC to AC neutral section then operate SMSC A-B also 2 to 3 notches & try.
4. Try by removing CCLSA fuse.
5. Check LSR is extinguished, if not -
 - i. Check J 1, J 2 are turned.
 - ii. Check GR & SC A-B on '0'.
 - iii. Check Q 50 energised, if not wedge it.
6. Check Q 48, QRS, Q 51, Q 52 de-energised or wedge. If Q 52 is wedged then do not hold MP on '+' for more time.
7. Check ZSMS on 'I', ZSMGR handle on 6'o clock, GR

pressure & SMSC/GR isolating cock..

8. Try from rear cab.
9. Operate SMGR manually.

On taking notch SMGR operating but both ammeters not reading -

1. Check HVSI 1-2 are on 'III' position.
2. Check HMCS 1-2 are on 'I' position.
3. Check BA panel iso. cock are open.
4. Check QACOS 1-2 DC is de-energised, if not wedge in de-energised condition.
5. Check Addl. CR iso. cock is open.
6. Check closing of L 3, L 4, L 5 & K 6 or operate them manually & try.
7. Try from rear cab.

On taking notch fast progression taking place

1. Tap Q 52 & try.
2. Operate SMGR manually.

GR Auto regression on 1st notch -

1. With LSP indication

If wheel slips are taking place then take its precautions. If wheel slipping is not taking place then check WF contactors are open & ZQWC is in OFF position. Isolate 2 TM's group one by one & try or operate GR manually.

2. Without LSP indication

Isolate VCD & try. Check rear cab BL key is locked. If rear cab BL key is not getting locked then wedge relay Q 118, work with EEC & inform LPC.

CCPT fuse blowing -

If this fuse is blown panto will come down & DJ will open & but LSDJ/DS will not illuminate. After replacing fuse LSDJ/DS will illuminate. Try by changing fuse, operate HOBA to 'OFF' & try.

1. On operation of BL key - try from rear cab.
2. On operation of ZPT to AC - operate it to AC-E & change fuse - try from rear cab.
3. On operation of MPJ to FOR - try from rear cab in REV, or from leading cab in REV & back the train if possible.
4. On taking 1st notch - try by EEC, or operate SMGR manually, or iso. TM group by HMCS 1-2 & try.
5. On taking WF - do not operate it.
6. During regression - operate SMGR manually.
7. Due to ZQWC - do not operate it.
8. Due to wheel slip - try to avoid it.
9. During Dynamic - do not work in dynamic.

MR Pressure not building up -

1. Check MCP are working.

2. Try by putting BLCPD to 'ON'.
3. If MCP is not working then start another MCP.
4. If compressors are working but pressure not increasing
 - i. If MCP safety valve is blowing, if isolating cock is provided then isolate it or start another MCP.
 - ii. If unloader valve is stuck up in open condition or leakage then close its isolating cock.
 - iii. If MR drain cocks are open then close it.
 - iv. If ABD valve is blowing then attend it or close its isolating cock.
 - v. If MR safety valve is blowing then attend it or if isolating cock is provided on it then closed it.
 - vi. Bypass air drier pneumatically through cocks. (A & B cock closed and C cock open)
 - vii. Try by isolating one by one VEPT.
 - viii. Check leakages on load.
 - ix. If still pressure not increasing then try by starting three compressors. This can be done only on air brake train.

Loco Brakes not applying -

1. Check MR pressure is 8.0 to 9.5 kg/cm².
2. Check SA 9 cut out cocks are open in driving cab and closed in non driving cab.
3. Operate MU 2B 2-3 times & keep it on Lead.

4. Check both bogie cut out cocks (bogie isolating cock) are open.
5. Tap C 2 relay valve.
6. MR equalising angle cocks should be closed.
7. If SA 9 valve is defective then apply proportionate (conjunction) brakes.

Loco Brakes Not Releasing -

1. While changing cab keep SA 9 on apply position & check brakes are applying. Then close both isolating cocks in that cab.
2. Keep SA 9 on apply position in another cab & open isolating cocks of that cab, now keep SA 9 to release position & check brakes are released.
3. Check BP pressure is 5.0 kg/cm^2 .
4. Tap SA 9 valve.
5. Tap C 2 relay valve.
6. Operate MU 2B 2-3 times & keep it on Lead.
7. Isolate distributor valve & release loco brakes by releaser spindle.
8. If still loco brakes are not releasing then close bogie brake isolating cocks. Do not forget to open cocks after releasing brakes.
9. Check by opening both end BC equalising cocks.
10. If still loco brakes are not releasing then close MR 4 cock and release SA 9 by operating it for 4-5 times &

now tap C 2 relay valve. Again open MR 4 cock & release SA 9.

11. If any one brake cylinder is not releasing then take out its pressure by loosening its nut or dummy it.

BP Pressure not creating -

1. Check MR 4 isolating cock is open, MR pressure should be 9.5 kg/cm^2 , both end MR & BP angle cock should be closed.
2. Check A 9 cocks are open in driving cab & closed in rear cab.
3. Adjust BP pressure to 5.0 kg/cm^2 by A 9 pressure adjusting cock.
4. Operate MU 2B 2-3 times & keep it on Lead.
5. Check L & T (BP) cock is open.
6. Tap Addl C 2 relay valve if it is stuck up.
7. If there is any leakage in BP pipe then attend it.
8. Check IP & E 3W valve cocks. If leakage is from E 3W valve then close its isolating cock.
9. Close BP angle cock between loco & load and check BP pressure. If BP pressure is increasing it means defect is in load. Check angle cocks are open in between coaches/wagons and hose pipes are coupled correctly & check there is no any leakage in BP.

FP Pressure not creating -

1. Check feed valve isolating cock is open.
2. Check MR & BP pressure is normal.
3. Operate feed valve isolating cock 2-3 times and tap 6 kg/cm² feed valve.
4. Check leakages in loco FP angle cock.
5. If any dead loco is coupled in rear then check both cocks of 6 kg/cm² C2N feed valve are closed on dead loco.
6. Check leakages in FP pipe of train.

Relay to be wedged in energised condition -

QAAC, QPPT AC, Q 118, Q 100, Q 50, CPR

Relay to be wedged in de-energised condition -

QSPT AC, Q 48, QRS, Q 51, Q 52, QMCS 1-2, QACOS 1-2 DC

WAG 5/WAG 7/WAM 4(6P) WAP 1/WAP 4 LOCO

Pantograph Not Going Up -

1. Try by raising other panto.
2. Check BA voltage, Addl CCBA, CCBA, CCPT, ER pressure, DJ open & LSDJ illuminating.
3. Check HLS switch is OFF if provided.
4. Check BPEMS switch in working cab is not in pressed condition if provided.
5. Check HOM is closed correctly.
6. Check VEPT cocks & its terminal wire.
7. Try from rear cab.
8. Wedge VEPT & clear the section.

DJ not closing (ICDJ) -

1. Operate GR 2 to 3 notches & bring back to '0' & try.
2. Check relay target, ER pressure & BA voltage.
3. Check Q 118, Q 45 & Q 44 are energised.
4. Check C 118 is closed & CCDJ intact.
5. Try from rear cab.
6. Try by draining VCB pressure.
7. **If Q 118 is not energised -**
 - i. Check GR on '0', CCBA, CCPT, C 105, C 106, C 107 & C 118 are open.
 - ii. Check Q 44, Q 46 are de-energised.

- iii. Operate Q 118 manually & release after closing DJ and after starting all blowers. If after releasing Q 118, DJ is tripping then wedge Q 118 & work with due precautions.
- 8. **After pressing BLRDJ if Q 45 is not energised -**
 - i. Check ZPT is on '1', BLDJ closed, CCDJ fuse intact, BP1DJ not in pressed condition, GR is on '0'.
 - ii. Try by BP 2 DJ.
 - iii. Try by changing ZPT position.
 - iv. Operate Q 45 manually & release after closing DJ.
 - v. Try from rear cab.
- 9. **If Q 44 is not energised -**
 - i. Operate GR 2 to 3 notches & bring back to '0'.
 - ii. Check Q 118, Q 45 are energised.
 - iii. Operate Q 44 manually or wedge.
 - iv. Try from rear cab.
- 10. **If C 118 is not closing -** Operate HBA to '0' & manually operate C 118 for 2-3 times & check its terminals.
- 11. Try from rear cab.

DJ tripping -

- 1. **DJ clsing & opening immediately -**
Check relay target & ER pressure.
- 2. **Before extinguishing LSCHBA -**
 - i. Check ARNO for fire/smoke, if noticed then ask for

- assisting engine.
 - ii. Put HQCVAR on '0'. Release BLRDJ in 4 seconds while closing DJ.
 - iii. Check OHE supply is available. If OHE supply is not available then Arno sound will not come.
3. **LSDJ, LSCHBA are extinguishing but opening in 0.6 seconds after releasing BLRDJ -**
- i. Wedge relay Q 44 & work.
4. **LSDJ, LSCHBA are extinguishing but opening in 5.6 seconds after releasing BLRDJ -**
- i. Try by putting HPH, HVSL 1-2 on 'III' position one by one.
 - ii. Try by putting HQCVAR on '0'.
 - iii. Try by wedging Q 118.
5. **By putting BLVMT ON -**
- i. Check MVRH, MVMT 1-2 are working, if not working then trouble shoot.
 - ii. If working then put HVRH, HVMT 1-2 on 'III' position one by one & try.
 - iii. Try by wedging Q 118.
6. **On 1st notch -**
- i. Check MVS1 1-2 are working, if not working then trouble shoot.
 - ii. If working then put HVSI 1-2 on 'III' position one by one & try.
 - iii. Operate GR manually.

7. On 6th notch -

- i. Check MVRH, MVMT 1-2 are working, if not working then trouble shoot.
- ii. Put HC 105 to ON & try if provided.
- iii. If HC 105 is not provided then, try by putting HVMT 1-2 on 'III' position or try by wedging Q 118.

8. Without any indication -

- i. Operate all blower switches to 'III' position & try.
- ii. Try by wedging Q 118.
- iii. Try by changing panto.
- iv. Operate GR manually.
- v. Try from rear cab.

All auxiliaries not working -

1. Check B conk connection on TB panel.
2. Check CCA, if blown then replace it.
3. Check Q 100 is energised, operate manually, wedge.
4. If still not working then wedge minimum two contactors & work cautiously without blowers by wedging Q 118 with 500A current. Wedge two MCP contactors if air brake train and one MCP & one MPV contactor if vacuum brake train.

QLM Dropping -

1. Check TFWR, GR for fire/smoke, oil spray.
2. If noticed then do not reset target & fail the loco.

3. If not then reset QLM & work.
4. If again dropping & all are normal then do not reset target & fail the loco.
5. QLM should be reset only once.

QLM dropping with relay QOP, QRSI 1-2

1. First trouble shoot for another relay & then trouble shoot for QLM.

QLA dropping -

1. Check all auxiliaries. If any abnormality noticed then isolate that particular auxiliary & work. If no any abnormality noticed then isolate one by one auxiliary & find out defective auxiliary, isolate it.

QOA dropping -

1. Check all auxiliaries contactors and check all auxiliaries for fire/smoke. If noticed then isolate particular auxiliary & work with due precautions.
2. If everything is normal then reset relay target close DJ.
3. On closing DJ -
Check ARNO, R 118, C 118, CHBA, RTPR, RA, TFVT, MPH, MVSL 1-2, MVSI 1-2. Isolate defective auxiliary & observe its precautions.
4. On closing BLCP - Isolate defective MCP.
5. On closing BLPV - Isolate defective MPV.
6. On closing BLVMT - Isolate defective auxiliary from MVRH, MVMT 1-2.

Note - If QOA is not resetting or tripping without any indication or if not successful after trouble shooting then operate HQOA to '0' and work the train. After putting HQOA to '0' still QOA is dropping then operate HOBA to 'OFF' position & try.

QRSI 1-2 dropping -

1. Check concern RSI, SL, SJ, REV, QD, TM. If any abnormality is found isolate it.
2. If nothing is found then reset & try.
3. If dropping on giving high current then try by giving less current.
4. If still dropping isolate TM one by one with concern HMCS 1-2 & try.
5. If dropping on all positions of HMCS then isolate that particular RSI block & work with remaining 3 TM's if load & road permits.

QOP 1 dropping -

1. Check RSI 1, SL 1, SJ, J 1, Q 20, QD 1, TM 1, 2, 3, L 1-2-3, RC Network. If any abnormality found then isolate that equipment & work if possible.
2. If no abnormality notices then reset target once & try.
3. If again QOP 1 drops then isolate TM 1-2-3 one by one with the help of HMCS-1 & try.
4. If QOP 1 is dropping on all positions of HMCS-1 or QOP 1 is not resetting then put HQOP-1 to 'OFF'

position & then apply SA 9 to ON & operate 2-3 notches & check traction motors, if everything is normal then clear the section & work as per LPC instructions. If any abnormality noticed then isolate concern TM & work the train.

QOP 2 dropping -

1. Check RSI 2, SL2, SJ, J 2, Q 20, QD 2, TM 4, 5, 6, L4-5-6, RC Network. If any abnormality found then isolate that equipment & work if possible.
2. If no abnormality notices then reset target once & try.
3. If again QOP 2 drops then isolate TM 4-5-6 one by one with the help of HMCS-2 & try.
4. If QOP 2 is dropping on all positions of HMCS-2 or QOP 2 is not resetting then put HQOP-2 to 'OFF' position & then apply SA 9 to ON & operate 2-3 notches & check traction motors, if everything is normal then clear the section & work as per LPC instructions. If any abnormality noticed then isolate concern TM & work the train.

Note - If QOP-1 or QOP-2 is dropping during dynamic working then do not work in dynamic.

LSB not extinguishing after operating MPJ to F or R -

1. Check J 1-2 position. For Cab-1, J 1-2 handle should be UP & for Cab-2, J 1-2 handle should be DN.

2. CTF 1-2-3 should be in traction i. e. in UP position.
3. C 145 should be open & lamp LS 145 is extinguished.
4. Wedge Q 50 in energised condition.
5. If still not extinguishing & notches are coming then work in same condition.

SMGR is not operating by MP -

1. Isolate VCD & try.
2. Remove CCLSA fuse & try.
3. Check Q 51, Q 48, Q 52 de-energised, if not wedge them.
4. Check Q 50, QRS energised, if not wedge them.
5. Check ZSMS, ZSMGR handle, SMGR pressure.
6. Try by EEC.
7. Try from rear cab.
8. Operate GR manually.

After taking notch SMGR operating but ammeters not reading (Total Loss of Tractive Effort - TLTE) -

1. Check Q 50 energised, if not wedge it.
2. Check CTF 1-2-3 in traction (UP).
3. Check HVSI 1-2, HVMT 1-2 on 'I'.
4. Try by putting HVSI 1-2, HVMT 1-2 on 'III'.
5. Check BA frame isolating cock is open.
6. Try from rear cab.
7. Check closing of L 1 to L 6. If not then wedge any one contactor from L 1/L 3/L 4/L 6 & try. On WAP 4 if line

contactor is wedged then wedge Q 50 also.

Auto regression of GR on 1st notch -

1. With LSP indication -

If wheel slip takes place then try to prevent it. Check WF contactors are open & ZQWC OFF in both the cabs. Isolate TM one by one connected by QD & try.

2. Without LSP indication -

Check rear cab BL key is locked. Isolate VCD & try. If rear cab BL key is not locking then wedge Q 118 & work with EEC & inform LPC or operate GR manually.

After taking notch fast progression is taking place of GR -

1. Tap Q 52 & try.
2. If still taking place then operate SMGR manually.

CCPT fuse blowing -

1. Operate HOBA to 'OFF'.
2. If by putting HBA to ON position then disconnect IP valve terminals & try, if still ask for assisting engine.
3. If by operation of BL Key then try from rear cab, if still then ask for assisting engine.
4. If by operation of ZPT 'I' then try by operating it to '2'. If still then try from rear cab. If still then ask for assisting engine.

5. If by closing DJ then try from rear cab, if still then ask for assisting engine.
6. If by operation of MPJ to FOR then try in reverse from rear cab, or try in reverse from leading cab & back train if possible.
7. If on 1st notch or by putting MP to 'N' position then isolate defective TM or group by HMCS 1/2, HVSI 1/2. Operate GR manually & try.
8. If on 6th notch then disconnect terminals of EVPHGR & work.
9. If during regression then operate GR manually.
10. If by operating MP to P then do not work in dynamic.
11. If by taking WF, do not operate it.
12. If by pressing PVEF, do not operate it.
13. If by pressing ZQWC, do not operate it.
14. If by pressing BPSW, do not operate it.
15. If due to Wheel slip, then try to avoid it.
16. If by operating MPS, do not operate it.

MR Pressure not building up -

1. Check MCP are working.
2. Try by putting BLCPD to 'ON'.
3. If MCP is not working then start another MCP.
4. If compressors are working but pressure not increasing
 - i. If MCP safety valve is blowing, if isolating cock is provided then isolate it or start another MCP.

- ii. If unloader valve is stuck up in open condition or leakage then close its isolating cock.
- iii. If MR drain cocks are open then close it.
- iv. If ABD valve is blowing then attend it or close its isolating cock.
- v. If MR safety valve is blowing then attend it or if isolating cock is provided on it then closed it.
- vi. Bypass air drier pneumatically through cocks. (A & B cock closed and C cock open)
- vii. Try by isolating one by one VEPT.
- viii. Check leakages on load.
- ix. If still pressure not increasing then try by starting three compressors.

Loco Brakes not applying -

1. Check MR pressure is 8.0 to 9.5 kg/cm².
2. Check SA 9 cut out cocks are open in driving cab and closed in non driving cab.
3. Operate MU 2B 2-3 times & keep it on Lead.
4. Check both bogie cut out cocks (bogie isolating cock) are open.
5. Tap C 2 relay valve.
6. MR equalising angle cocks should be closed.
7. If SA 9 valve is defective then apply proportionate (conjunction) brakes.

Loco Brakes Not Releasing -

1. While changing cab keep SA 9 on apply position & check brakes are applying. Then close both isolating cocks in that cab.
2. Keep SA 9 on apply position in another cab & open isolating cocks of that cab, now keep SA 9 to release position & check brakes are released.
3. Check BP pressure is 5.0 kg/cm^2 .
4. Tap SA 9 valve.
5. Tap C 2 relay valve.
6. Operate MU 2B 2-3 times & keep it on Lead.
7. Isolate distributor valve & release loco brakes by releaser spindle.
8. If still loco brakes are not releasing then close bogie brake isolating cocks. Do not forget to open cocks after releasing brakes.
9. Check by opening both end BC equalising cocks.
10. If still loco brakes are not releasing then close MR 4 cock and release SA 9 by operating it for 4-5 times & now tap C 2 relay valve. Again open MR 4 cock & release SA 9.
11. If any one brake cylinder is not releasing then take out its pressure by loosening its nut or dummy it.

BP Pressure not creating -

1. Check MR 4 isolating cock is open, MR pressure should be 9.5 kg/cm^2 , both end MR & BP angle cock should be closed.
2. Check A 9 cocks are open in driving cab & closed in rear cab.
3. Adjust BP pressure to 5.0 kg/cm^2 by A 9 pressure adjusting cock.
4. Operate MU 2B 2-3 times & keep it on Lead.
5. Check L & T (BP) cock is open.
6. Tap Addl C 2 relay valve if it is stuck up.
7. If there is any leakage in BP pipe then attend it.
8. Check IP & E 3W valve cocks. If leakage is from E 3W valve then close its isolating cock.
9. Close BP angle cock between loco & load and check BP pressure. If BP pressure is increasing it means defect is on load. Check angle cocks are open in between coaches/wagons and hose pipes are coupled correctly & check there is no any leakage in BP.

FP Pressure not creating -

1. Check feed valve isolating cock is open.
2. Check MR & BP pressure is normal.
3. Operate feed valve isolating cock 2-3 times and tap 6 kg/cm^2 feed valve.
4. Check leakages in loco FP angle cock.

5. If any dead loco is coupled in rear then check both cocks of 6 kg/cm² C2N feed valve are closed on dead loco.
6. Check leakages in FP pipe of train.

WAG 5/WAG 7/WAM 4(6P) WAP 1/WAP 4 Static Converter Loco

SI Unit not working -

1. Check CCINV & CCA, if blown replace it, operate HOBA to 'OFF', check DJ is closed.

SI Unit is not working after putting BLVMT to ON

1. Check CCA, if blown replace it, operate HOBA to 'OFF'.
2. Check relay QVSM energised or wedge it in energised condition. If wedged then operate BLVMT to ON before closing DJ.
Note - On microprocessor loco relay QSVM is not provided.
3. If Input Volt Out of Range LED is illuminating then contact LPC regarding OHE supply.

Compressors not working -

1. Check LSCHBA is extinguished. If illuminating then check relay QCON is energised or wedge it in energised condition. If QCON is wedged then wedge Q 118 also.
2. If LSCHBA is extinguished then check relay QTD 101 is energised or wedge it in energised condition. If relay

QTD 101 is wedged operate BLCP to ON after 20 seconds of DJ closing.

Note - On microprocessor loco relay QCON, QTD 101 are not provided.

Blowers not working after putting BLVMT to ON position -

1. Check HVMT 1-2, HVRH are on 'I' or 'III' position.
2. Wedge C 105, C 106, C 107 & put BLVMT to OFF position.

ICDJ or DJ Tripping -

1. Check QSIT & LSSIT. If QSIT is de-energised & LSSIT is also not illuminating it means there is no any fault in SI unit. Trouble shoot as per normal loco.
2. If QSIT is energised & LSSIT is illuminating it means fault is in SI unit or in any auxiliary.
3. Firstly check Internal fault or External Fault LED is illuminating on SI unit.
4. Press reset button provided on SI unit to de-energise relay QSIT or operate HBA to '0' then again to 'I'.
5. If Internal Fault LED is illuminating then operate HBA to '0', wait for 5 minutes & operate HBA to 'I' & try. Press ELD Bypass button provided on SI unit & check ELD Bypass LED is illuminating, After that operate HSIV to '0' position, if successful then clear

the section with due precautions within 45 minutes. If not successful then ask for assisting engine.

6. If External Fault LED is illuminating then put HRAVT to '0' & close DJ. If successful then work. Cab heater, Cab fan, Notch repeater will not work.
7. Locos where AC unit is provided in cab, by putting HRAVT to '0' AC unit is also isolated and also switch OFF 3 phase MCB provided on TB panel.
8. Put HRAVT to '0' and close DJ. If not successful then operate HPH, HVSL 1-2, HVSI 1-2, HVMT 1-2, HVRH to '0' , Press reset button provided on SI unit or operate HBA to '0' then again to 'I' to de-energise relay QSIT and close DJ.
 - i. If DJ is not tripping it means fault is on SI unit output load. At this time switch ON auxiliaries one by one & wait for 20 seconds, if DJ is tripping by any one auxiliary then operate that switch to '0' & remaining switches to 'I' position and work with due precautions.
 - ii. If DJ is tripping then put all auxiliaries switches to normal. Press ELD Bypass button provided on SI unit & check ELD Bypass LED is illuminating, After that operate HSIV to '0' position, if successful then clear the section with due precautions within 45 minutes.

Note - During trouble shooting if HBA has to be made

OFF then before switching OFF HBA close IP valve & E3W valve cocks to avoid dropping of BP pressure and open above mentioned cocks after completion of trouble shooting.

**WAG 5/WAG 7/WAM 4(6P)
WAP 1/WAP 4
Micro Processor Loco
(FDCS Loco)**

On Micro Processor loco if any fault takes place it will be displayed on the display unit & buzzer will sound. In this condition note down the message & press Acknowledge button.

If any fault comes on loco & trouble shooting is done as per the fault message but still not successful then before asking assisting engine -

1. Operate HOBA to 'OFF' & try.
2. Put HBA to 'OFF' for 5 minutes & try.

DJ not closing -

1. BA voltage, ER pressure, CCBA, CCPT/CCCPU, GR '0', BP2DJ, C118, Rear cab, HOBA, HQOA & HQOP 1-2, HBA to 'OFF' for 5 minutes & try.

Auto Regression -

1. Auto regression through RGEB -

- i. Check BP pressure is 5 kg/cm².

2. Auto regression through QD -

- i. If comes due to defect in TM, then isolate TM respective to QD 1/2 through HMCS 1/2 & try.
- ii. If comes due to wheel slip then press BPQD or operate HPAR/HQ 51 to 'I' or '0'.

WAP 5/WAP 7/ WAG 9/WAG 9H LOCO

Procedure to switch off control electronics

Stop train, Open VCB, Lower panto, BL key 'D' to 'OFF', then 'OFF' to 'C' & check DDS screen is OFF, then again operate BL key 'C' to 'OFF'.

Releasing of Vigilance penalty brakes -

Operate A 9 to emergency after stopping the train, put SA 9 to apply & throttle to '0'. On WAP 5/7 loco wait for 2 minutes & on WAG 9 loco wait for 3 minutes, press BPVR, press PVCD & release, acknowledge fault by pressing BPFA. Operate A 9 to RUN position & start train after creating BP/MR pressure.

Vigilance unit defective -

Throttle to '0', open VCB, lower panto, CE OFF, operate 237.1 to '0' on SB-1 panel, CE ON, press BPFA, inform LPC & work with normal traction.

Throttle or Angle transmitter defective -

Clear the section in coasting, open VCB, lower panto, CE OFF, operate 152 switch to 'I' on SB-1 panel, CE ON, press BPFA & start traction in failure mode.

Isolation of traction bogie -

1. If train is in running condition then bring throttle to '0', open VCB check 550 node, isolate required bogie through 154 switch on SB-1 panel, bogie will isolate after 10 seconds.
2. If train is in stationary condition then bring throttle to '0' & check 590 node comes, then isolate required bogie through 154 switch on SB-1 panel, bogie will isolate after 10 seconds.

Note - If not then try by switching OFF CE.

CE temperature above 70°, LSCE illuminating -

1. If possible clear the section in coasting.
2. open VCB, lower panto, CE OFF, BL key OFF to C, raise panto, close VCB.
3. After extinguishing LSCE, open VCB, lower panto, BL key C to OFF, OFF to D & energise the loco.

Isolation of one or two bogie -

Try by switching OFF & ON CE.

Isolation of one Aux converter -

Try by switching OFF & ON CE.

MCB tripped in HB 1 or HB 2 -

Open VCB, reset MCB, press BPFA, close VCB & check working of concern equipment.

MCB tripped in SB 1 or SB 2 -

Open VCB, lower panto, CE OFF, reset MCB.

Main Power Catenary Voltage Out Of Limit (F0104P1) -

1. Bring throttle to '0', check 'U' meter, if U meter shows voltage then check the range. If U meter shows '0' then arcing (chattering) of panto with OHE, if there is no arcing (chattering) it means there is no OHE supply, contact LPC.
2. If arcing (chattering) takes place then check 2 amp PT fuse on SB-1 panel, if blown replace it.
3. Try by switching OFF & ON CE, change panto or cab & try, isolate SR 1 (127.1/1) or SR 2 (127.1/2) & try. If still not successful then ask for assisting engine.

MR pressure not increasing -

Check both MCP are working, press BLCP to MAN & try, check MCB 47.1/1, 47.1/2 if blown then reset them & press BPFA, check MR drain cock, bypass air drier, check leakage on unloader valve (above BA Box No. 2) if found then isolate it, tap EP 26.

BP pressure not increasing -

Check cock No. 70 & 74 are open, operate ZBAN to ON & OFF, check RS flap valve is closed, check rear A 9 handle in neutral, tap EP 16.

Resetting of Emergency stop push button

Bring throttle to '0', MPJ to '0', operate stop push button in the direction of arrow provided on it, it will come out, press BPFA, raise panto, close VCB, start normal traction after creating BP pressure.

Indication of Fire or Smoke -

Buzzer will sound, open VCB, lower panto, stop train, CE OFF, check machine room, switch on flasher, if fire or smoke is noticed then extinguished with the help of fire extinguisher, press reset button provided on fire detection unit (FDU) in SB-2 panel.

Parking Brake not applied -

Press BPPB, press left side apply button of solenoid valve or apply wooden wedges.

Parking Brakes not releasing -

Press BPPB, press right side release button of solenoid valve or release manually wheel no. 2, 6, 7, 11 on WAG 9 loco and wheel no. 1, 4, 5, 8 on WAP 5

loco. While releasing parking brakes manually loco brakes should be released.

Dead Loco Movement -

Open VCB, lower panto, CE OFF, remove BL key & A 9, couple dead loco, connect BP/FP, press solenoid valve apply button & lock it, release SA 9, open cock no. 47, close cock no. 70, 74 & 136, release C 3W, drain MR 1-2, switch OFF 112.1, release parking brakes manually on wheel no. 2, 6, 7, 11 on WAG 9 loco and on wheel no. 1, 4, 5, 8 on WAP 5 loco.

Earth Fault in Aux winding circuit (F0103P2)

-

(Aux Conv 1, 2 & Main Power OFF)

1. Check MCB 59.1/1 or 59.1/2, if not tripped then isolate one OCB at a time & try. If successful then isolate respective bogie.
2. Check MCB 59.1/1 or 59.1/2, if tripped then do not reset it, isolate respective bogie through 154 switch & work with one bogie.

Earth Fault in Aux winding circuit (F0103P2) (Aux Conv 2, 1 & Main Power OFF)

1. Check MCB 53.1/1 or 53.1/2, if not tripped then isolate one TMB at a time & try. If successful then isolate respective bogie.
2. Check MCB 53.1/1 or 53.1/2, if tripped then do not reset it, isolate respective bogie through 154 switch & work with one bogie.

Earth Fault in Aux winding circuit (F0103P2) (Aux Conv 2, 3 & Main Power OFF)

1. Check MCB 63.1/1 or 63.1/2, if not tripped then isolate one MPH or SR at a time & try.
2. Check MCB 63.1/1 or 63.1/2, if tripped then do not reset it, isolate respective bogie through 154 switch & work with one bogie.

Earth Fault in Aux winding circuit (F0103P2) (Aux Conv 3, 2 & Main Power OFF)

1. Check MCB 47.1/1 or 47.1/2, if not tripped then isolate one MCP at a time & try.
2. Check MCB 47.1/1 or 47.1/2, if tripped then do not reset it, work with one MCP.

Harmonic Filter Current Too High (F0401P1)

speed restriction will be 40 kmph, after clearing section try by switching OFF & ON CE, if harmonic

filter comes in service then work the train normally. If harmonic filter does not come in service then isolate bogie-1 through 154 switch & work normally with one bogie.

Fault in Brake Electronics (F1001P1) -

1. Check MCB 127.7 or 128.1 on SB-2 panel, if tripped then reset it, if only 128.1 is tripped then do not reset it.
2. CE OFF & ON and try, if not successful and knorr brake system is provided then clear the section with maximum speed of 10 kmph in PTDC mode. If knorr brake system is not provided then ask for assisting engine.

Battery Voltage Too Low message (F0901P1) -

Check MCB 110, 112.1 on SB-2 panel and 112 MCB in BA Box, if tripped reset it. check MCB 100 on HB-2 panel, if tripped reset it. If message is coming due to BUR-3 then isolate BUR-3 (127.22/3), If message is coming due to BUR-2 then isolate BUR-2 (127.22/2).

Important instructions regarding trouble shooting on 3 phase loco -

Before fail the loco following action to be taken -

1. Check MCB of HB 1/2 & SB 1/2, if tripped reset the same by opening VCB.

2. Make CE 'OFF' for 5 minutes then CE 'ON'.
3. 'OFF' & 'ON' the battery by MCB 112.1.
4. Try by changing the cab.
5. If any sub system or auxiliary given repeatedly fault messages & also traction not allowed then isolate the same & work according to load/road.
6. If not succeed fail the loco.

Note -

1. While reporting fault message & No. to LPC also repeat DDS message.
2. Sub system isolated by control electronics, may comes in service by putting CE 'OFF'/'ON'.
3. Before rotating any switch, switch 'OFF' CE.

WAP 5/WAP 7/ WAG 9/WAG 9H Knorr Brake Loco

Energising of Cab -

This loco should be energised as per normal WAG 9 loco but before energising loco following things should keep in mind

-

1. In working cab A 9 handle unlocked & on RUN position & rear cab A 9 handle locked in FS position.
2. In working cab mode switch in 'Lead' and in 'Trail' in rear cab.
3. Energise loco as per normal WAG 9 loco.
4. For charging BP operate A 9 handle to FS position & wait for 10 seconds, then operate it to RUN position. BP will charge upto 3.0 kg/cm².
5. Check parking brake pressure. If pressure shows '0' then press BPPB on loco pilot desk and check parking brake pressure shows 6.0 kg/cm² pressure.
6. Bring A 9 handle from RUN to FS, wait for 10 seconds & bring again to RUN position, BP will charge 5.0 kg/cm² & brake cylinder pressure will show '0'.
7. Everytime after applying brakes when A 9 handle is operated to RUN position BP will overcharge by 0.2 kg/cm² due to which distance wagons will release quickly & BP will come to 5.0 kg/cm² automatically.

8. To overcharge BP by 0.5 kg/cm^2 , A 9 handle has to be kept on Release position.
9. To release loco brakes via synchronising system PVEF is used but by pressing bell ring provided on SA 9 handle loco brakes via synchronising system can be released quickly.

Cab changing -

1. Keep A 9 handle to FS & lock it by key and remove the locking key.
2. Operate SA 9 to release and operate mode switch by pressing its knob from Lead to Trail.
3. Open VCB, lower panto & switch OFF control electronics through BL key & proceed towards another cab by taking BL key.
4. Unlock A 9 handle & operate it to RUN position, operate mode switch from Trail to Lead and energise the loco.
5. Before charging BP to 5.0 kg/cm^2 first release parking brakes through BPPB, then check BP is charged.
6. Every time while changing cab above sequence should be kept in mind.

Resetting of Vigilance penalty brakes -

On this loco whenever penalty brakes are applied BP will drop 3.0 kg/cm^2 , due to which BP will remain 2.0 kg/cm^2 . So to reset vigilance penalty brakes following action should be taken -

1. Bring throttle to '0'.
2. wait for 160 seconds.

3. For acknowledging the fault put A 9 to FS position and press BPVR & release and also press vigilance foot paddle switch.
4. Put A 9 to RUN position. Check BP is comes to 5.0 kg/cm² & brake cylinder pressure to '0'.
5. Acknowledge the fault by pressing BPFA. After ensuring the pressure is restored work the train.

Action after Emergency Brakes -

Emergency penalty brakes will be applied whenever Emergency stop push button is pressed or due to over speed or by operating A 9 handle to emergency or by ALP brake cock, due to which BP will come to '0'. For releasing above mentioned emergency penalty brakes first operate A 9 handle to Emergency & wait for 10 seconds, then keep it on FS and then on RUN position, then BP will charge to 5.0 kg/cm², acknowledge the fault by pressing BPFA & work the train.

Resetting of service penalty brakes -

Service penalty brakes will be applied in following conditions due to which BP pressure comes to 3.0 kg/cm².

1. If BC-1 or BC-2 is isolated in leading mode of loco.
2. If any cock or all three cocks PB-PDS, PB-BUS and PBR-COS are isolated and in this condition BPPB is pressed then service penalty brakes will be applied.
3. To release service penalty brakes whichever above mentioned cock is isolated, operate it to normal position. Operate A 9 handle to FS position & after waiting for

10 seconds bring it to RUN position. Press BPFA & check BP comes to 5.0 kg/cm².

Banking Mode -

If loco has to be worked as banker then following procedure should be followed -

1. Open DJ & switch ON ZBAN provided on A panel. (BP will come to '0')
2. Keep mode switch in HLPR position.
3. Energise the loco as per normal procedure.
4. BP pressure will come to '0' but when loco is attached on train or coupled with another loco then its BP pressure will indicate on this loco.
5. During this Priority-2 fault 'Loco is in Banking Mode' will appear on DDS screen. Acknowledge the same by pressing BPFA.
6. Now check the loco is responding by throttle after operating MPJ to FOR. Loco will respond even though the BP is '0'. It means loco is ready to work in banking mode.

Procedure to attach loco as dead loco -

1. Bring throttle to '0'. Open VCB, lower panto & switch OFF control electronics by BL key & remove the BL key.
2. Operate both cab A 9 handle to FS & lock them and remove the key.

3. Keep both cab SA 9 handle to release position & mode switch to 'Trail' position.
4. Open dead loco cock No. 47 on auxiliary manifold and close feed valve cock No. 136 it means operate it in vertical position.
5. Operate PAN-1 & PAN-2 to vertical position provided on auxiliary manifold.
6. Close SIFA 74 cock by operating upwards on air brake manifold.
7. Switch OFF MCB 112.1 on SB-2 panel and drain MR pressure.
8. Couple the dead loco with energised loco & connect BP & FP pipe and open both the locos angle cocks.
9. BC pressure should be '0'. If BC pressure is not comes to '0' then release brakes by distributor valve release spindle.
10. To release parking brakes on dead loco operate PB-BUS cock from horizontal to vertical position provided on air brake manifold, due to which parking brakes will be released. Check parking brake pressure is showing 5.0 kg/cm².

To clear block section in PTDC following action should be taken -

1. Bring throttle to '0'
2. Open VCB, lower panto & switch OFF control electronics.

3. Trip 127.7 MCB on SB-2 panel and check 127.15 vigilance MCB is set.
4. Close PB-BUS cock on pneumatic brake manifold and operate PER-COS cock from horizontal to vertical position.
5. Unlock A 9 handle in working cab & keep it on RUN position and energise the loco.
6. Acknowledge the fault by pressing BPFA if BPFA is illuminating.
7. Operate PTDC handle to release position & check BP pressure is 5.0 kg/cm² and brake cylinder pressure is '0'. If BC pressure is not '0' then release distributor valve by pulling its release spindle.
8. Switch ON CE, raise panto and close VCB.
9. If BC pressure is not '0' then release DV.
10. For applying & releasing auto brakes operate PTDC handle in apply & release position as per requirement. Clear the block section with 10 kmph speed.

WAP 5/WAP 7/ WAG 9/WAG 9H Modified Knorr Brake Loco

Energising of cab -

This loco should be energised as per normal WAG 9 loco but before energising loco following things should keep in mind

-
1. In working cab A 9 handle unlocked & on RUN position & rear cab A 9 handle locked in FS position.
2. In working cab mode switch in 'Lead' and in 'Trail' in rear cab.
3. Energise loco as per normal WAG 9 loco.
4. Now operate A 9 handle to FS position.
5. When '**Okay to Run BP Target 3.35**' message appears on the LCD screen provided below A 9 then operate A 9 handle to Run position due to which BP will charge up to 5.0 kg/cm².
6. Check parking brake pressure. If it shows '0' then press BPPB switch on loco pilot desk and check parking brake pressure gauge shows 6.0 kg/cm².
7. Everytime after applying brakes when A 9 handle is operated to RUN position BP will overcharge by 0.2 kg/cm² due to which distance wagons will release quickly & BP will come to 5.0 kg/cm² automatically.
8. To overcharge BP by 0.5 kg/cm², A 9 handle has to be kept on Release position.

9. To release loco brakes via synchronising system PVEF is used but by pressing bell ring provided on SA 9 handle loco brakes via synchronising system can be released quickly.

Cab changing -

1. Keep A 9 handle to FS & lock it by locking pin.
2. Operate SA 9 to release and operate mode switch by pressing its knob from Lead to Trail.
3. Open VCB, lower panto & operate BL key from D to OFF & proceed towards another cab by taking BL key.
4. Operate mode switch from Trail to Lead, Unlock A 9 handle & operate it to RUN position, check BP is charged to 5.0 kg/cm².
5. Energise the loco.
6. Release parking brakes by pressing BPPB switch.
7. Every time while changing cab above conditions should be kept in mind.

Resetting of Vigilance penalty brakes -

On this loco whenever penalty brakes are applied BP will drop 0.0 kg/cm² & **Train line Emergency - Keep Handle in EMER** message will appear on A 9 screen. So to reset vigilance penalty brakes following action should be taken -

1. Bring throttle to '0' & MPJ to '0'.
2. Wait for minimum 32 seconds.
3. Keep A 9 to emergency & press BPVR & release it.

4. Acknowledge the fault by pressing BPFA.
5. Operate A 9 to Run. Check BP pressure comes to 5.0 kg/cm² alongwith BC pressure to '0'. After confirming the pressure restored fully start the train.

Action after Emergency Brakes By ALP -

Whenever emergency brakes are applied by ALP emergency brake cock, emergency penalty brakes will get applied due to which BP will come to '0' & **Train line Emergency - Put Auto in EMER** message will appear on the A 9 screen. To release above mentioned emergency penalty brakes first keep A 9 handle to emergency position, after some time when **Okay to Run BP Target - 0.0** message appears on the A 9 screen then operate A 9 handle to Run position & BP will charge up to 5.0 kg/cm², acknowledge the fault by pressing BPFA & work the train.

Action after Emergency Brakes By A 9-

Whenever emergency brakes are applied by A 9 handle, emergency brakes will get applied due to which BP will come to '0' & **Operator Emergency - Wait** message will appear on the A 9 screen. To release above mentioned emergency brakes, after some time when **Okay to Run BP Target - 0.0** message appears on the A 9 screen then operate A 9 handle to Run position & BP will charge up to 5.0 kg/cm², acknowledge the fault by pressing BPFA & work the train.

Setting up Banking Mode on Energised Loco

If loco has to be worked as banker then following procedure should be followed -

1. Open VCB.
2. Operate Mode switch to 'HLPR' position.
3. Switch ON the ZBAN switch on A panel. **Loco is in Banking Mode** message will appear on the DDS screen. Acknowledge the fault by pressing BPFA.
4. Energise the loco.
5. BP pressure will come to '0' but when loco is attached on train or coupled with another loco then its BP pressure will indicate on this loco.
6. Now check the loco is responding by throttle after operating MPJ to FOR. Loco will respond even though the BP is '0'. It means loco is ready to work in banking mode.

Setting up Banking Mode on De-energised Loco

If loco has to be worked as banker then following procedure should be followed -

1. Operate BL key from OFF to D.
2. Operate mode switch to HLPR position.
3. Switch ON the ZBAN switch on A panel. **Loco is in Banking Mode** message will appear on the DDS screen. Acknowledge the fault by pressing BPFA.
4. Unlock A 9 handle & operate it to RUN.
5. Energise the loco normally.

Action after wrong set up -

If loco is in energised condition & in rear cab anyone operates mode switch to Lead -

1. **Fault 108 Active Check setup** message will appear on A 9 screen & BP will drop up to 3.0 kg/cm².
2. Operate mode switch to Trail in rear cab, **Mode Change Pass Lead IN** message will appear on A 9 screen. After some time **Safety Penalty Put Auto in FS** message will appear on A 9 screen.
3. Operate A 9 to FS position & wait.
4. When **Okay to Run BP Target - 3.32** message will appear on A 9 screen, operate A 9 to Run. BP will charge up to 5.0 kg/cm².

Procedure to attach loco as dead loco -

1. Bring throttle to '0'. Open VCB, lower panto & switch OFF control electronics by BL key & remove the BL key.
2. Operate both cab A 9 handle to FS & lock them.
3. Keep both cab SA 9 handle to release position & mode switch to 'Trail' position.
4. On pneumatic panel operate SIFA 74 cock from vertical to horizontal position.
5. Open dead loco cock No. 47 in anticlockwise direction from right to left.
6. Operate 136 feed pipe cock horizontal to vertical on pneumatic panel.

7. Couple the dead loco with energised loco & connect BP & FP pipe and open both the locos angle cocks.
8. BC pressure should be '0'. If BC pressure is not comes to '0' then release brakes by distributor valve release spindle. If still loco brakes are not releasing then release them by pressing 16TP / 20TP (Test Panel Nipple) on distributor valve.
9. To release parking brakes on dead loco press right side knob of solenoid valve on pneumatic panel due to which parking brakes will release. If still parking brakes are not releasing then release parking brakes manually.
10. Switch OFF 112.1 on SB-2 panel & drain MR pressure.

To clear block section in PTDC following action should be taken -

1. Bring throttle to '0'
2. Open VCB, lower panto & switch OFF control electronics.
3. Trip 127.7 MCB on SB-2 panel and check 127.15 vigilance MCB is set.
4. On pneumatic panel operate pneumatic equalising reservoir cut off switch (PER-COS) from horizontal to vertical position and acknowledge the fault message **Brake Electronics Failed** by pressing BPFA.
5. Unlock A 9 handle in working cab & keep it on RUN position and in non working cab it should be in FS position.

6. If BPFA is illuminating then acknowledge the fault by pressing BPFA.
7. Operate PTDC handle to release position & ensure BP pressure 5.0 kg/cm² as well as BC pressure is 0.0 kg/cm². If still loco brakes are not releasing then release them by pressing 16TP / 20TP (Test Panel Nipple) on distributor valve.
8. Switch ON control electronics, raise panto & close VCB.
9. Press BPPB to release parking brakes.
10. To apply or release auto brakes operate PTDC handle in apply or release position as per requirement. Clear the block section with 10 kmph speed.
11. If speed of the train exceeds 10 kmph then traction will cut off automatically and **Traction with Auto Brake not allowed** message will appear on DDS screen.

TROUBLE SHOOTING POCKET DIARY

Old Knorr Brake System	New Knorr Brake System
Solenoid 30 valve not provided	Solenoid 30 valve provided
P/G cock on DV valve	P/G cock & electrical switch on DV valve
Air brake manifold & Auxiliary manifold two pneumatic panels	Only one pneumatic panel
Two keys provided, one BL key & another A 9 key	Only one BL key is provided
No screen between A9 & SA9	Screen between A 9 & SA 9
PB-BUS cock provided	PB-BUS cock not provided
IG 38 key normal position horizontal.	IG 38 key normal position vertical.
WFL cock provided	WFL cock not provided
TC1-2, FC cock normal position horizontal	TC1-2, FC cock normal position vertical
During PTDC PB-BUS, PER-COS to be operated in vertical VCD penbalty brakes will	During PTDC only PER-COS to be operated in vertical
apply after 68 seconds & it can be reset after 2 or 3 minutes	VCD penbalty brakes will apply after 76 seconds & it can be reset after 32 seconds
136 cock normal position vertical	
	136 cock normal position horizontal



**Quality is our habit
Safety, Reliability, Punctuality
is our aim**