



INSTRUCTIONS

GEK-86667
Insert Booklet GEK-86638

TLS9000 MODULAR RELAY SYSTEM FOR TRANSMISSION LINE PROTECTION

INTRODUCTION

This instruction book, together with insert booklet GEK-86638, forms the instructions for the TLS9000 series relays.

DESCRIPTION

The TLS9000 modular relays are similar to the TLS1000 modular systems. The features that make the two different lie in the output contacts and the DLA point locations. These two distinguishing features are evident in the elementary diagrams (Figures 1, 2 and 3 of this book), and the logic diagrams (Figures 4, 5, 6 and 7 of this book).

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

To the extent required the products described herein meet applicable ANSI, IEEE and NEMA standards; but no such assurance is given with respect to local codes and ordinances because they vary greatly.

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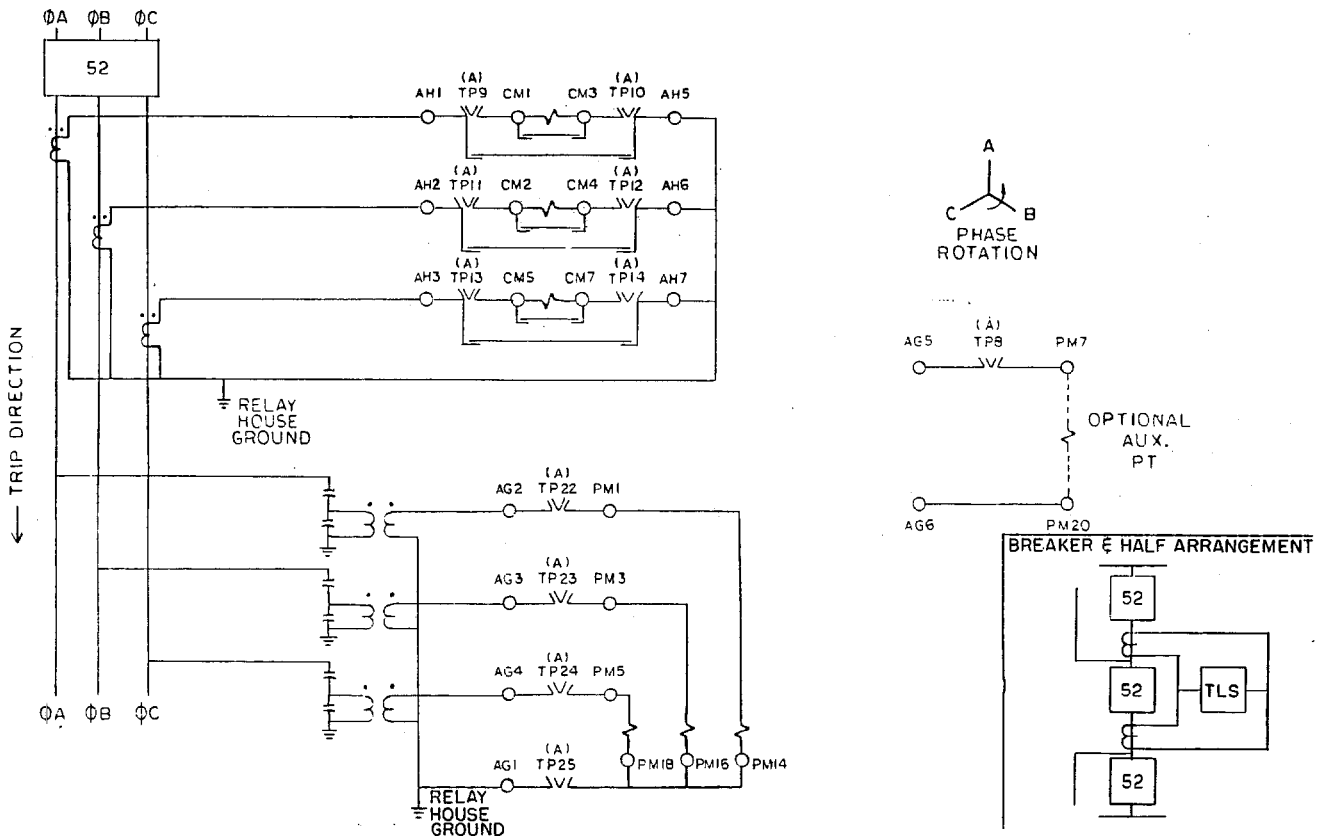
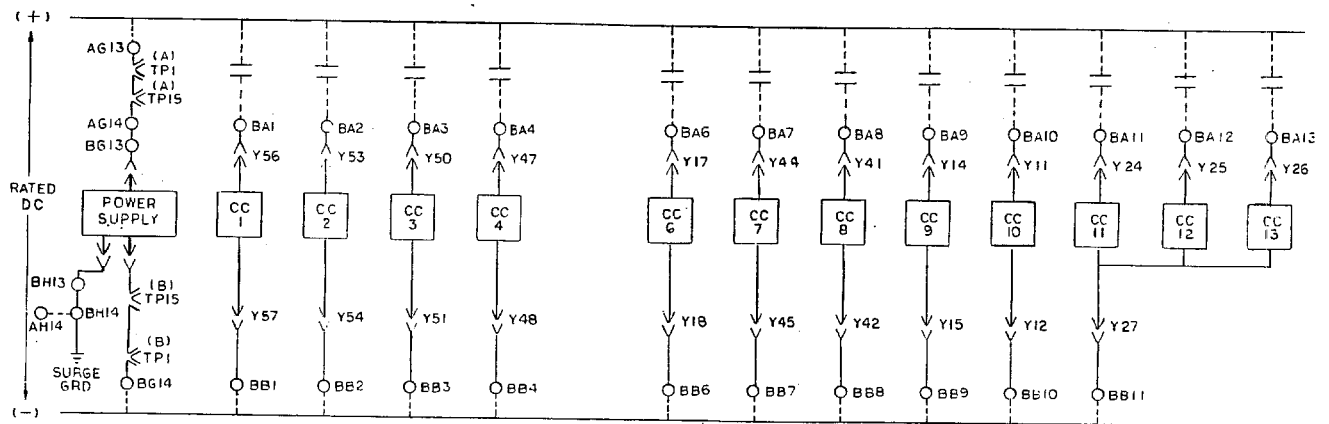


Figure 1A (0183B3676-0, Sh. 1) Elementary Diagram TLS9001
Hybrid/Permissive Three Pole
Tripping Scheme - One Zone



LEGEND:

CC1 - 1 POLE RECEIVER INPUT
 CC2 - DTT RECEIVER INPUT (IF USED)
 CC3 - 3 POLE RECEIVER INPUT
 CC4 - PERM. RCVR DR ZONE ACC. INPUT (IF USED)
 CC6 - CHANNEL FAILURE ALARM INPUT FOR LINE PICKUP

CC7 - EXT. 3 POLE DIRECT TRIP WITH RECLOSE INITIATION
 CC8 - EXT. 3 POLE DIRECT TRIP WITHOUT RECLOSE INITIATION
 CC9 - REMOTE CONTACT TO DISABLE ALL TRIP OUTPUTS
 CC10 - REMOTE CONTACT TO RESET TARGET LAMPS
 CC11 - INHIBIT U/V INPUT FOR BUS SIDE POTENTIAL OR FOR
 CC12 - PHASE SELECTION WITH PHASE IDENTIFIED CHANNELS (IF USED)
 CC13 -

Figure 1B (0183B3676-0, Sh. 2) Elementary Diagram TLS9001
 Hybrid/Permissive Three Pole
 Tripping Scheme - One Zone

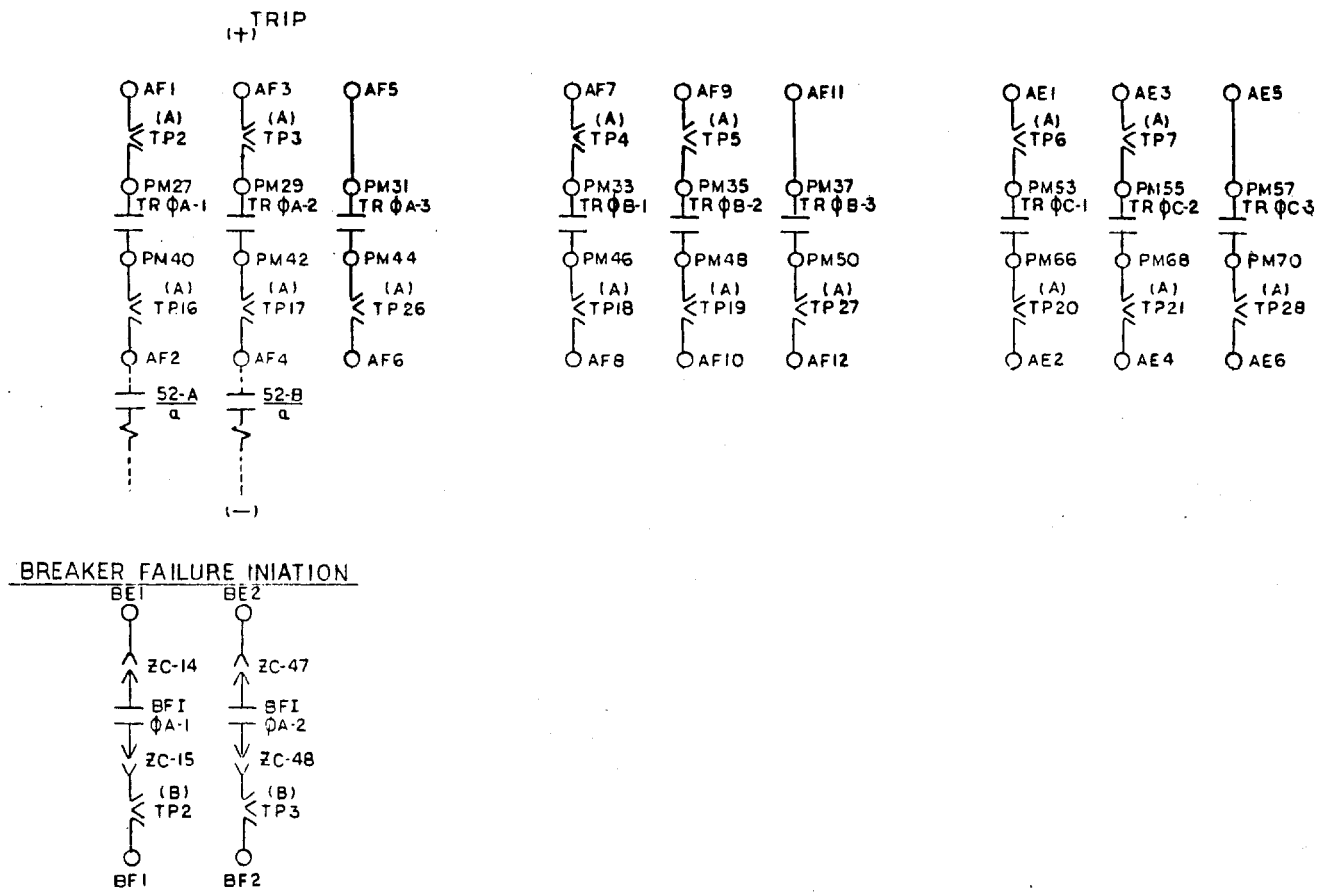


Figure 1C (0183B3676-0, Sh. 3) Elementary Diagram TLS9001
Hybrid/Permissive Three Pole
Tripping Scheme - One Zone

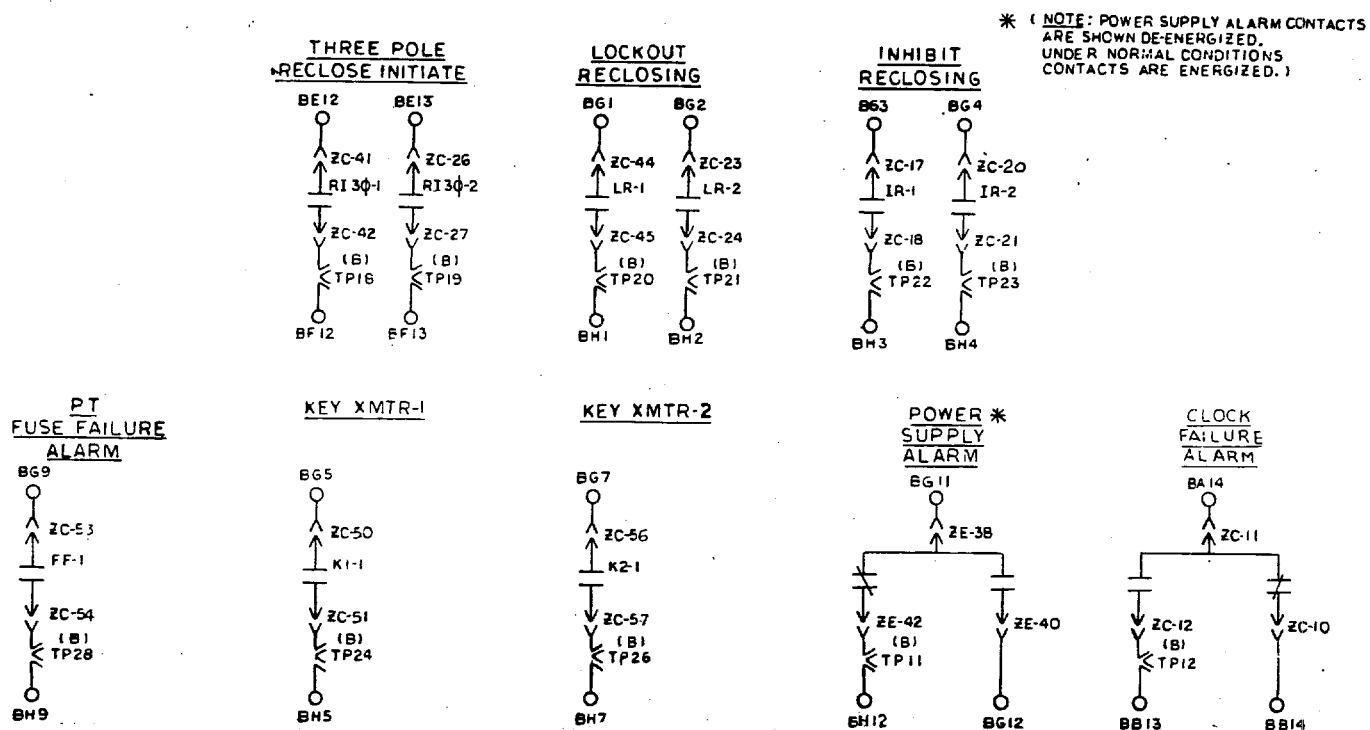
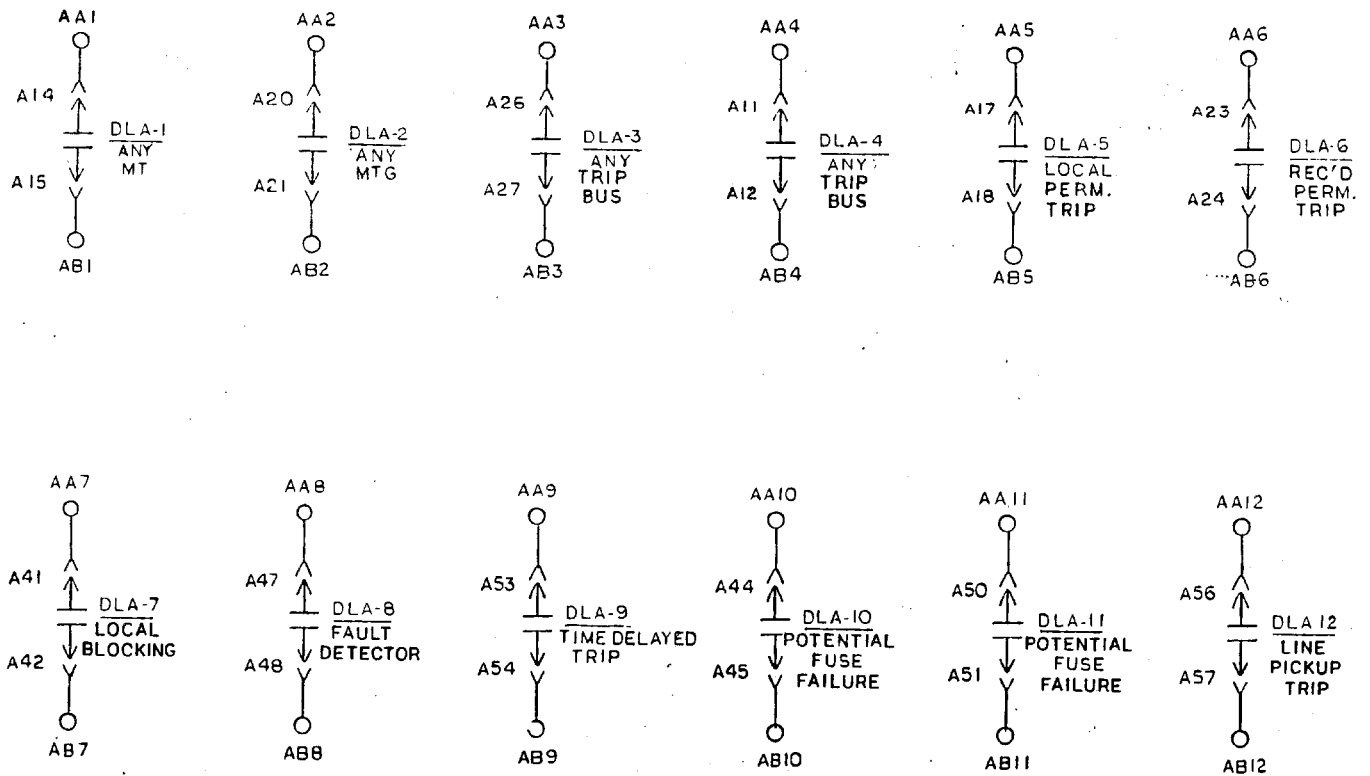


Figure ID (0183B3676-2, Sh. 4) Elementary Diagram TLS9001 Hybrid/Permissive Three Pole Tripping Scheme - One Zone



DLA CONTACTS

NOTE: BACK PLANE WIRING
0285A7115G2

Figure 1E (0183B3676-1, Sh. 5) Elementary Diagram TLS9001
Hybrid/Permissive Three Pole
Tripping Scheme - One Zone

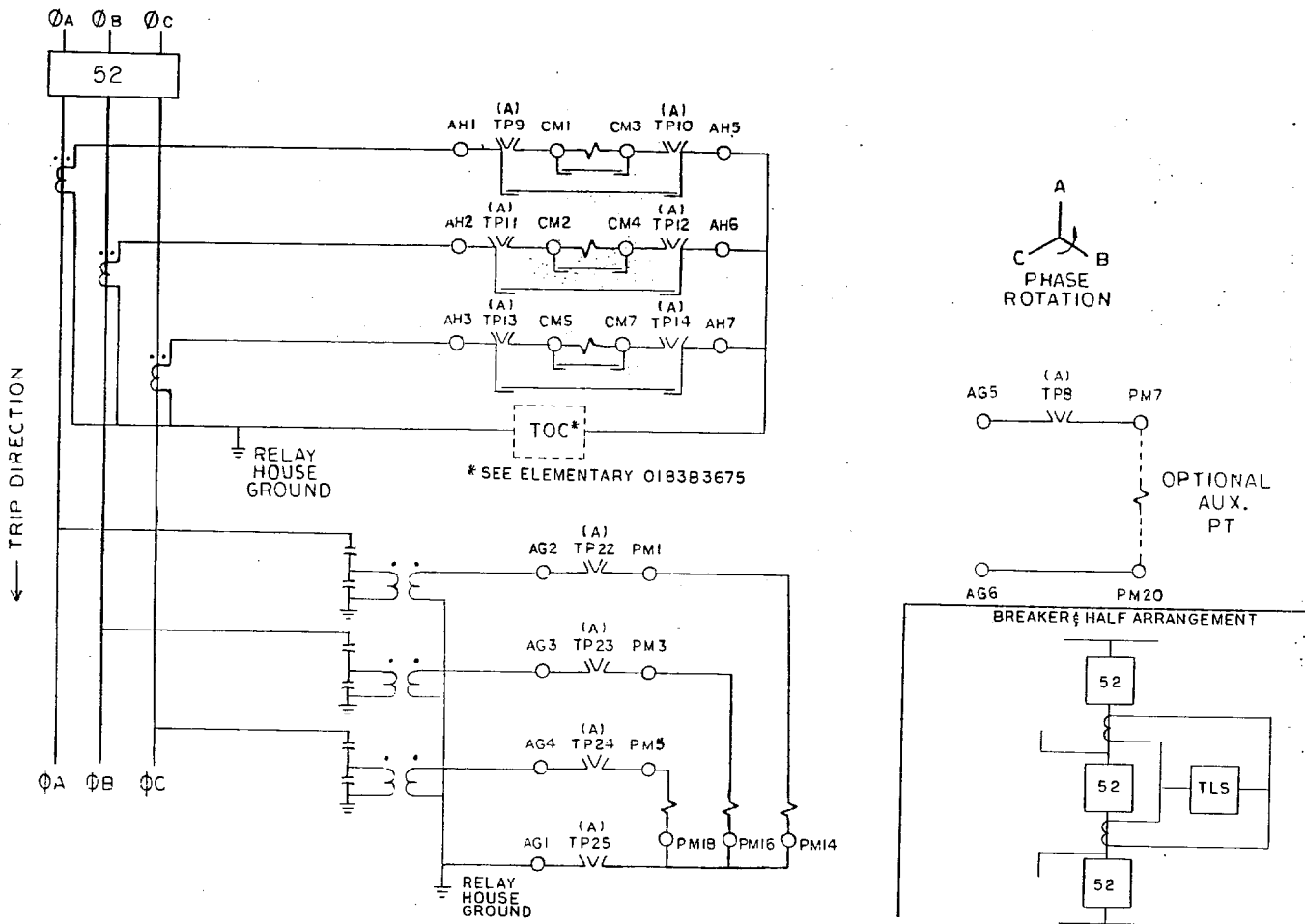
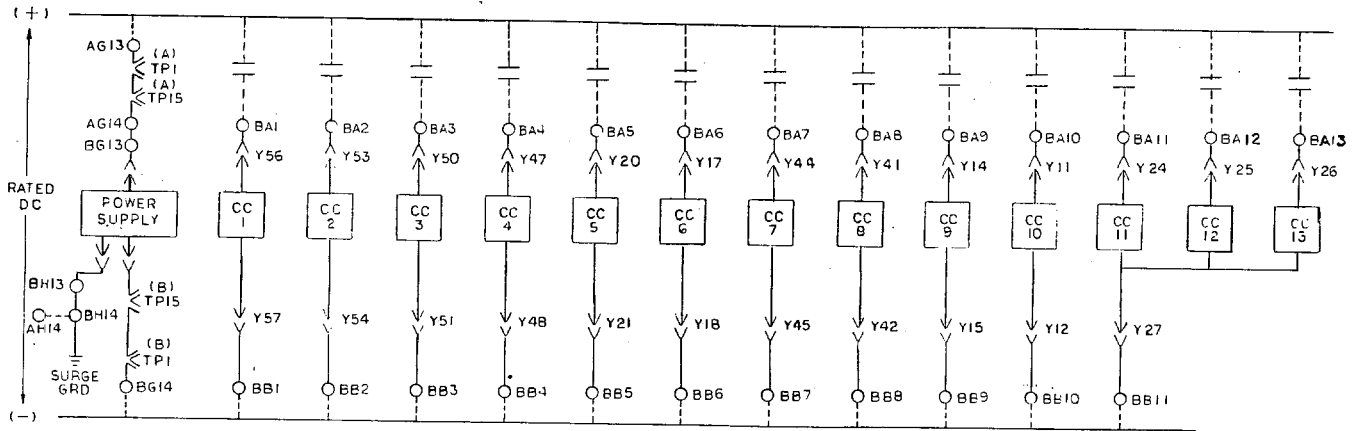


Figure 2A (0183B3678-0, Sh. 1) Elementary Diagram TLS9002 Hybrid/Permissive Single Pole Tripping Scheme - Two Zone



LEGEND:

- | | |
|---|---|
| CC1 - 1 POLE RECEIVER INPUT | CC7 - EXT. 3 POLE DIRECT TRIP WITH RECLOSE INITIATION |
| CC2 - DTT RECEIVER INPUT (IF USED) | CC8 - EXT. 3 POLE DIRECT TRIP WITHOUT RECLOSE INITIATION |
| CC3 - 3 POLE RECEIVER INPUT | CC9 - REMOTE CONTACT TO DISABLE ALL TRIP OUTPUTS |
| CC4 - PERM. RCVR OR ZONE ACC. INPUT (IF USED) | CC10 - REMOTE CONTACT TO RESET TARGET LAMPS |
| CC5 - REMOTE SELECTION OF 3 POLE TRIP MODE | CC11 |
| CC6 - CHANNEL FAILURE ALARM INPUT FOR LINE PICKUP | CC12 - INHIBIT U/V INPUT FOR BUS SIDE POTENTIAL OR FOR |
| | CC13 - PHASE SELECTION WITH PHASE IDENTIFIED CHANNELS (IF USED) |

Figure 2B (0183B3678-0, Sh. 2) Elementary Diagram TLS9002
Hybrid/Permissive Single Pole
Tripping Scheme - Two Zone

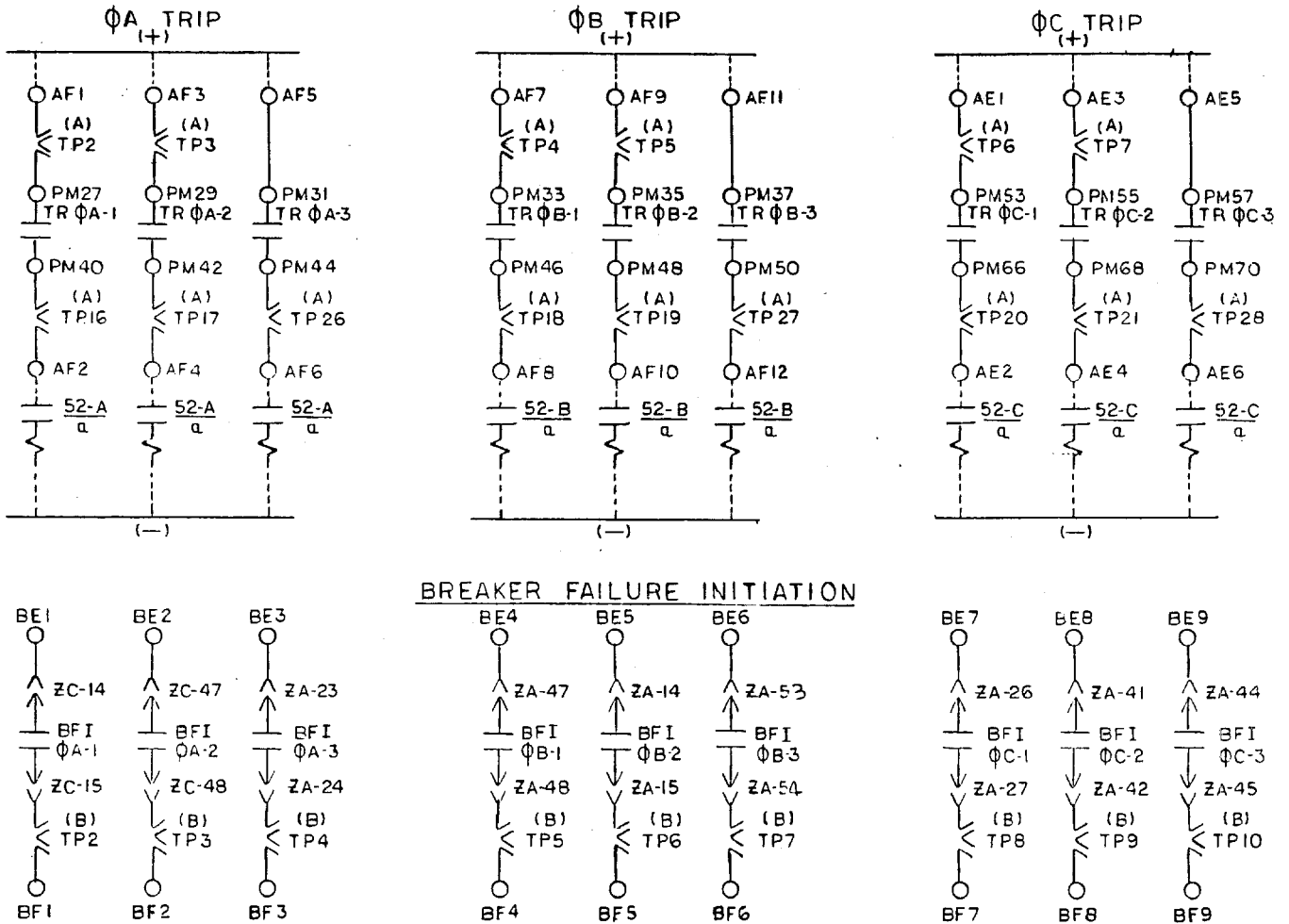
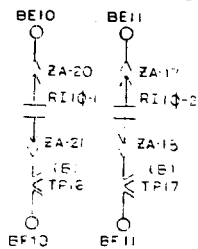
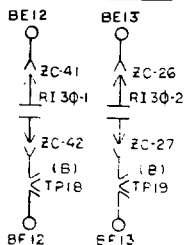


Figure 2C (0183B3678-1, Sh. 3) Elementary Diagram TL59002
 Hybrid/Permissive Single Pole
 Tripping Scheme - Two Zone

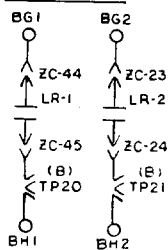
**SINGLE POLE
RECLOSE INITIATE**



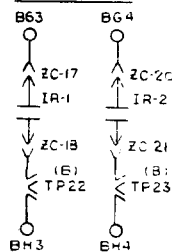
**THREE POLE
RECLOSE INITIATE**



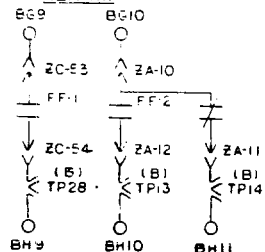
**LOCKOUT
RECLOSING**



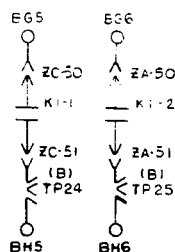
**INHIBIT
RECLOSING**



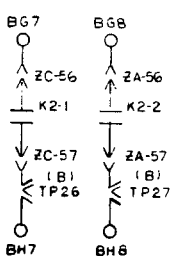
**PT
FUSE FAILURE
ALARM**



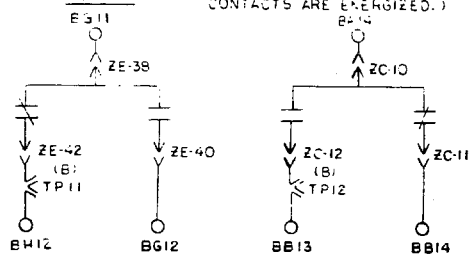
KEY XMTR-1



KEY XMTR-2

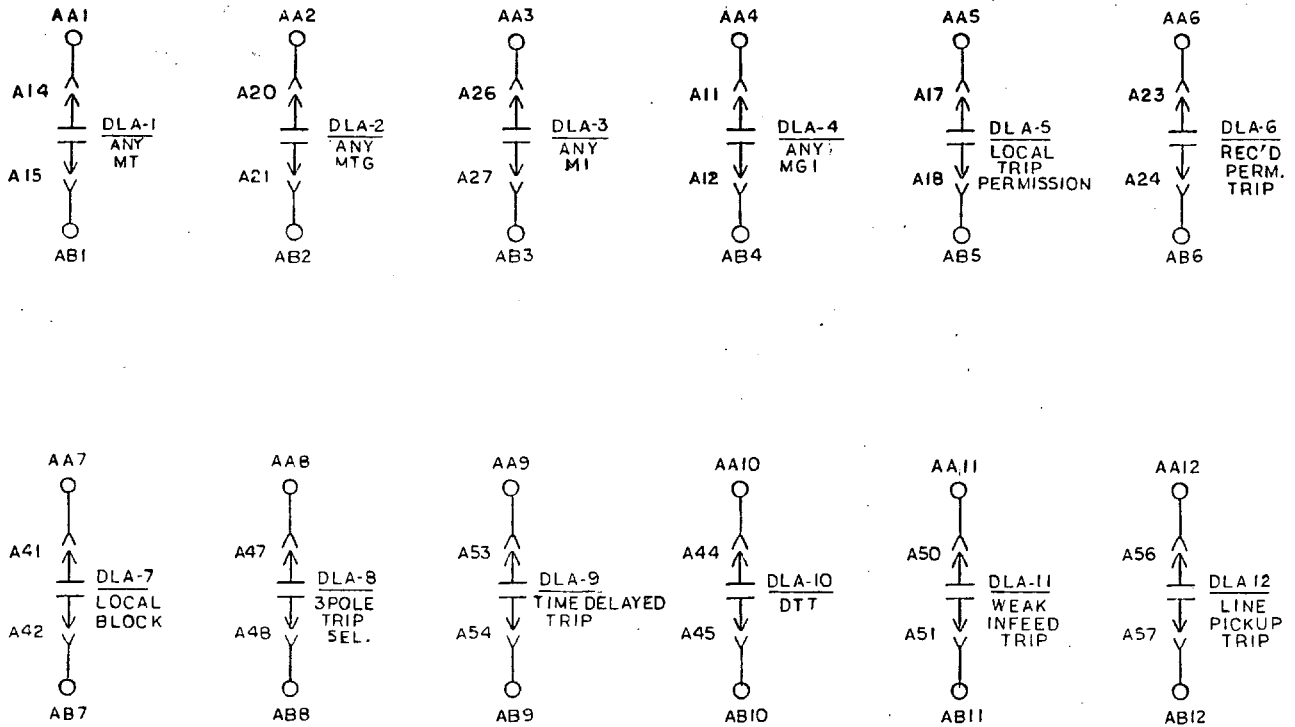


**POWER
SUPPLY
ALARM**



(NOTE: POWER SUPPLY ALARM CONTACTS ARE SHOWN DEENERGIZED. UNDER NORMAL CONDITIONS, CONTACTS ARE ENERGIZED.)

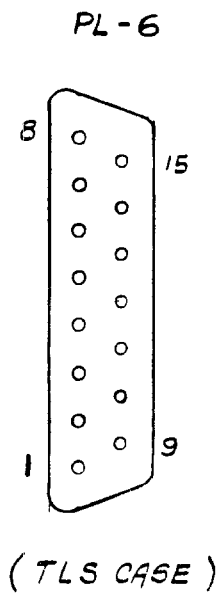
Figure 2D (0183B3678-1, Sh. 4) Elementary Diagram TLS9002 Hybrid/Permissive Single Pole Tripping Scheme - Two Zone



DLA CONTACTS

NOTE: BACK PLANE WIRING
0285A7115G3

Figure 2E (0183B3678-1, Sh. 5) Elementary Diagram TLS9002
Hybrid/Permissive Single Pole
Tripping Scheme - Two Zone



PIN ASSIGNMENT

- 1 ○ GROUND
- 2 ○ 3 POLE SELECTED
- 3 ○ ANY TRIP BUS
- 4 ○ OUT-OF-STEP BLOCK
- 5 ○ CHANNEL TRIP
- 6 ○ FAULT DETECTOR
- 7 ○ TRIP PERMISSION
- 8 ○ POTENTIAL FUSE FAILURE
- 9 ○ K1-NN40-1
- 10 ○ K2-NN40-2
- 11 ○ K1-NN40-1
- 12 ○ K2-NN40-2
- 13 ○ BLOCK RECLOSING
- 14 ○ SPARE
- 15 ○ SPARE

} TO TOC
AUX DLA CASE

Figure 2F (0183B3678-1, Sh. 6) Elementary Diagram TLS9002
Hybrid/Permissive Single Pole
Tripping Scheme - Two Zone

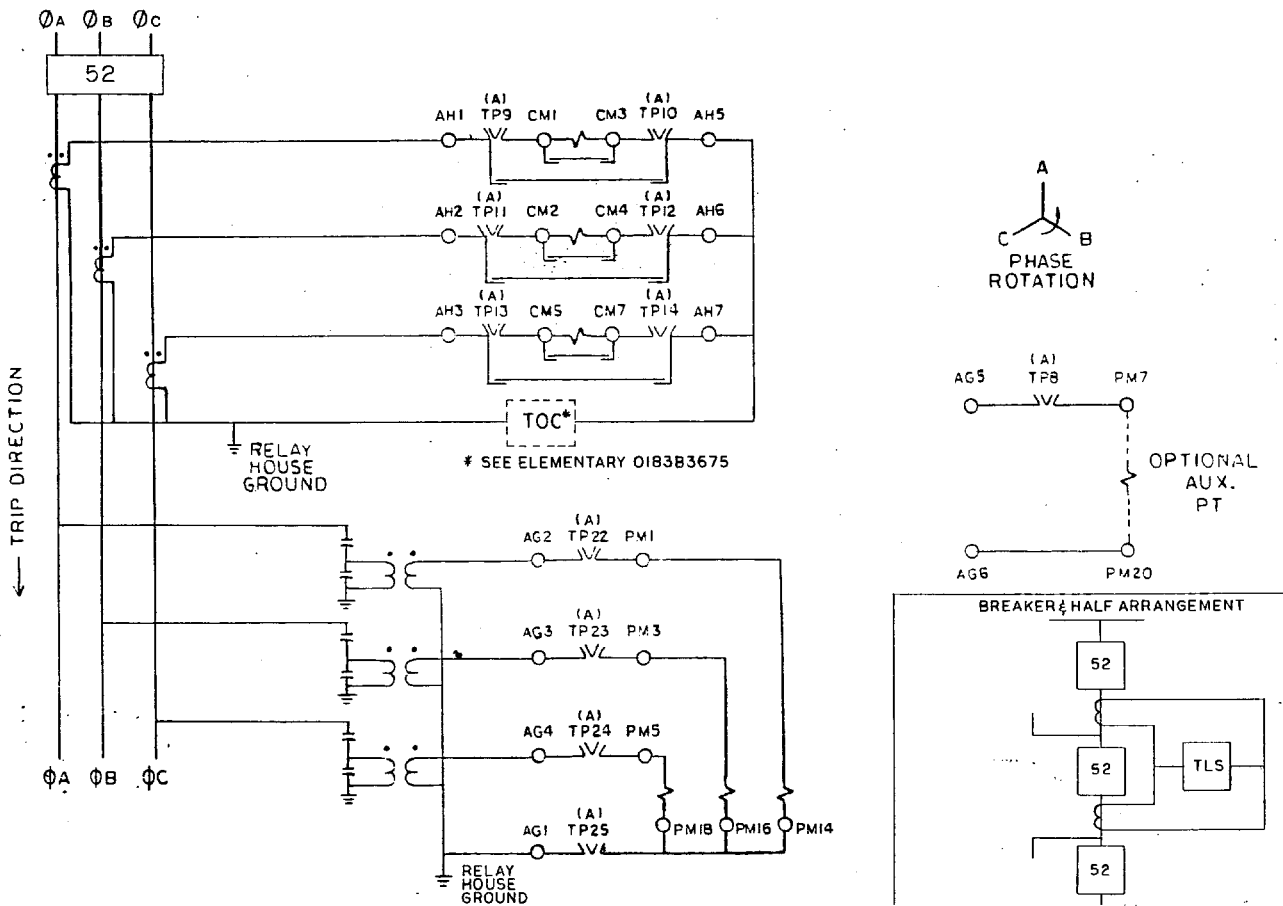
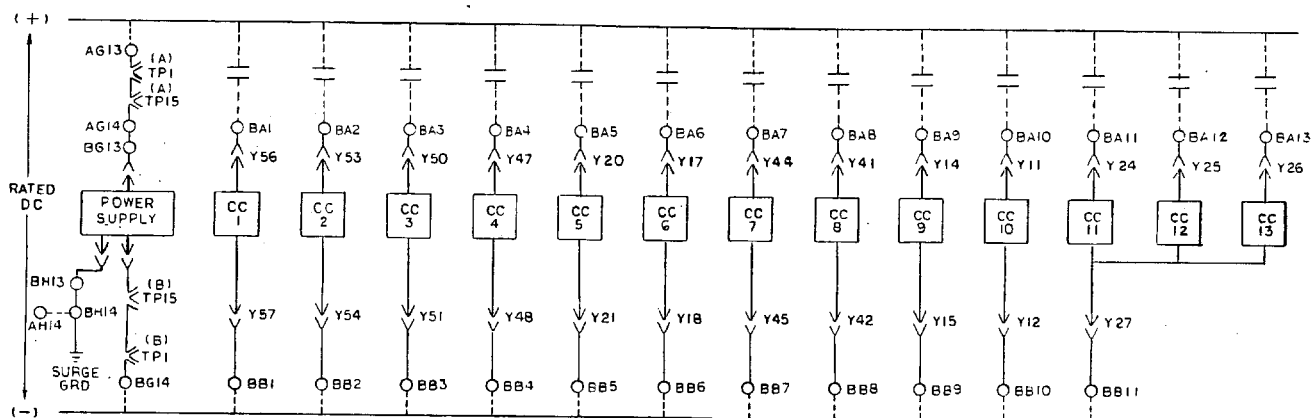


Figure 3A (0183B3679-0, Sh. 1) Elementary Diagram TLS9003 Hybrid/Permissive Single Pole Tripping Scheme - Three Zone



LEGEND:

- | | |
|---|---|
| CC1 - 1 POLE RECEIVER INPUT | CC7 - EXT. 3 POLE DIRECT TRIP WITH RECLOSE INITIATION |
| CC2 - DTT RECEIVER INPUT (IF USED) | CC8 - EXT. 3 POLE DIRECT TRIP WITHOUT RECLOSE INITIATION |
| CC3 - 3 POLE RECEIVER INPUT | CC9 - REMOTE CONTACT TO DISABLE ALL TRIP OUTPUTS |
| CC4 - PERM. RCVR OR ZONE ACC. INPUT (IF USED) | CC10 - REMOTE CONTACT TO RESET TARGET LAMPS |
| CC5 - REMOTE SELECTION OF 3 POLE TRIP MODE | CC11 |
| CC6 - CHANNEL FAILURE ALARM INPUT FOR LINE PICKUP | CC12 - INHIBIT U/V INPUT FOR BUS SIDE POTENTIAL OR FOR |
| | CC13 - PHASE SELECTION WITH PHASE IDENTIFIED CHANNELS (IF USED) |

Figure 3B (0183B3679-1, Sh. 2) Elementary Diagram TLS9003
Hybrid/Permissive Single Pole
Tripping Scheme - Three Zone

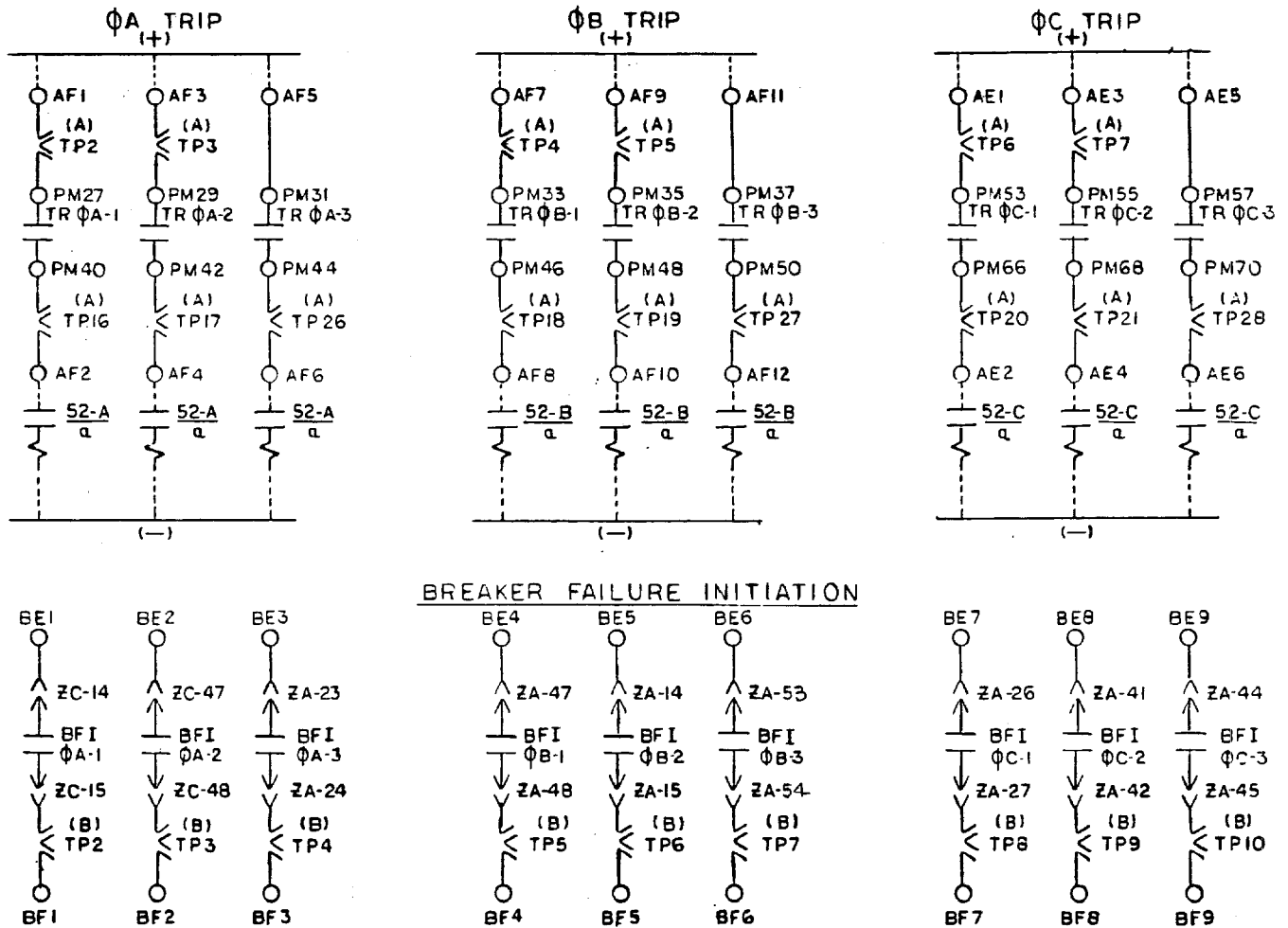
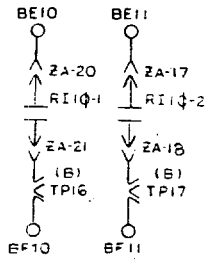
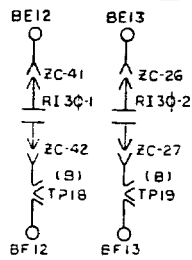


Figure 3C (0183B3679-1, Sh. 3) Elementary Diagram TLS9003 Hybrid/Permissive Single Pole Tripping Scheme - Three Zone

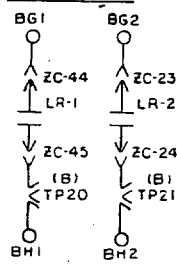
**SINGLE POLE
RECLOSE INITIATE**



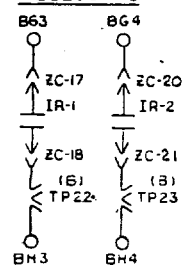
**THREE POLE
RECLOSE INITIATE**



**LOCKOUT
RECLOSING**

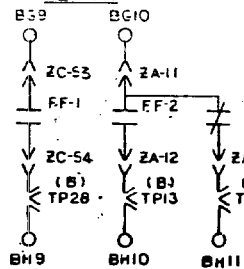


**INHIBIT
RECLOSING**

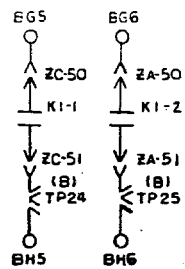


*(NOTE: POWER SUPPLY ALARM CONTACTS
ARE SHOWN DE-ENERGIZED.
UNDER NORMAL CONDITIONS
CONTACTS ARE ENERGIZED.)

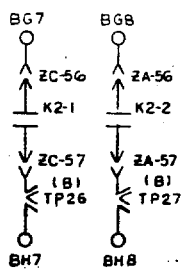
**PT
FUSE FAILURE
ALARM**



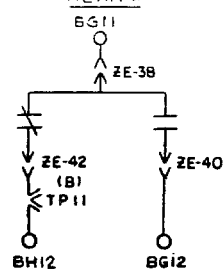
KEY XMTR-1



KEY XMTR-2



**POWER *
SUPPLY
ALARM**



**CLOCK
FAILURE
ALARM**

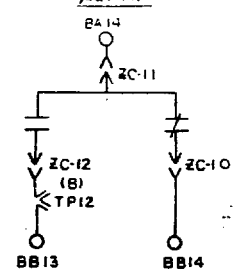
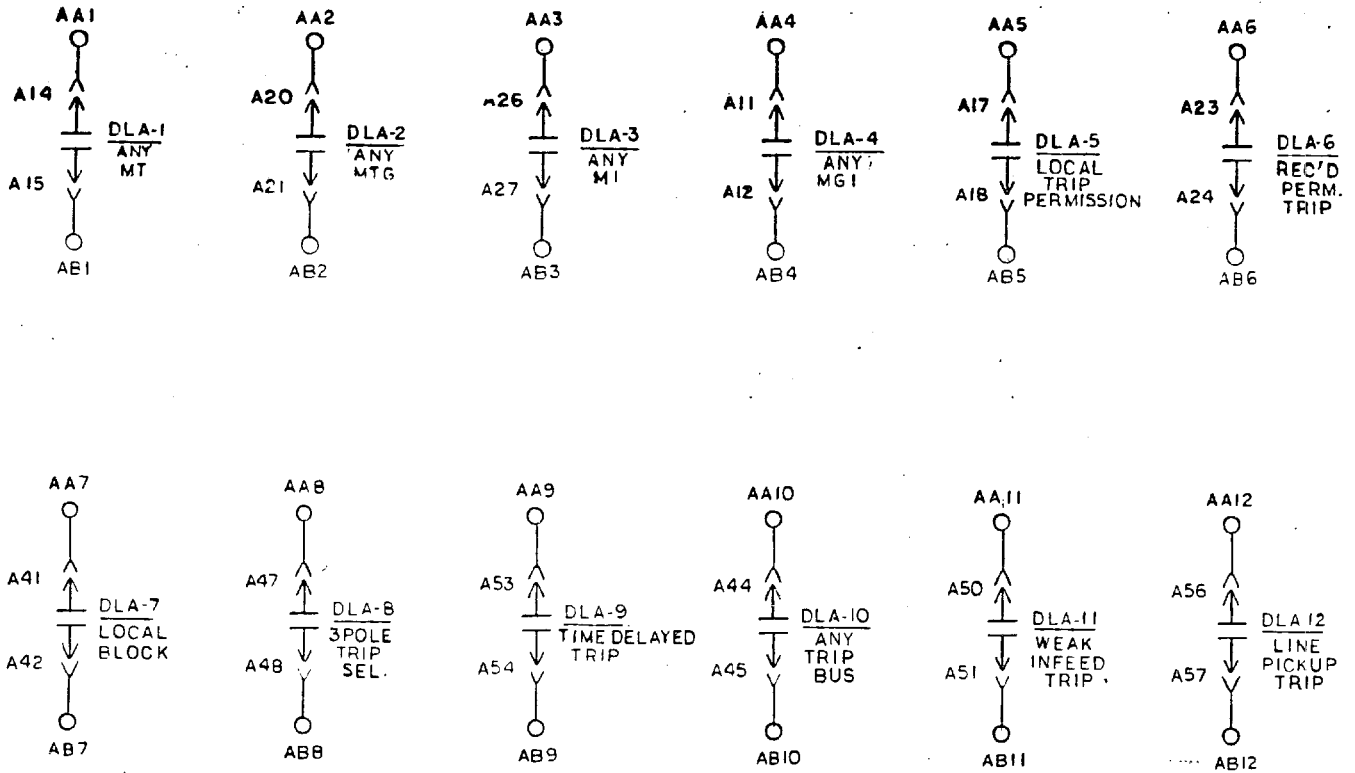


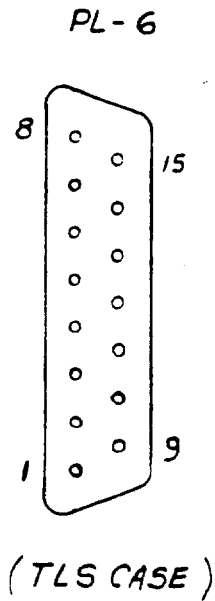
Figure 3D (0183B3679-2, Sh. 4) Elementary Diagram TLS9003
Hybrid/Permissive Single Pole
Tripping Scheme - Three Zone



DLA CONTACTS

NOTE: BACK PLANE WIRING
0285A8812 G2

Figure 3E (0183B3679-1, Sh. 5) Elementary Diagram TLS9003
Hybrid/Permissive Single Pole
Tripping Scheme - Three Zone



PIN ASSIGNMENT

- 1 ° GROUND
- 2 ° ZONE 1 TRIP
- 3 ° ZONE 2 TRIP
- 4 ° ZONE 3 TRIP
- 5 ° ANY M2
- 6 ° ANY MG2
- 7 ° ANY TRIP BUS
- 8 ° CHANNEL TRIP
- 9 ° TRIP PERMISSION
- 10 ° FAULT DETECTOR
- 11 ° BLOCK RECLOSING
- 12 ° OUT-OF-STEP BLOCKING
- 13 ° PT FUSE FAILURE
- 14 ° NOT USED
- 15 ° NOT USED

TO TOC
AUX DLA CASE

Figure 3F (0183B3679-1, Sh. 6) Elementary Diagram TLS9003
Hybrid/Permissive Single Pole
Tripping Scheme - Three Zone

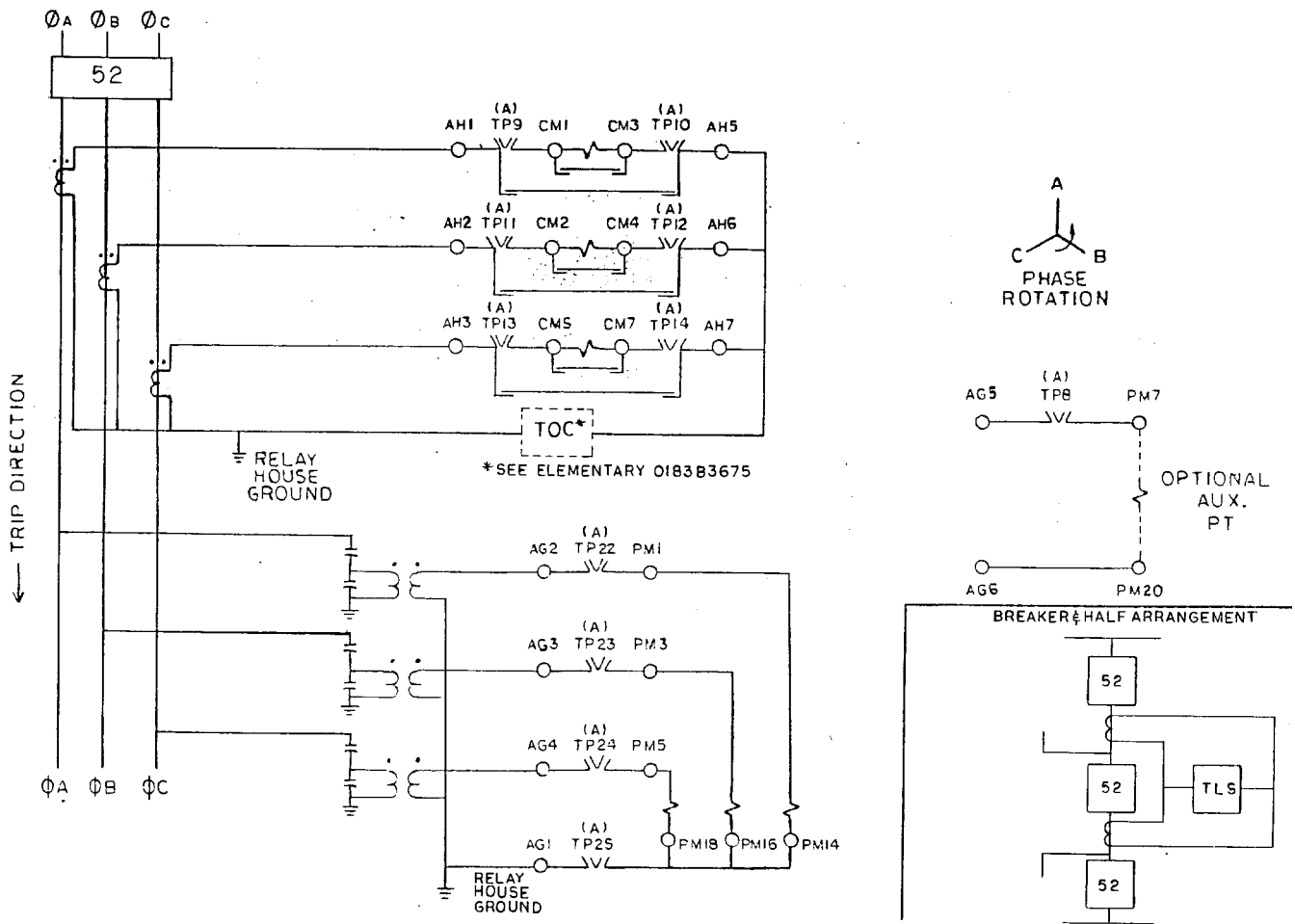
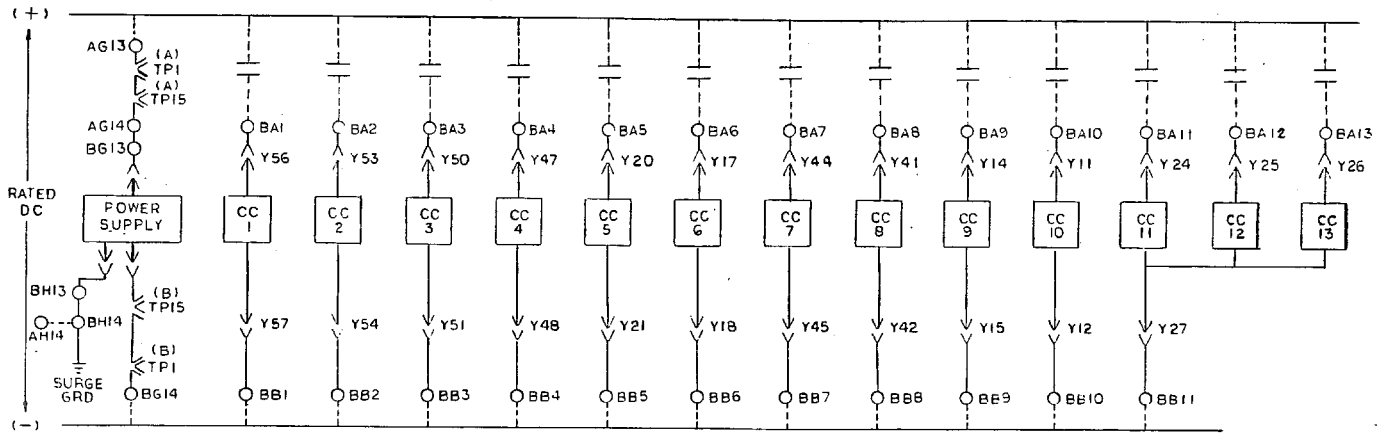


Figure 4A (0183B3677-0, Sh. 1) Elementary Diagram TLS9003
 Directional Comparison Blocking
 Single Pole Trip Scheme - Three Zone



LEGEND:

- | | |
|---|---|
| CC1 - 1 POLE RECEIVER INPUT | CC7 - EXT. 3 POLE DIRECT TRIP WITH RECLOSE INITIATION |
| CC2 - DTT RECEIVER INPUT (IF USED) | CC8 - EXT. 3 POLE DIRECT TRIP WITHOUT RECLOSE INITIATION |
| CC3 - 3 POLE RECEIVER INPUT | CC9 - REMOTE CONTACT TO DISABLE ALL TRIP OUTPUTS |
| CC4 - PERM. RCVR OR ZONE ACC. INPUT (IF USED) | CC10 - REMOTE CONTACT TO RESET TARGET LAMPS |
| CC5 - REMOTE SELECTION OF 3 POLE TRIP MODE | CC11 - |
| CC6 - CHANNEL FAILURE ALARM INPUT FOR LINE PICKUP | CC12 - INHIBIT U/V INPUT FOR BUS SIDE POTENTIAL OR FOR |
| | CC13 - PHASE SELECTION WITH PHASE IDENTIFIED CHANNELS (IF USED) |

Figure 4B (0183B3677-1, Sh. 2) Elementary Diagram TLS9003
 Directional Comparison Blocking
 Single Pole Trip Scheme - Three Zone

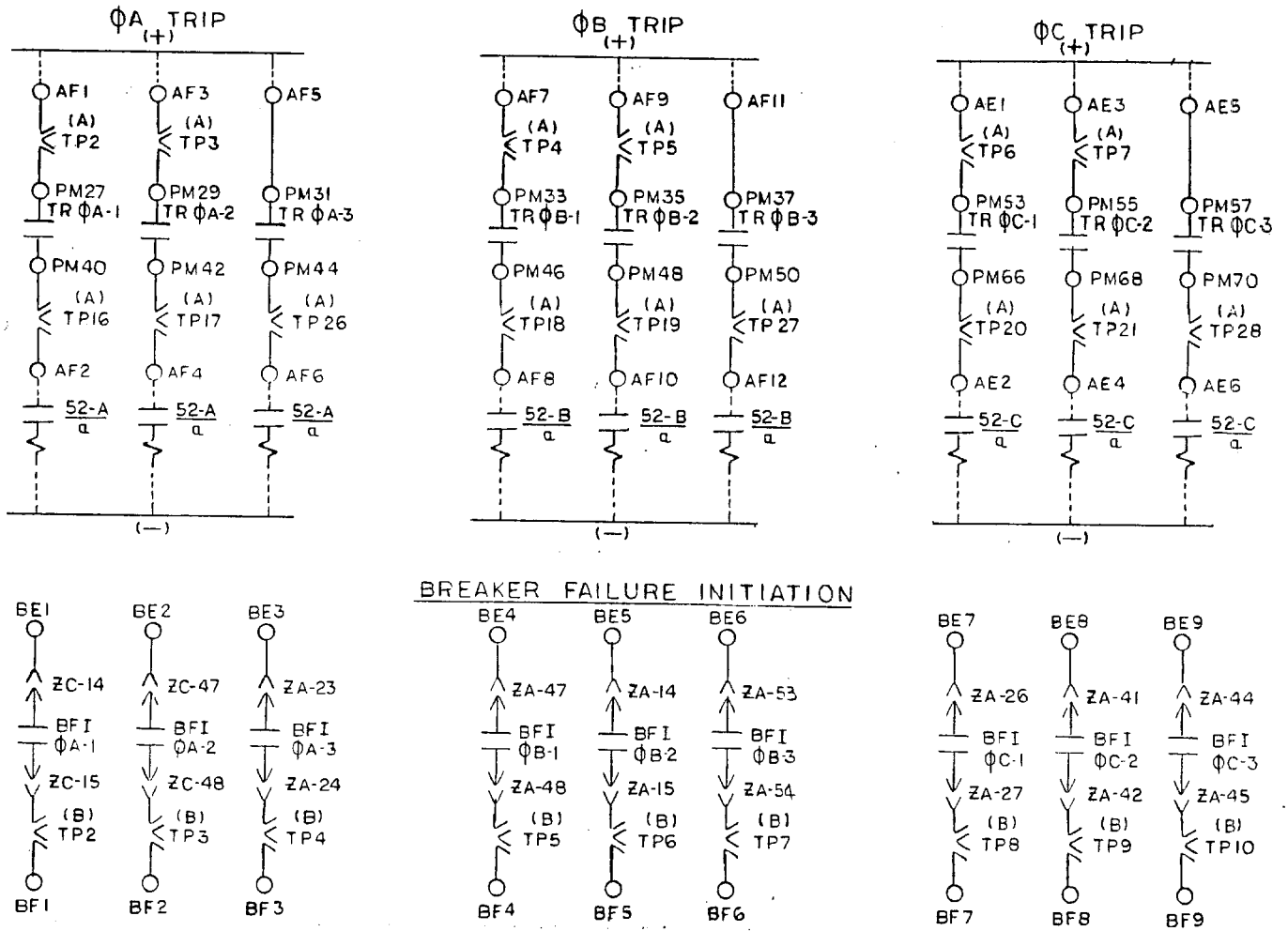
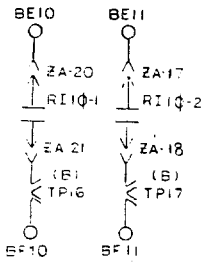
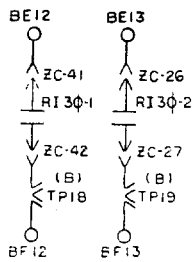


Figure 4C (0183B3677-1, Sh. 3) Elementary Diagram TLS9003
 Directional Comparison Blocking
 Single Pole Trip Scheme - Three Zone

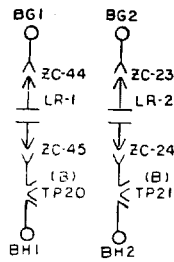
SINGLE POLE
RECLOSE INITIATE



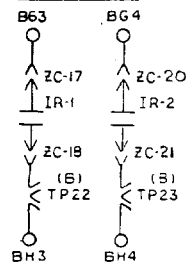
THREE POLE
RECLOSE INITIATE



LOCKOUT
RECLOSING

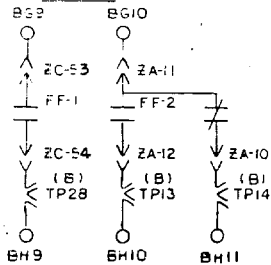


INHIBIT
RECLOSING

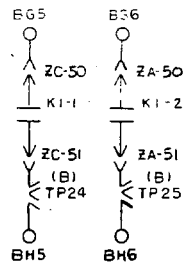


* (NOTE: POWER SUPPLY ALARM CONTACTS ARE SHOWN DE-ENERGIZED. UNDER NORMAL CONDITIONS CONTACTS ARE ENERGIZED.)

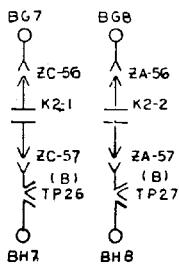
PT
FUSE FAILURE
ALARM



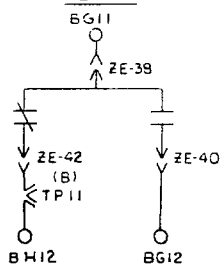
START CARRIER



STOP CARRIER



POWER *
SUPPLY
ALARM



CLOCK
FAILURE
ALARM

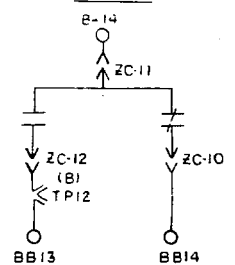
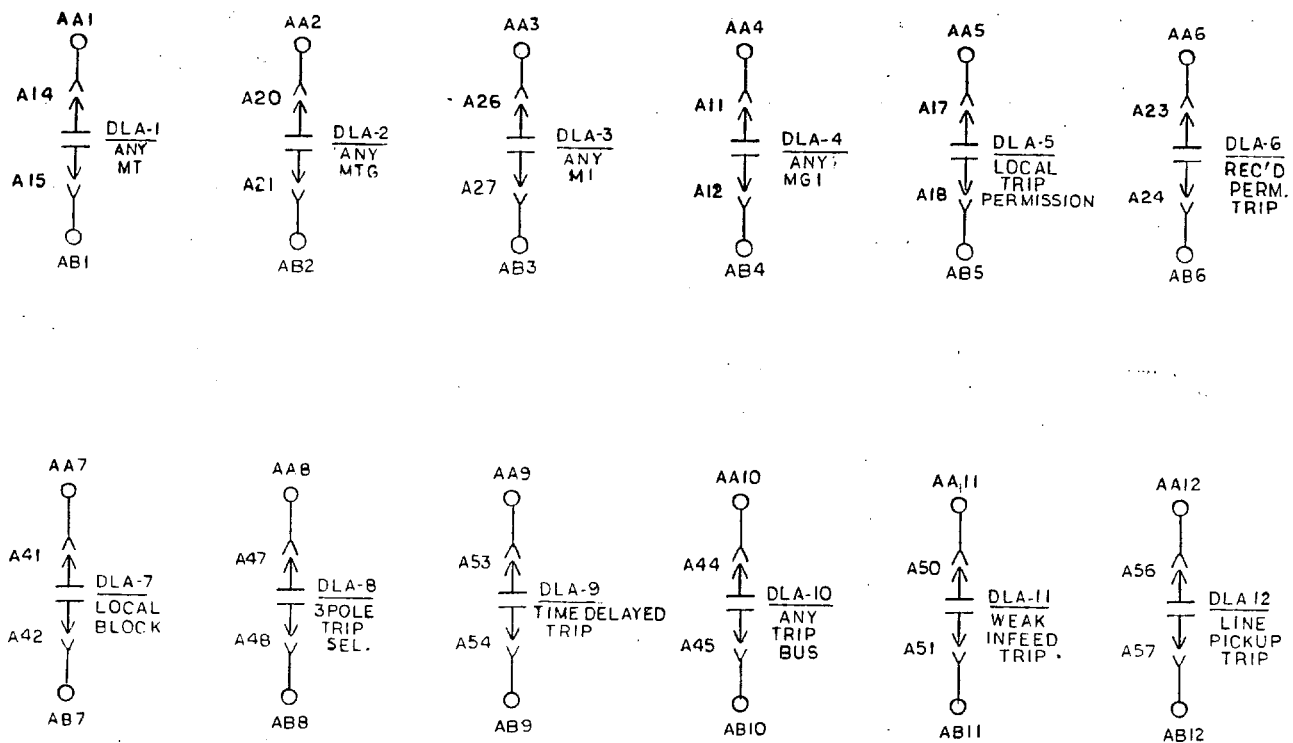


Figure 4D (0183B3677-2, Sh. 4) Elementary Diagram TLS9003
Directional Comparison Blocking
Single Pole Trip Scheme - Three Zone

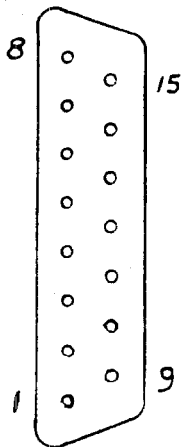


DLA CONTACTS

NOTE: BACK PLANE WIRING
0285A8812G2

Figure 4E (0183B3677-1, Sh. 5) Elementary Diagram TLS9003
Directional Comparison Blocking
Single Pole Trip Scheme - Three Zone

PL-6



(TLS CASE)

PIN ASSIGNMENT

- 1 ◦ GROUND
- 2 ◦ ZONE 1 TRIP
- 3 ◦ ZONE 2 TRIP
- 4 ◦ ZONE 3 TRIP
- 5 ◦ ANY M2
- 6 ◦ ANY MG2
- 7 ◦ ANY TRIP BUS
- 8 ◦ CHANNEL TRIP
- 9 ◦ TRIP PERMISSION
- 10 ◦ FAULT DETECTOR
- 11 ◦ BLOCK RECLOSING
- 12 ◦ OUT-OF-STEP BLOCKING
- 13 ◦ PT FUSE FAILURE
- 14 ◦ NOT USED
- 15 ◦ NOT USED

TO TOC
AUX DLA CASE

Figure 4F (0183B3677-1, Sh. 6) Elementary Diagram TLS9003
Directional Comparison Blocking
Single Pole Trip Scheme - Three Zone

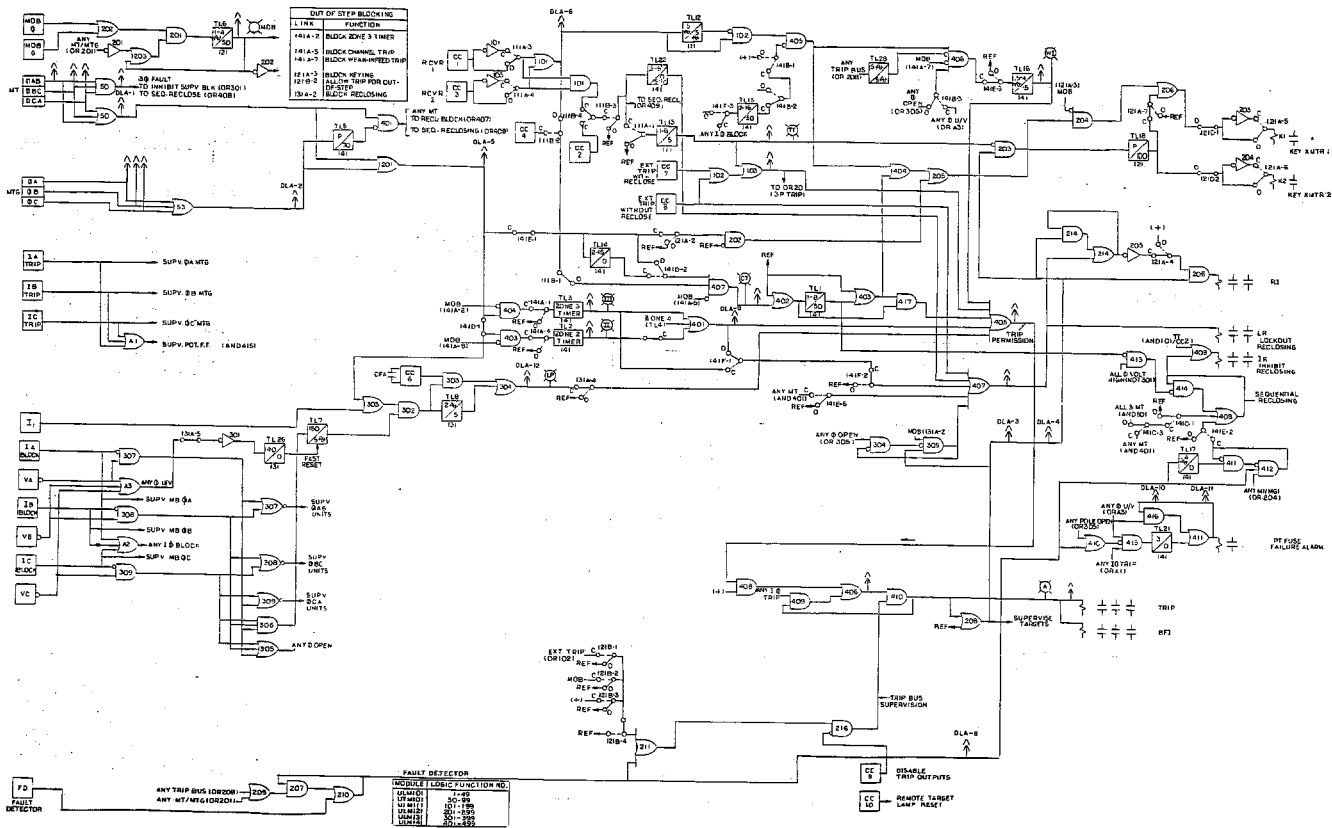


Figure 5 (0145D8982-2, Sh. 7) Logic Diagram TLS9001 Hybrid/Permissive Three Pole Tripping Scheme - One Zone

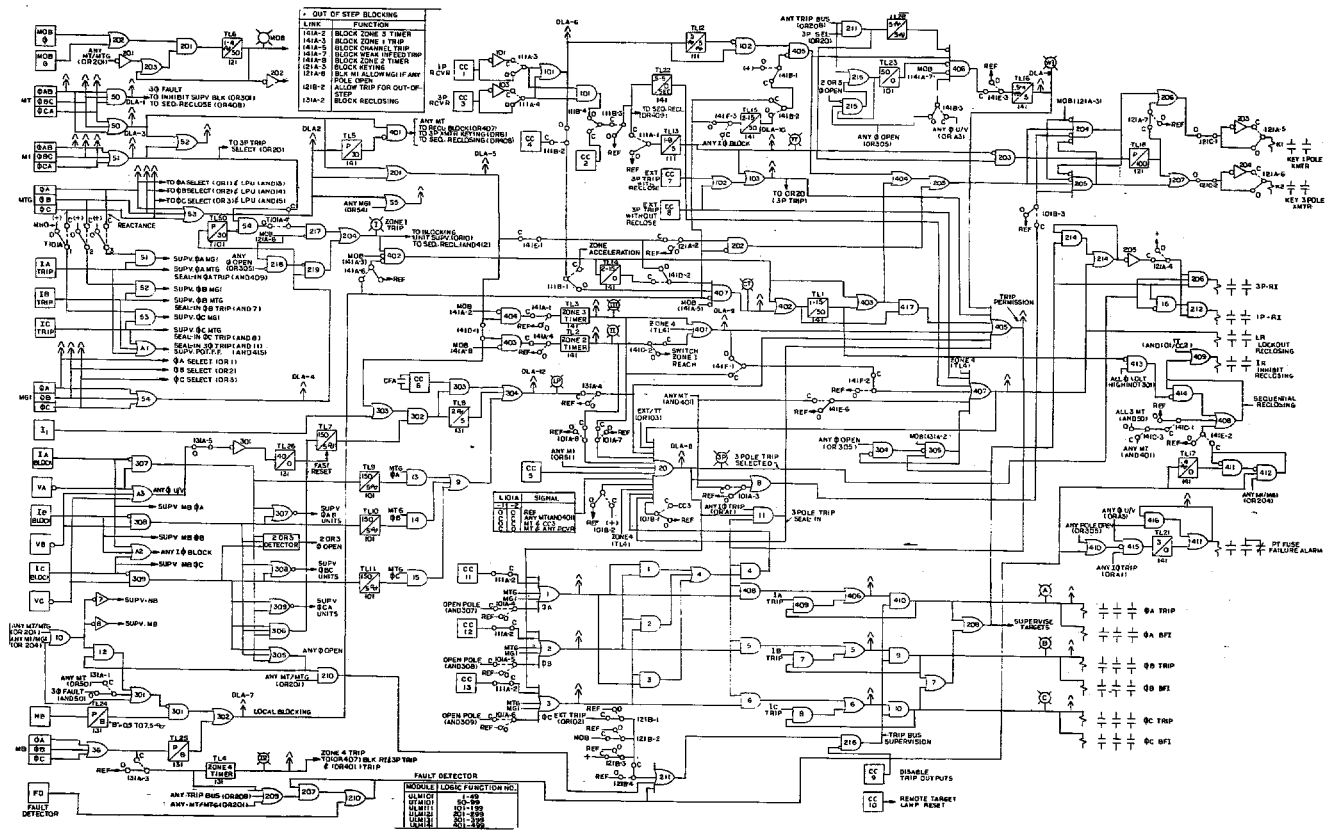


Figure 6 (0145D8982-3, Sh. 1) Logic Diagram TLS9002
 Hybrid/Permissive Single Pole
 Tripping Scheme - Two Zone

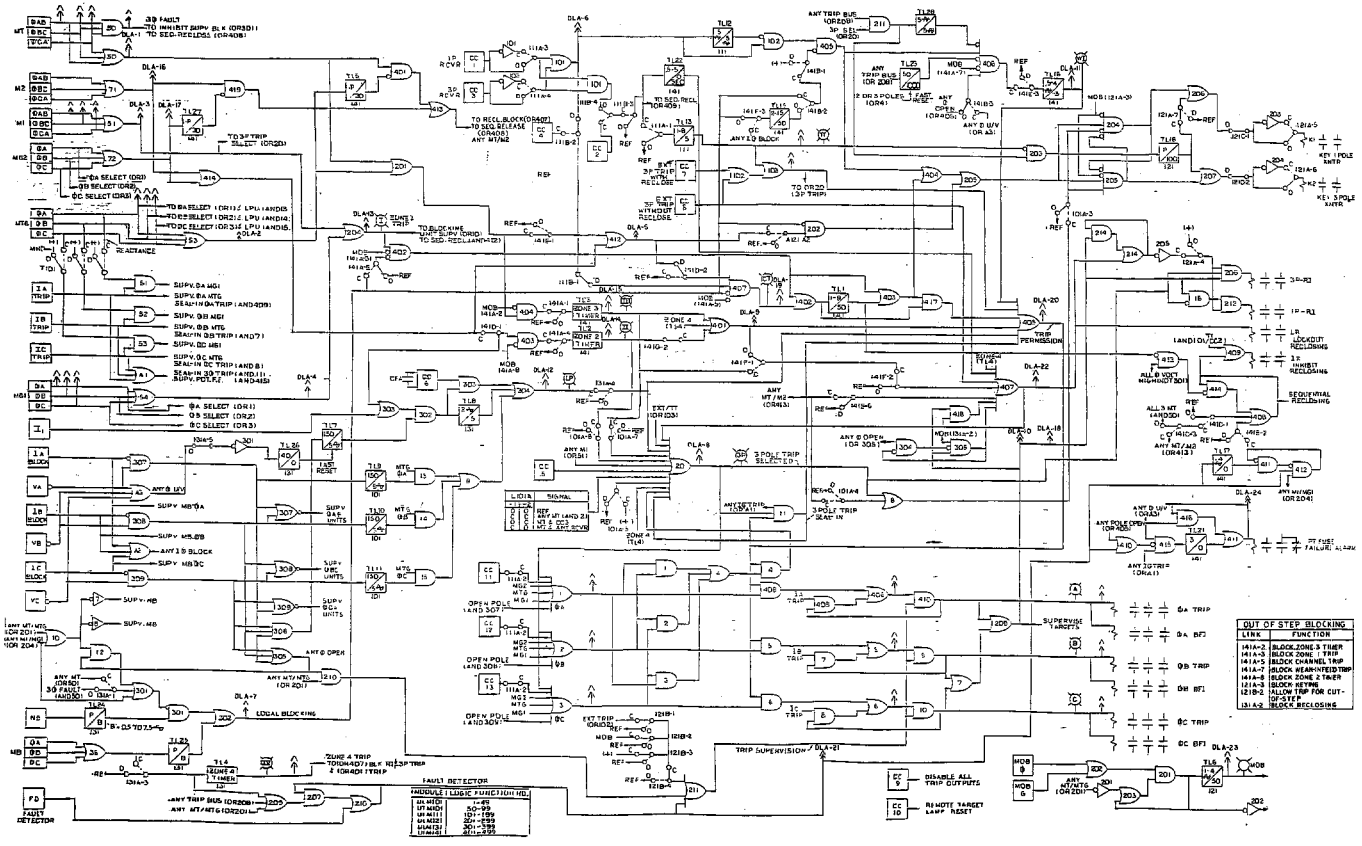
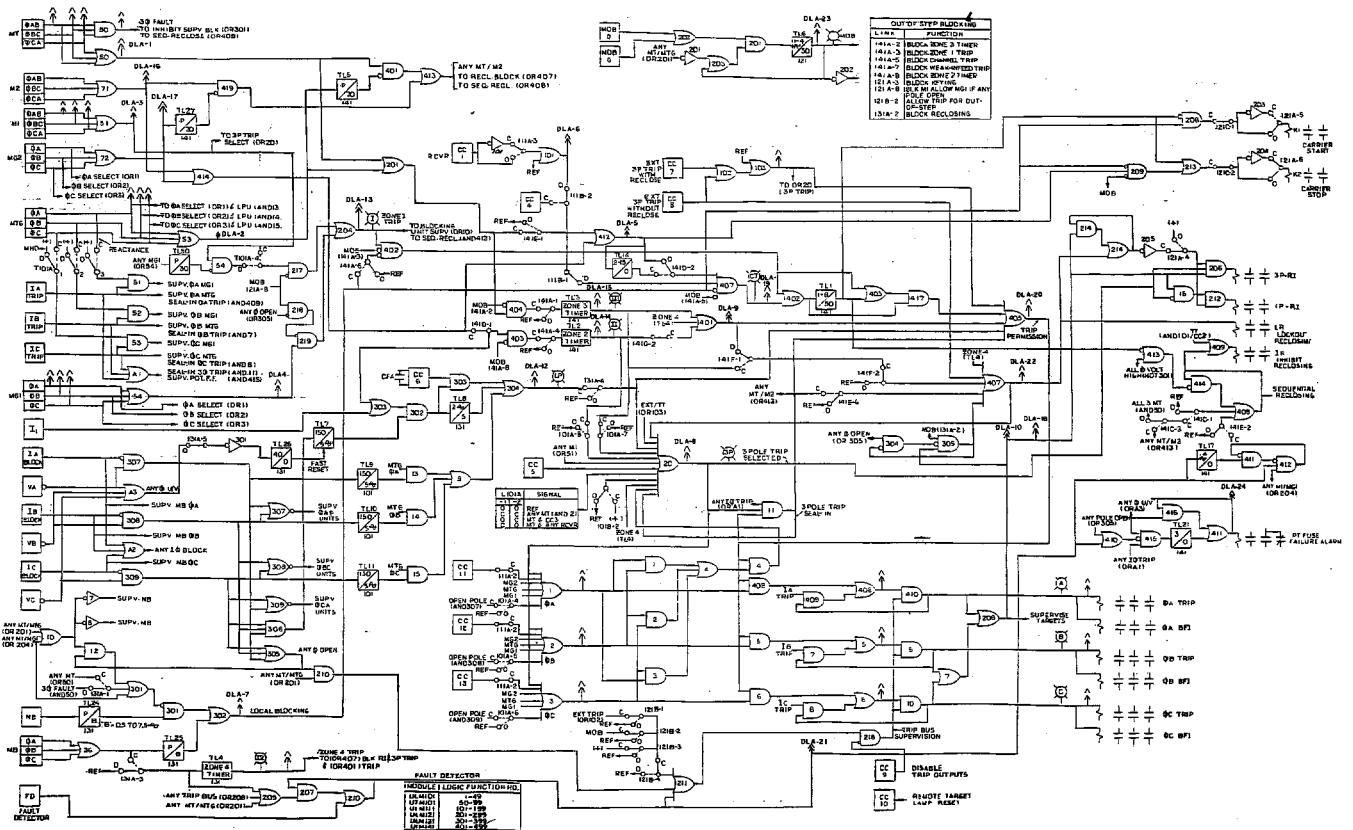


Figure 7 (0145D8982-1, Sh. 9) Logic Diagram TLS9003 Hybrid/Permissive Single Pole Tripping Scheme - Three Zone



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POWER SYSTEMS MANAGEMENT BUSINESS DEPT.
MALVERN, PA 19355**

GENERAL  ELECTRIC