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Standard transformer application diagrams do not take voltage levels into account:

- the transformer primary winding is always at the top
- the transformer secondary winding is always at the bottom.

The transformer primary and secondary windings need to be protected.

The Sepam proposed can be installed on either the primary or secondary winding of the transformer.

The other winding can be protected by an incomer or feeder type substation application Sepam.

Protection functions	ANSI code	T20	T24	T40 T50	T42 T52	T60	T62	T81	T82	T87
Phase overcurrent <sup>(1)</sup>	50/51	4	4	4	4	4	4	8	8	8
Phase overcurrent cold load pick-up	CLPU 50/51		1	4 <sup>(5)</sup>	4 <sup>(5)</sup>					
Earth fault / Sensitive earth fault <sup>(1)</sup>	50N/51N 50G/51G	4	4	4	4	4	4	8	8	8
Earth fault cold load pick-up	CLPU 50N/51N		1	4 <sup>(5)</sup>	4 <sup>(5)</sup>					
Breaker failure	50BF		1	1	1	1	1	1	1	1
Negative sequence / unbalance	46	1	1	2	2	2	2	2	2	2
Broken conductor	46BC			1 <sup>(5)</sup>	1 <sup>(5)</sup>					
Thermal overload for machines <sup>(1)</sup>	49RMS	2	2	2	2	2	2	2	2	2
Restricted earth fault differential	64REF					2	2	2	2	2
Two-winding transformer differential	87T									1
Directional phase overcurrent <sup>(1)</sup>	67				2		2		2	2
Directional earth fault <sup>(1)</sup>	67N/67NC				2		2	2	2	2
Directional active overpower	32P						2	2	2	2
Overfluxing (V / Hz)	24									2
Positive sequence undervoltage	27D					2	2	2	2	2
Remanent undervoltage	27R					2	2	2	2	2
Undervoltage (L-L or L-N)	27			2	2	2	2	4	4	4
Overvoltage (L-L or L-N)	59			2	2	2	2	4	4	4
Neutral voltage displacement	59N			2	2	2	2	2	2	2
Negative sequence overvoltage	47			1	1	2	2	2	2	2
Overfrequency	81H			2	2	2	2	2	2	2
Underfrequency	81L			4	4	4	4	4	4	4
Thermostat / Buchholz <sup>(2)</sup>	26/63	□	□	□	□	□	□	□	□	□
Temperature monitoring (8/16 RTDs) <sup>(3)</sup>	38/49T	□ 8 RTDs	□ 8 RTDs	□ 8/16 RTDs	□ 8/16 RTDs	□ 8/16 RTDs	□ 8/16 RTDs	□ 8/16 RTDs	□ 8/16 RTDs	□ 8/16 RTDs
Synchro-check <sup>(4)</sup>	25					□	□	□	□	□

The figures indicate the number of units available for each protection function

■ standard, □ options.

(1) Protection functions with 2 groups of settings.

(2) According to parameter setting and optional input/output modules.

(3) With optional MET148-2 temperature input modules.

(4) With optional MCS025 synchro-check module.

(5) Only for applications S50, S51, S52, S53, T50, T52.

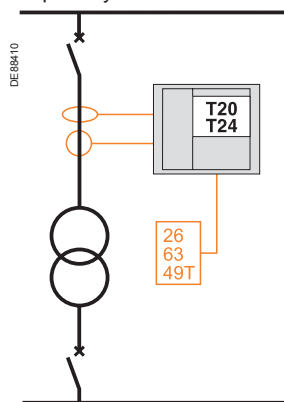
### Transformer feeder protection

- transformer short-circuit and overload protection
- internal transformer protection: Thermostat / Buchholz (ANSI 26/63)
- RTD temperature monitoring (ANSI 49T).

### Transformer feeder protection without voltage monitoring: Sepam T20, T24

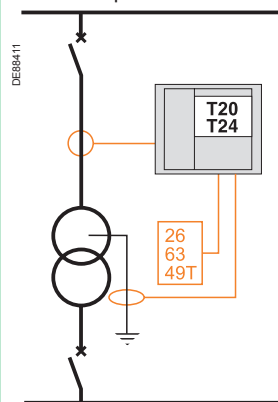
Earth fault protection:

- primary: 50G/51G.



Earth fault protection:

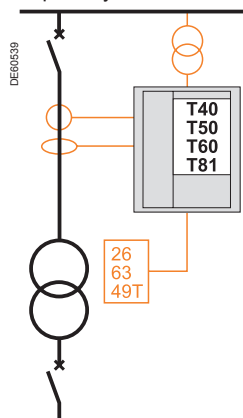
- neutral point: 50G/51G.



### Transformer feeder protection with voltage monitoring: Sepam T40, T50, T60 or T81

Earth fault protection:

- primary: 50G/51G.

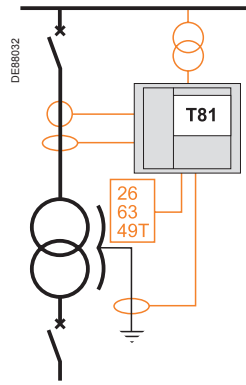


*Note: for long feeders, the 50G/51G function may be replaced by the 67N/67NC.*

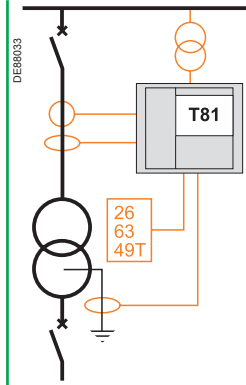
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**Transformer feeder protection with voltage monitoring and additional current measurement: Sepam T81**

Earth fault protection:  
 ■ primary: 50G/51G  
 ■ tank earth leakage: 50G/51G.



Earth fault protection:  
 ■ primary: 50G/51G  
 ■ secondary: 50G/51G.

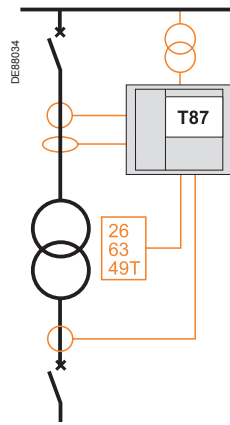


*Note: for long feeders, the 50G/51G function may be replaced by the 67N/67NC.*

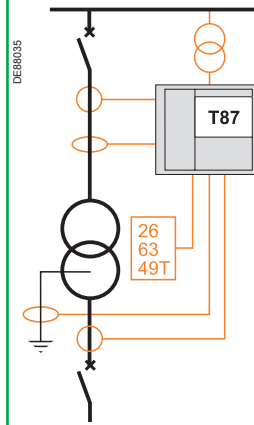
**Transformer feeder differential protection: Sepam T87**

Transformer differential protection: 87T

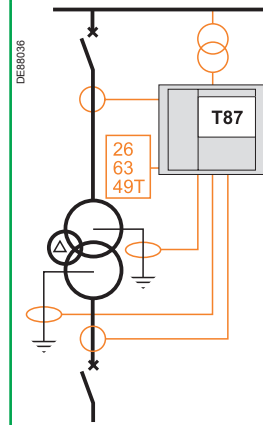
Earth fault protection:  
 ■ primary: 50G/51G.



Earth fault protection:  
 ■ primary: 50G/51G  
 ■ secondary:  
 □ 64REF  
 □ 50G/51G.



Earth fault protection:  
 ■ primary:  
 □ 64REF  
 □ 50G/51G  
 ■ secondary:  
 □ 64REF  
 □ 50G/51G.

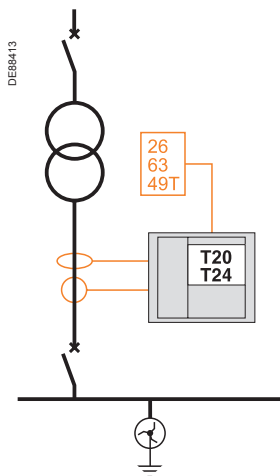


### Transformer incomer protection

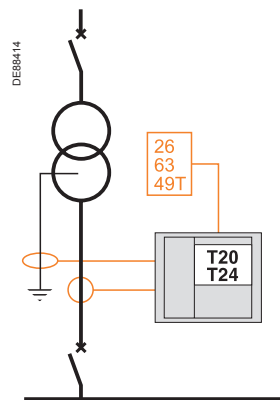
- transformer short-circuit and overload protection
- internal transformer protection: Thermostat / Buchholz (ANSI 26/63)
- RTD temperature monitoring (ANSI 49T).

### Transformer incomer protection without voltage monitoring: Sepam T20, T24

Earth fault protection:  
 ■ secondary: 50G/51G.

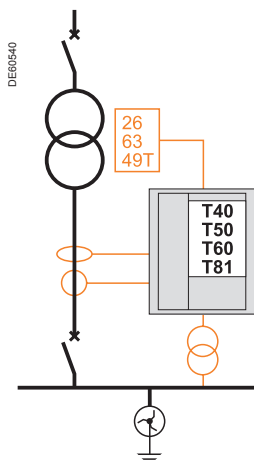


Earth fault protection:  
 ■ neutral point: 50G/51G.

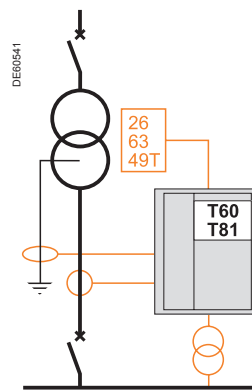


### Transformer incomer protection with voltage monitoring: Sepam T40, T50, T60 or T81

Earth fault protection:  
 ■ secondary: 50G/51G.



Earth fault protection:  
 ■ secondary:  
 □ 64REF  
 □ 50G/51G.

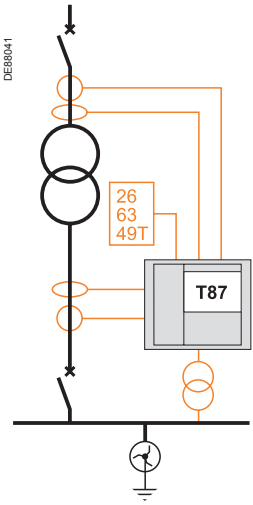


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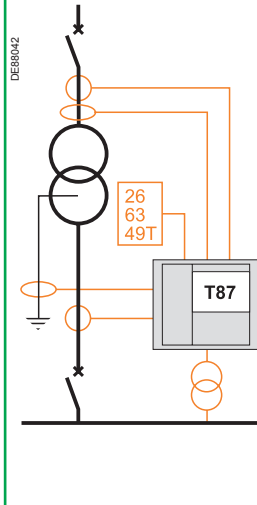
**Transformer incomer differential protection: Sepam T87**

Transformer differential protection: 87T

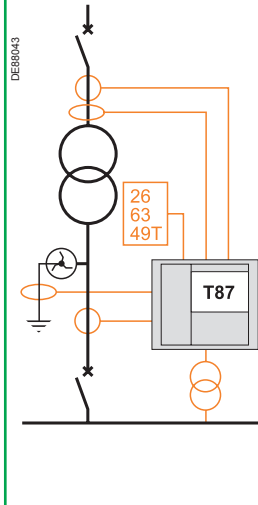
- Earth fault protection:
- primary: 50G/51G
  - secondary: 50G/51G.



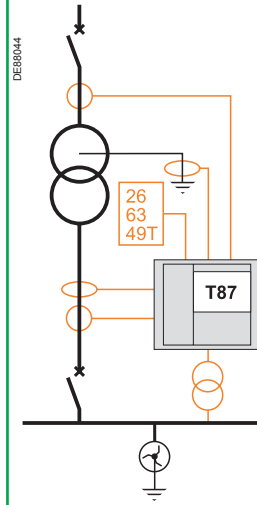
- Earth fault protection:
- primary: 50G/51G
  - secondary:
    - 64REF
    - 50G/51G.



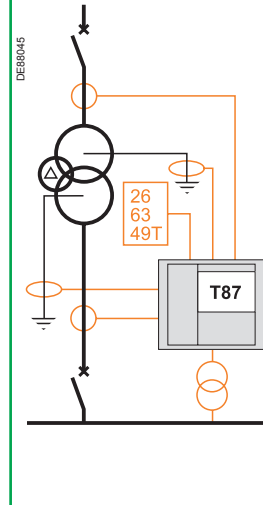
- Earth fault protection:
- primary: 50G/51G
  - secondary:
    - 64REF
    - 50G/51G.



- Earth fault protection:
- primary:
    - 64REF
    - 50G/51G
  - secondary: 50G/51G.

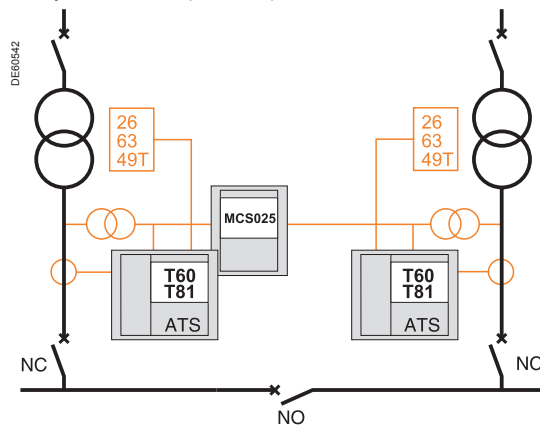


- Earth fault protection:
- primary:
    - 64REF
    - 50G/51G
  - secondary:
    - 64REF
    - 50G/51G.



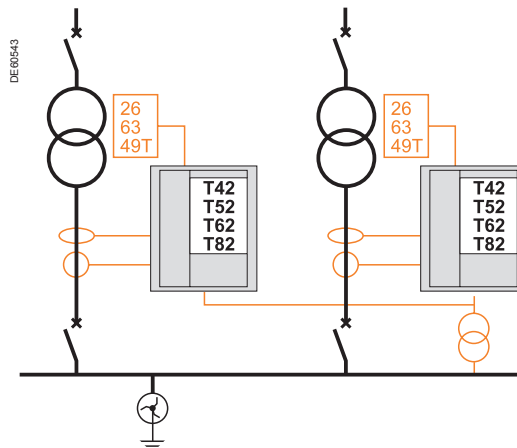
**Protection of 2 non-coupled transformer incomers: Sepam T60 or T81**

- automatic source transfer (ATS)
- synchro-check (ANSI 25).

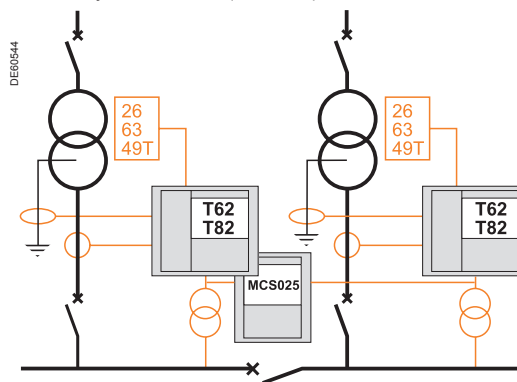


**Parallel transformer incomer protection: Sepam T42, T52, T62 or T82**

- transformer directional phase overcurrent protection: 67
- transformer secondary earth fault protection: 50G/51G, 59N.



- transformer directional phase overcurrent protection: 67
- transformer secondary earth fault protection: 67N/67NC, 64REF
- with synchro-check (ANSI 25).



**Parallel incomer differential protection: Sepam T87**

- transformer differential protection: 87T
- directional transformer protection: 67
- transformer secondary earth fault protection: 50G/51G, 67N/67NC 64REF.

