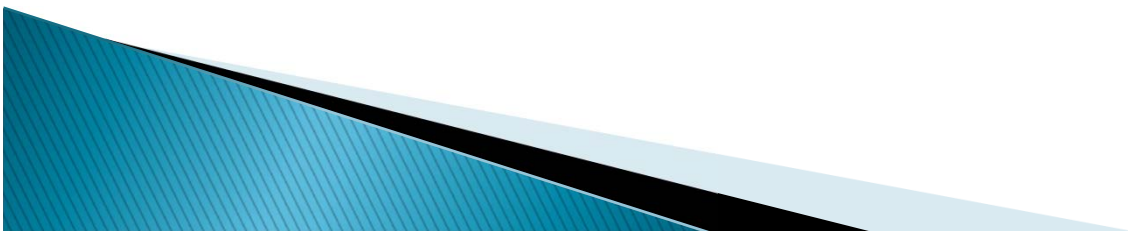# UNIDAD 13

RELES DE PROTECCIÓN

Protecciones

En toda instalación eléctrica es fundamental contar con elementos de protección que deben estar correctamente calibrados. Mientras no ha falla no deben actuar, pero en cuanto se produce una falla, deben sacar de servicio con la mayor celeridad la parte del sistema con problemas.
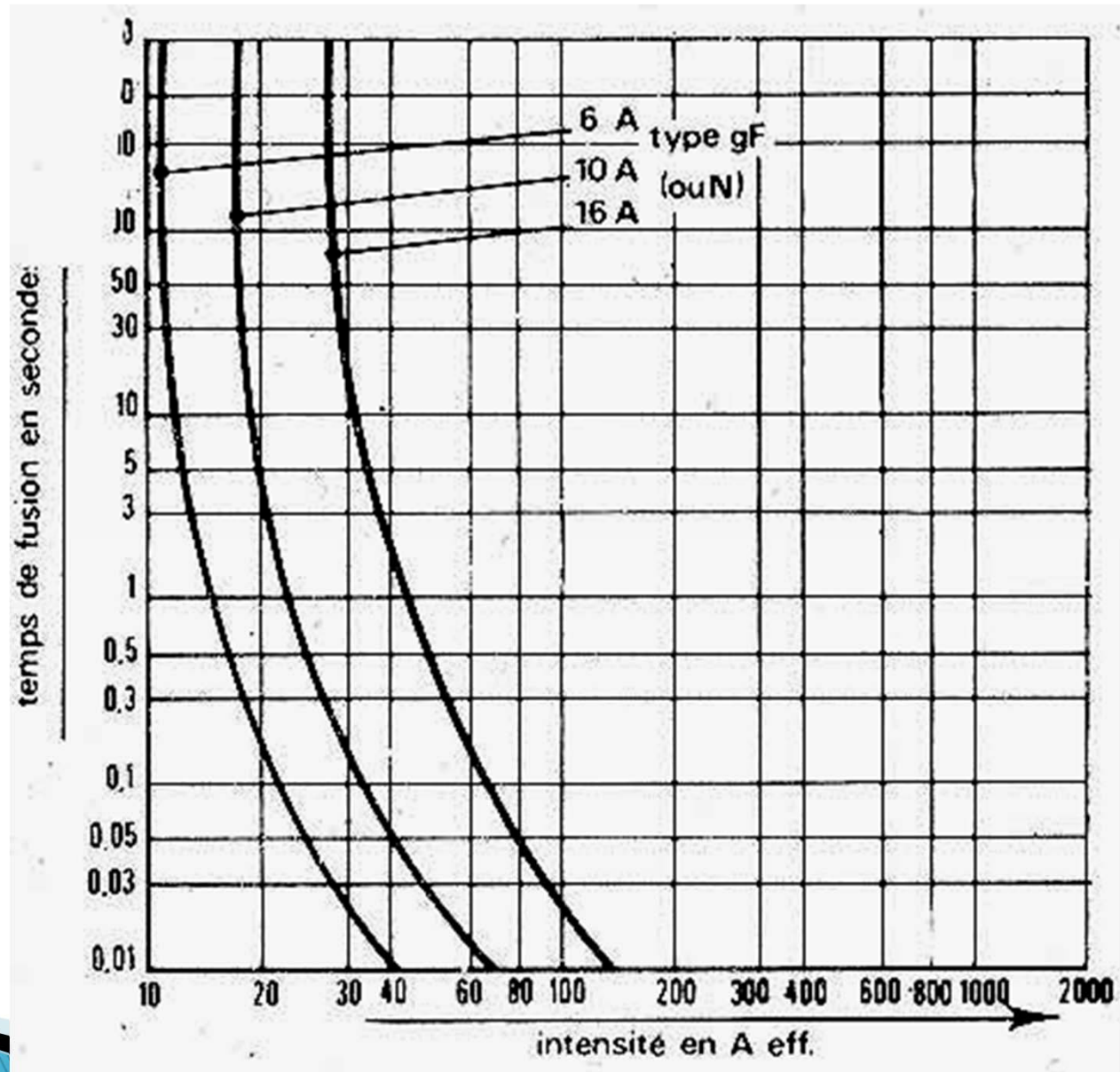
Protecciones

Existen protecciones de diferentes tipos, las más antiguas son los fusibles.
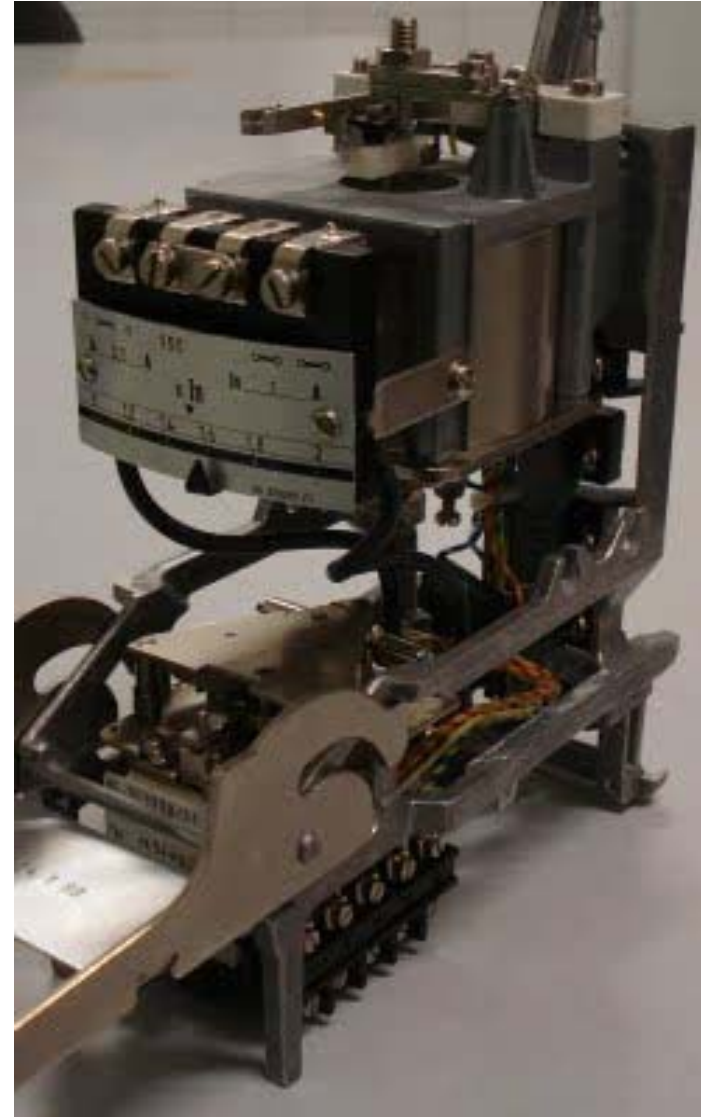
Protecciones

Protecciones

Rele electromecánico

Protecciones

Rele electromecánico

Protecciones
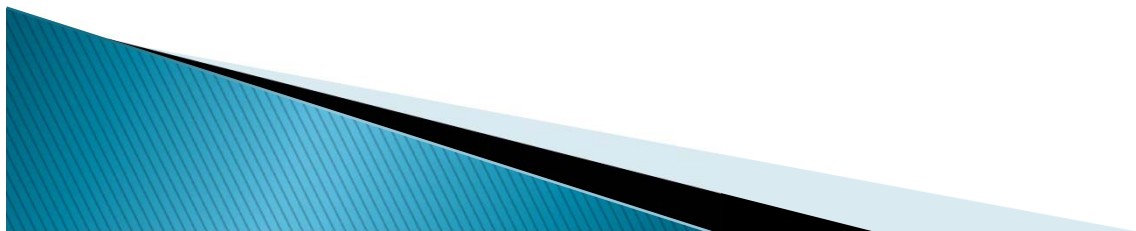
Reles electrónicos

Protecciones

Reles electrónicos

Protecciones

A partir de la invención de los micro procesadores y la programación digital la potencialidad de los equipos se ha expandido y los volúmenes se han reducido.
Hoy todas las protecciones tienen comunicación, que permite transmitir datos, levantar curvas de respuesta, etc.
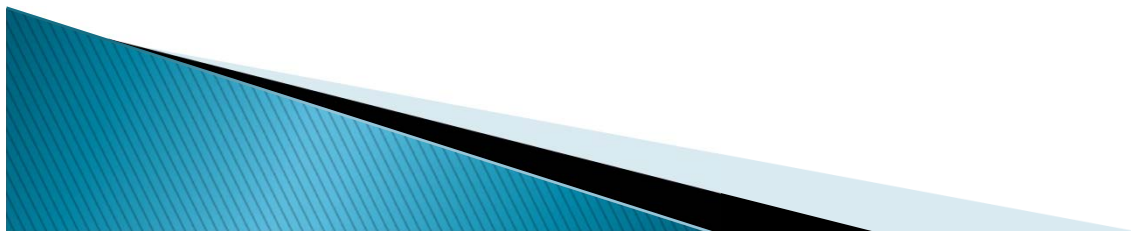
Protecciones

Protecciones

- Amperométricas
- Voltimétricas
- de potencia
- de frecuencia
- diferenciales
- de impedancia

Protecciones

PROTECCIONES POR SOBRECORRIENTE

PROTECCIONES ELECTRONICAS

PROTECCIONES ELECTRONICAS

PROTECCIONES ELECTRONICAS

PROTECCIONES ELECTRONICAS

INSTALACIÓN DE PROTECCIONES
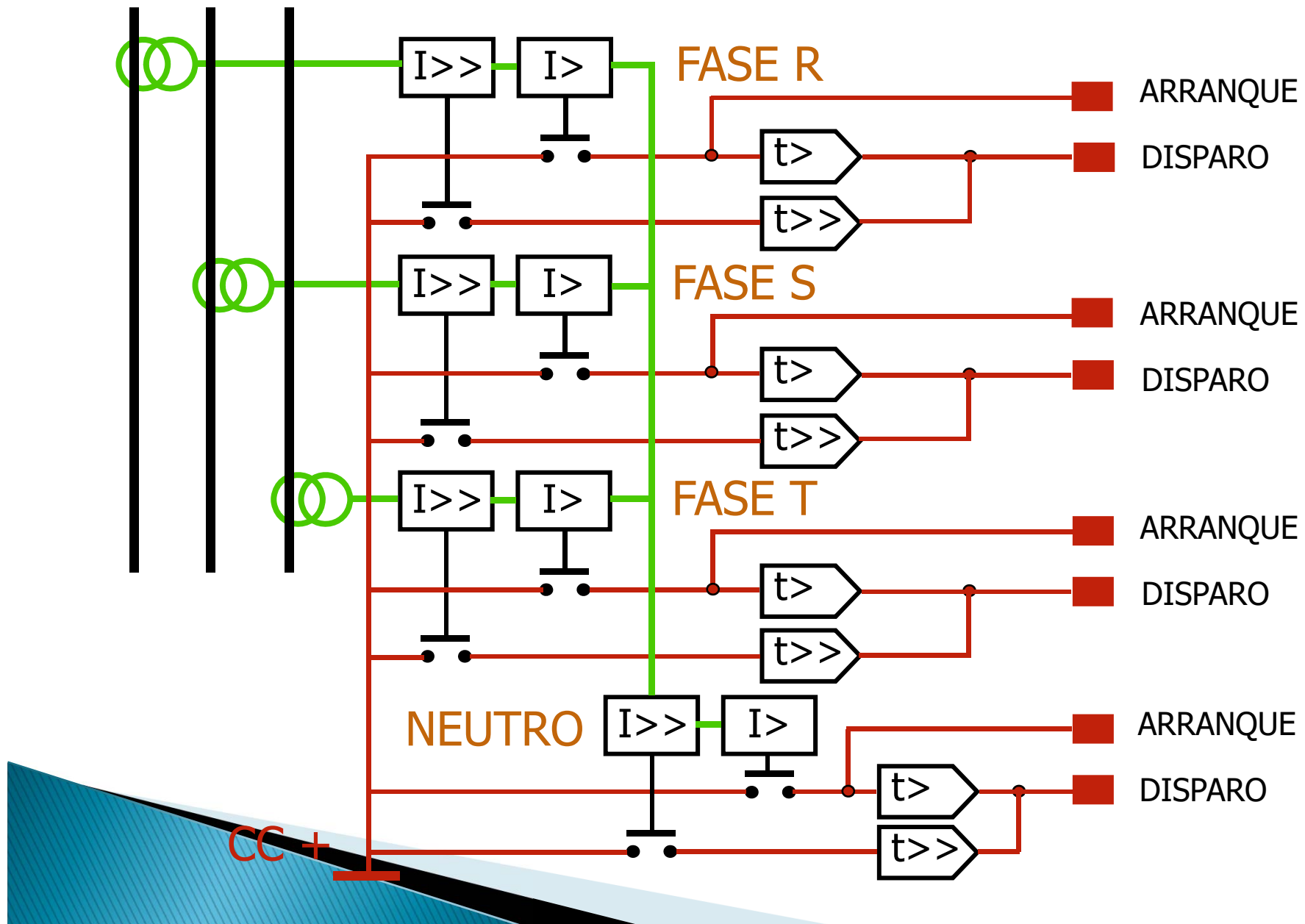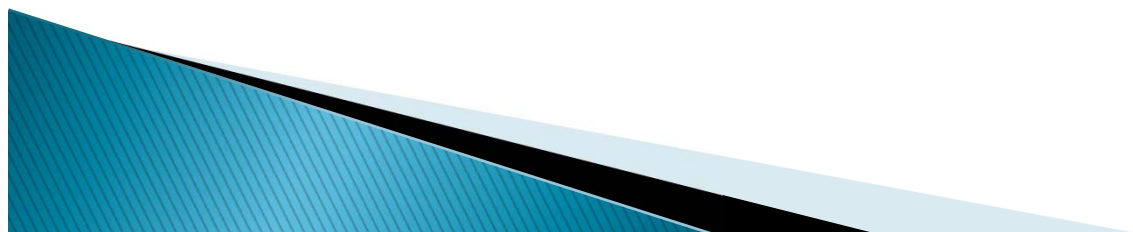
INSTALACIÓN DE PROTECCIONES

INSTALACIÓN DE PROTECCIONES
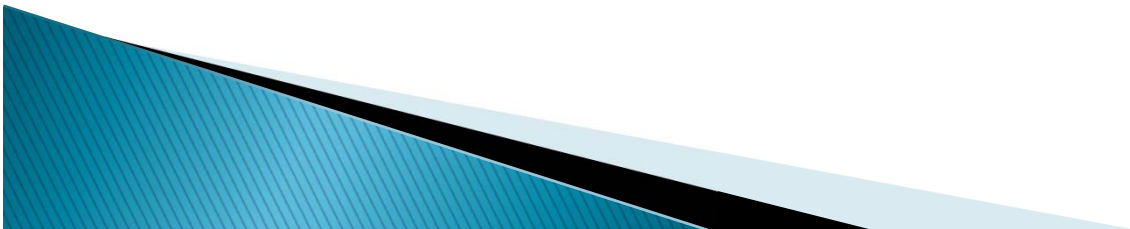
PROTECCIONE POR SOBRECORRIENTE TRIFASICO

TIEMPO INDEPENDIENTE
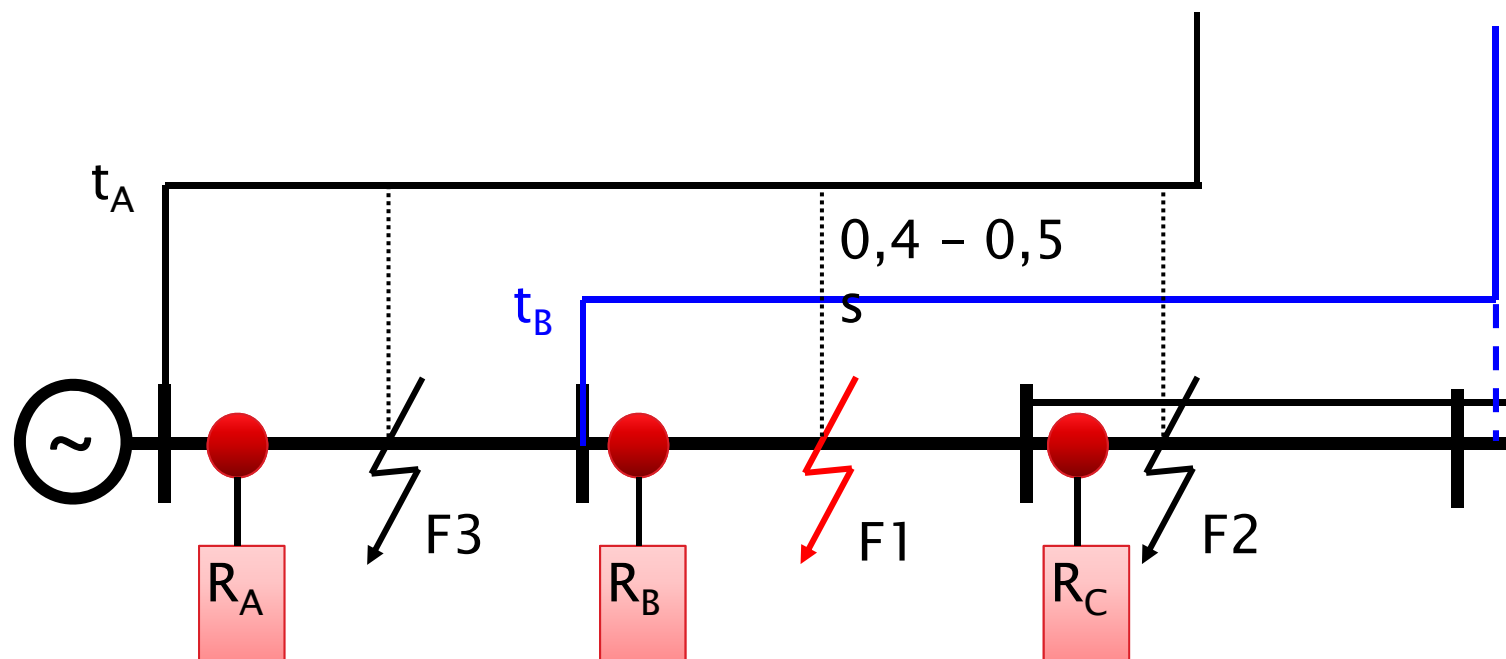
TIEMPO DEPENDIENTE

TIEMPO INDEPENDIENTE – t-I
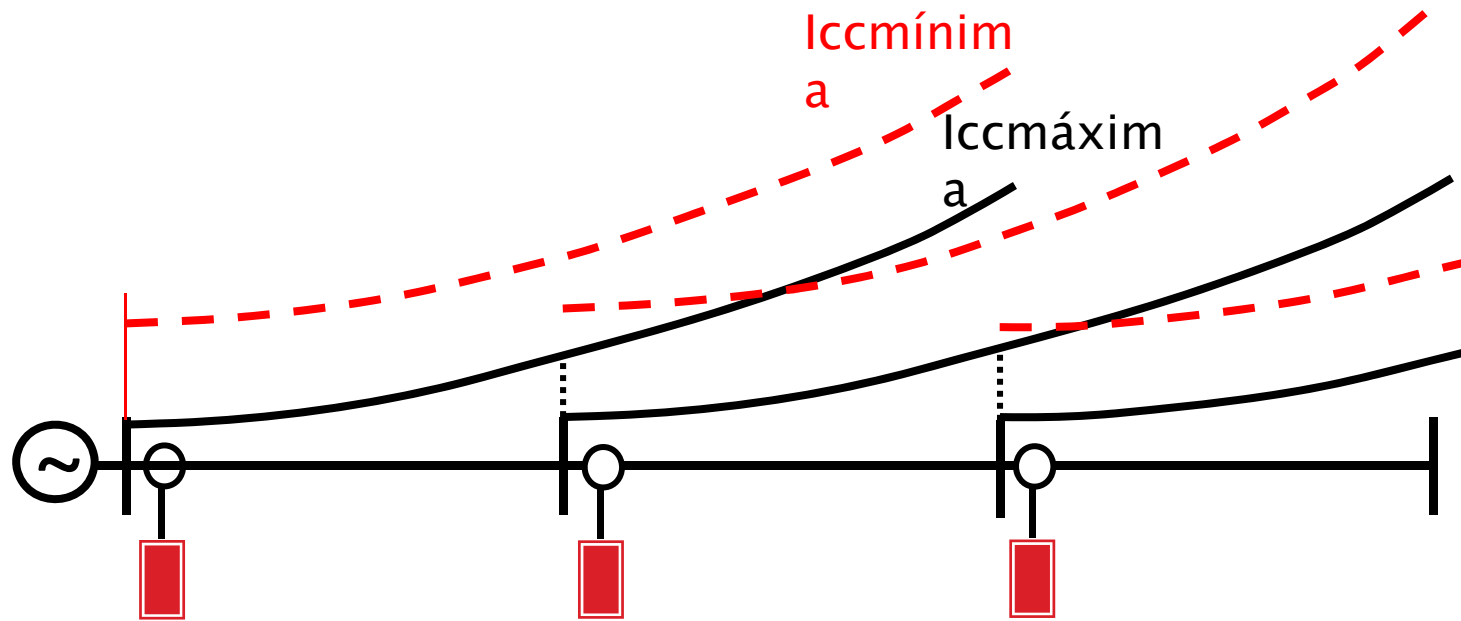
TIEMPO DEPENDIENTE
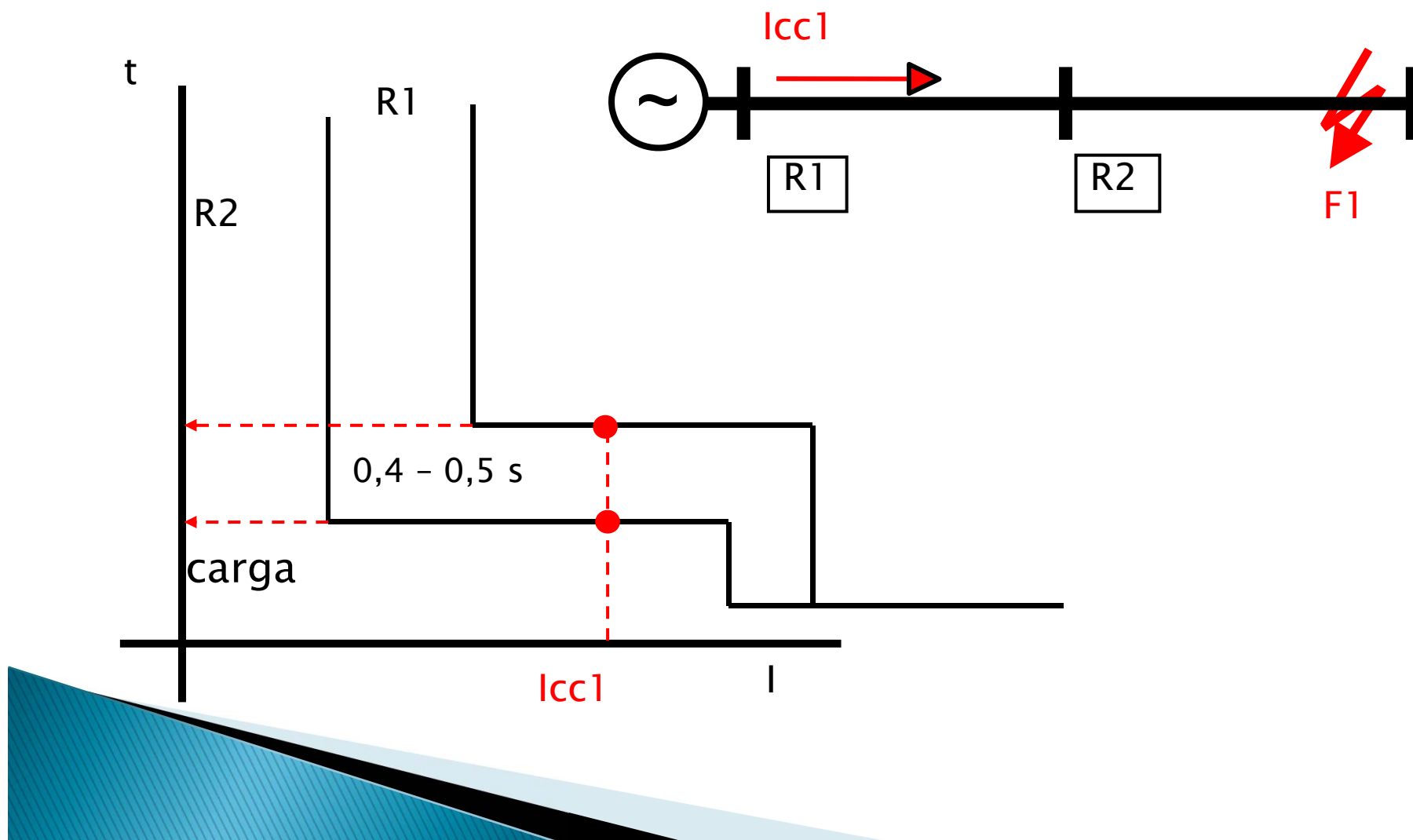
COORDINACION TIEMPO DEPENDIENTE
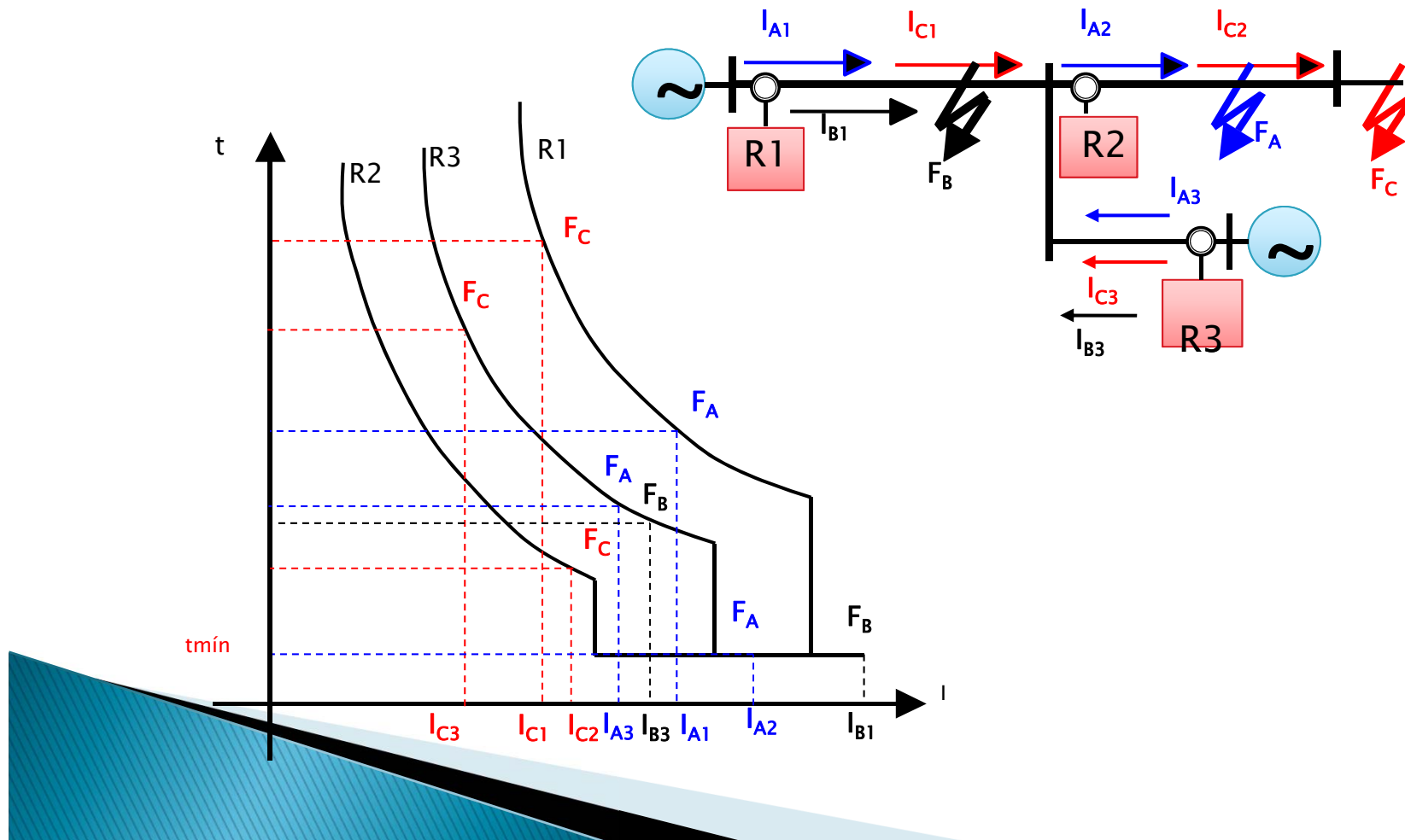
COMPARACION DEPENDIENTE/INDEPENDIENTE

Luis M. Funes
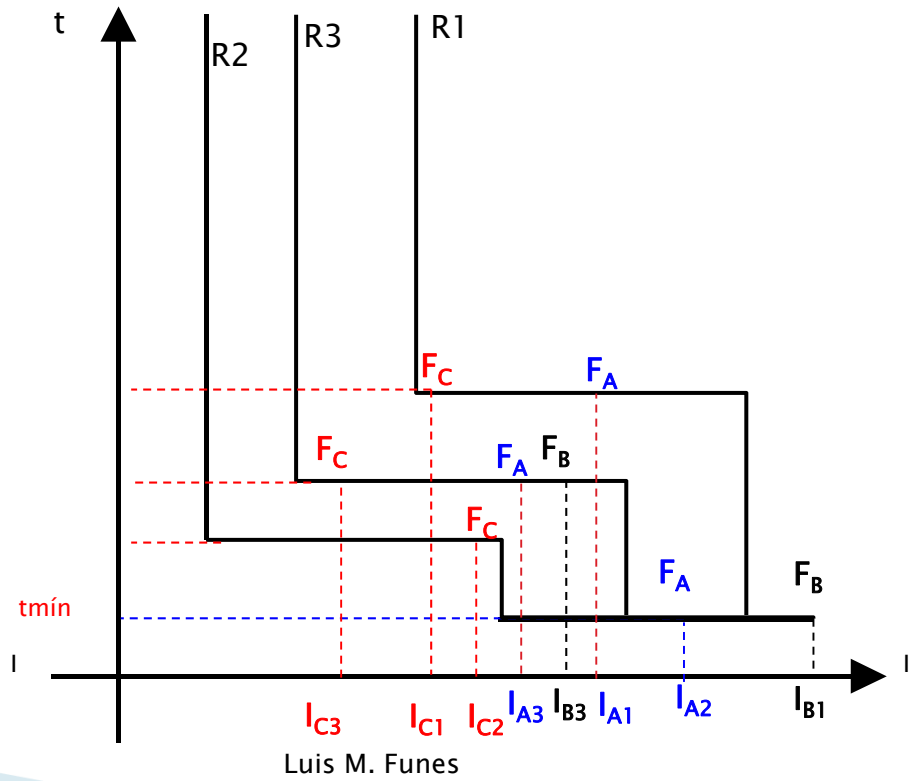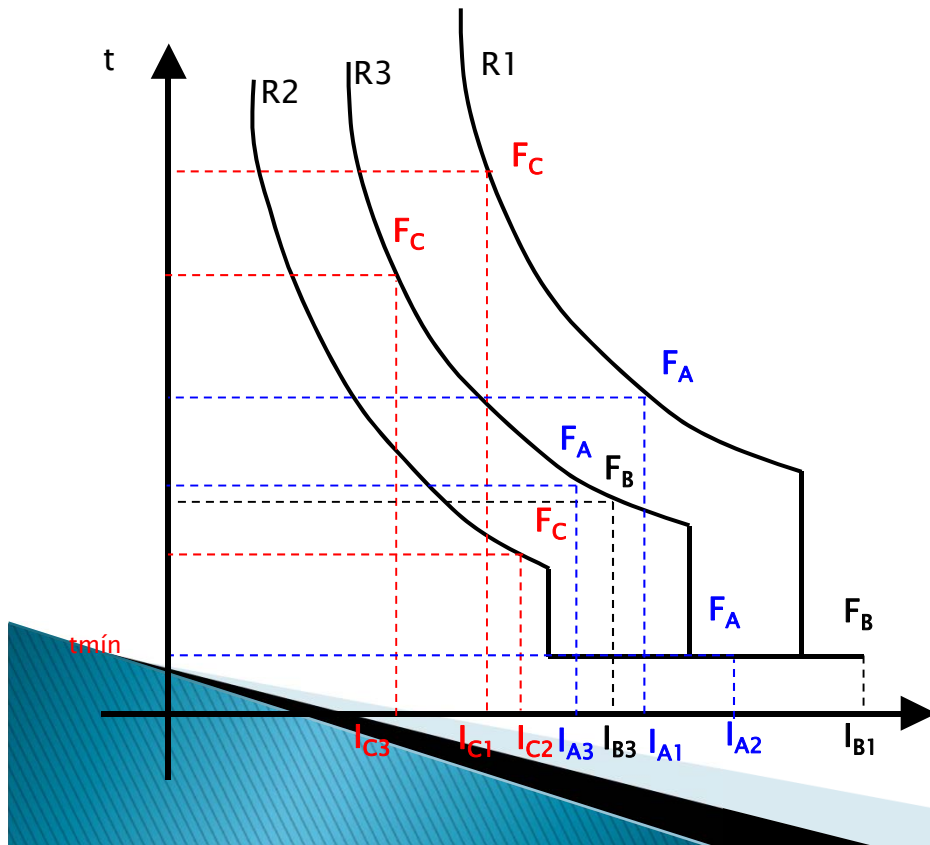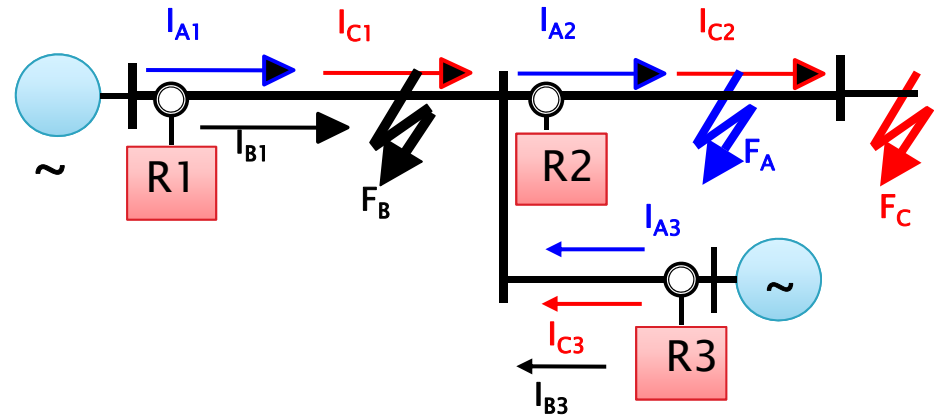
TIEMPO INDEPENDIENTE CON DEPENDIENTE
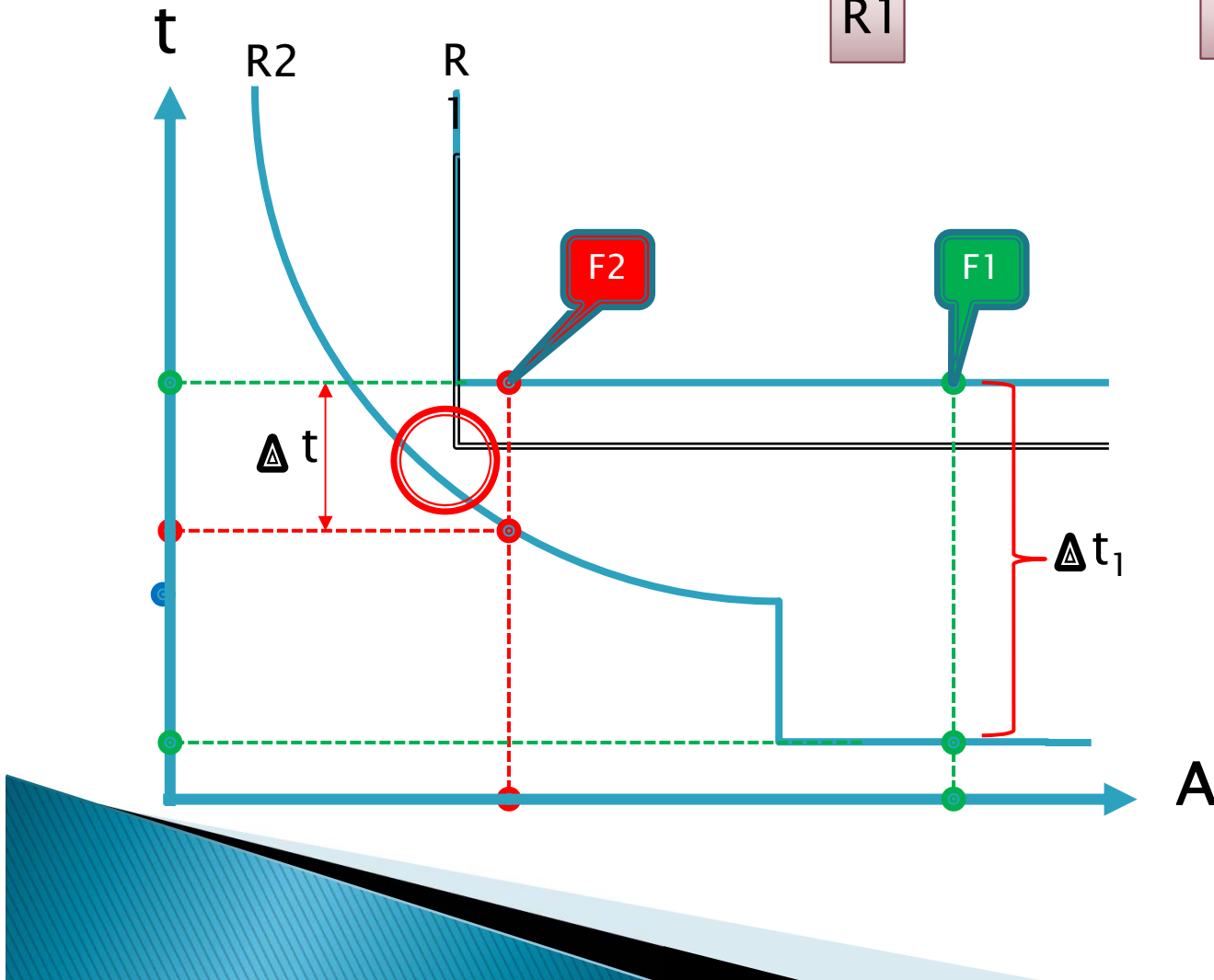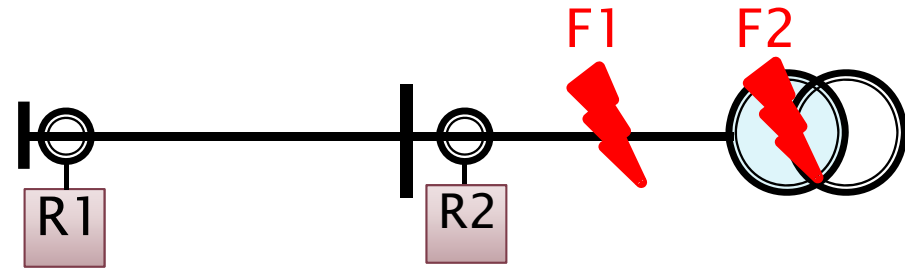
TIEMPO DEPENDIENTE – NORMAL INVERSA
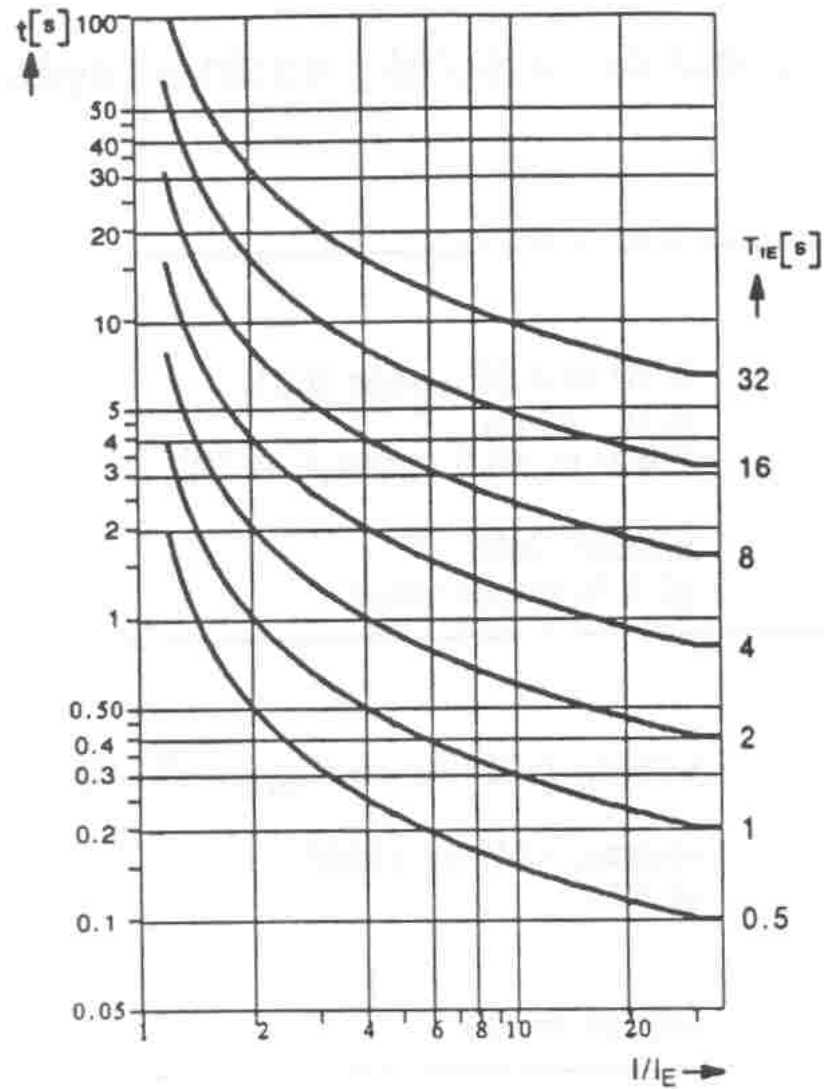
Normal Inverse: $t = \dfrac{0.14}{(I/I_E)^{0.02} - 1} \cdot \dfrac{T_{IE}}{10}$ [s]

DIRECCIONAL

adelante

$U_{Ref. girada}$

U_R

U_{Rcc}

atrás

I_{Rcc}

$U_{ST} = U_{Referencia}$

U_T

U_S

U_{ST}
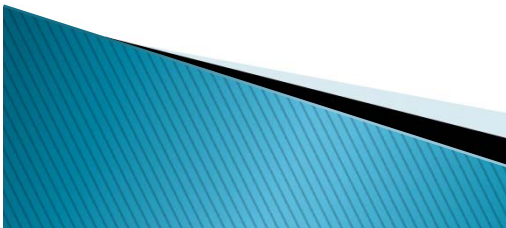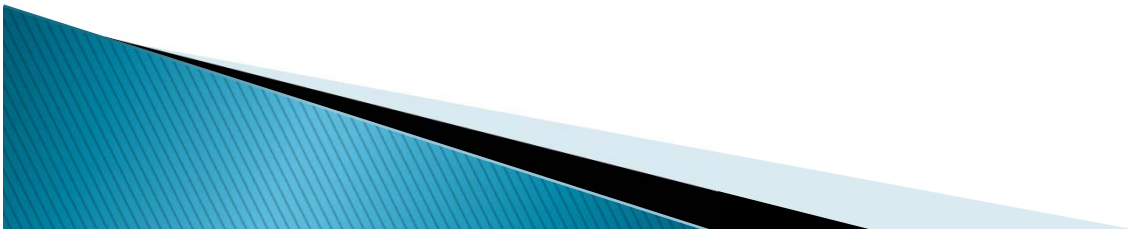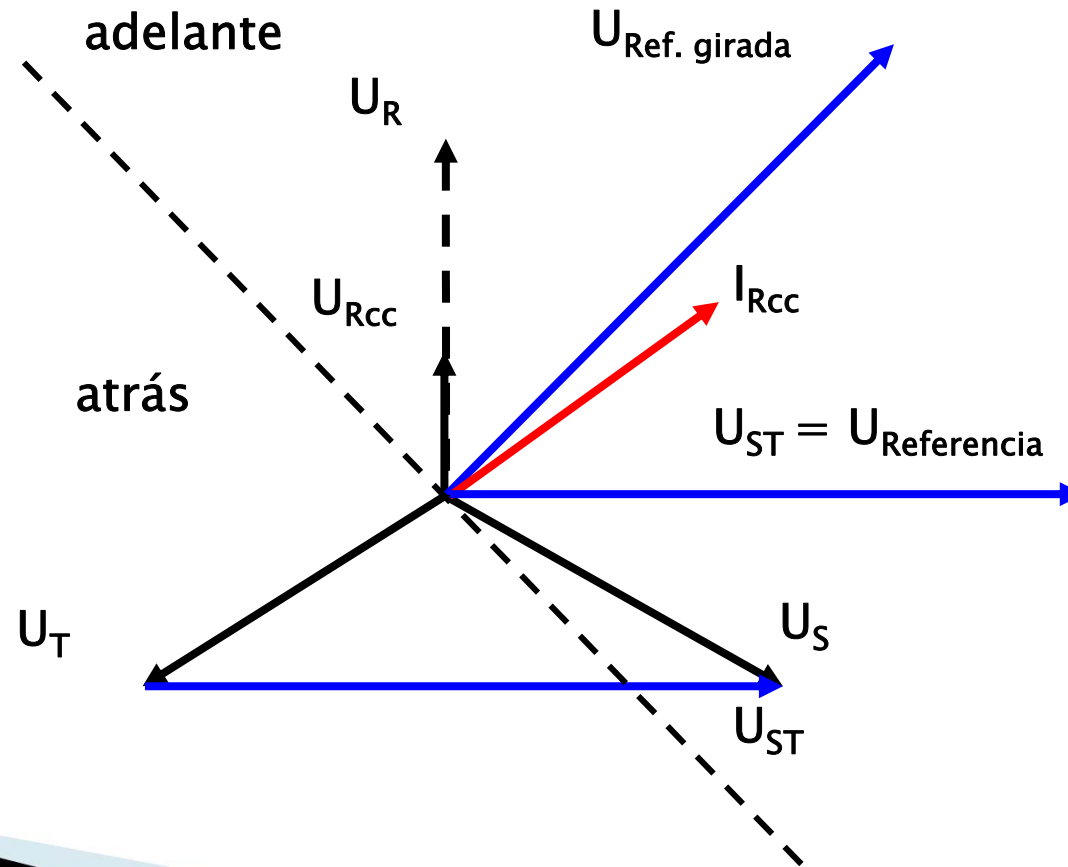
DIRECCIONAL - BLOQUES
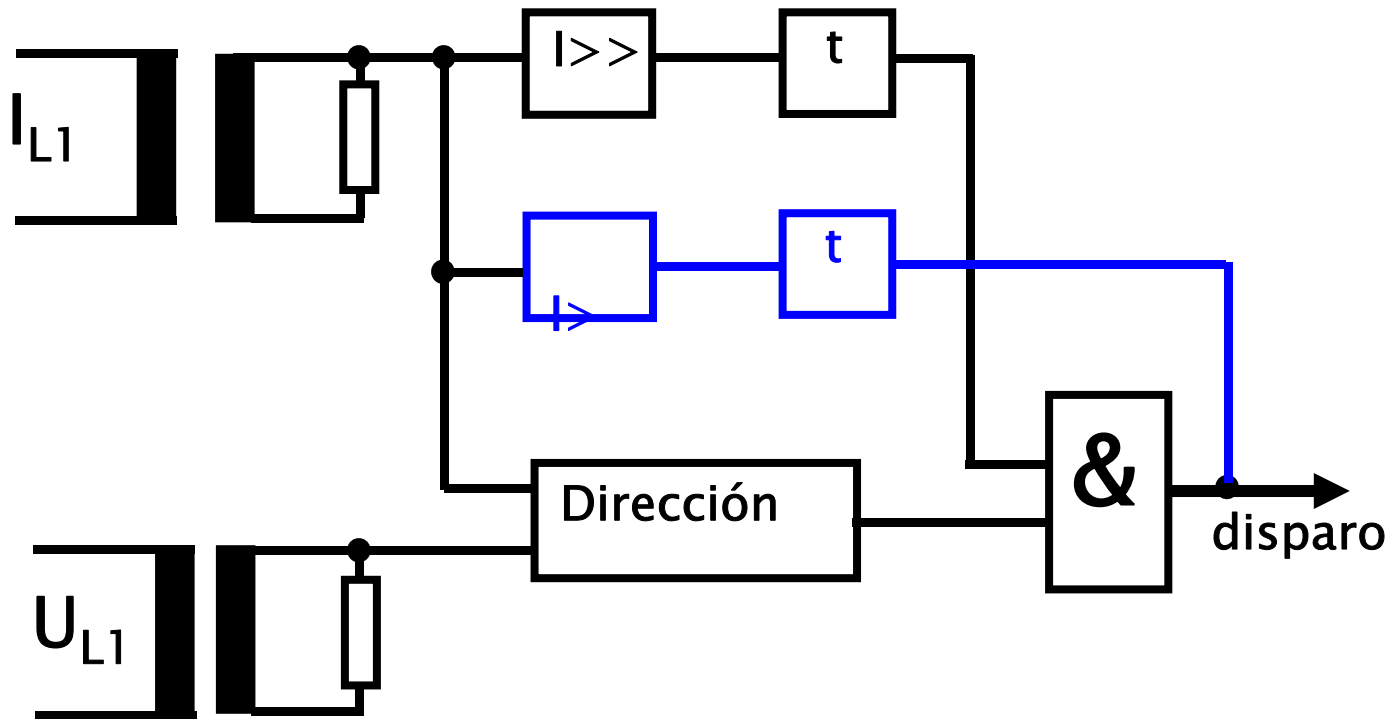
DIRECCIONALES - COORDINACION

DIRECCIONAL EN TRAFOS
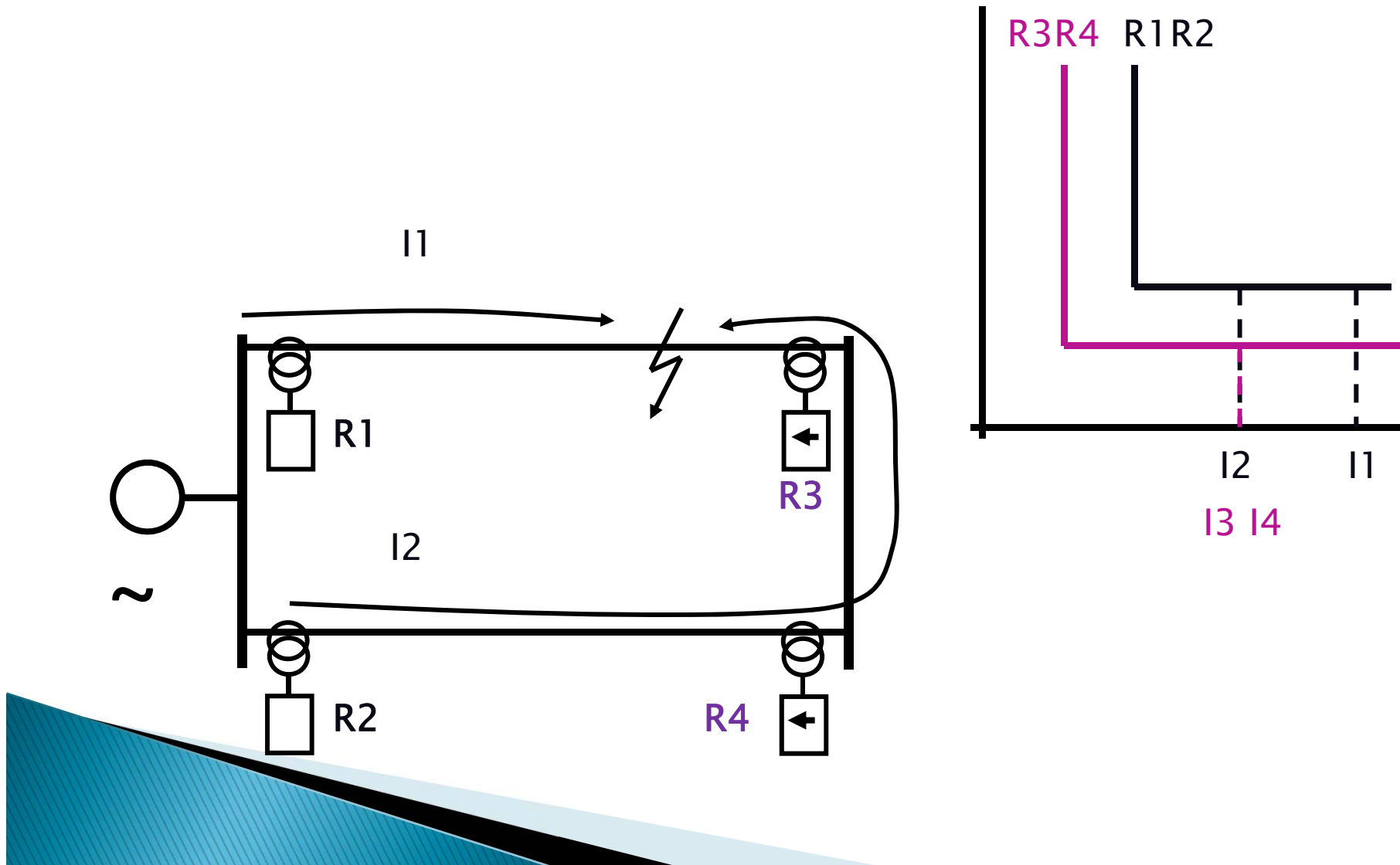
Protecciones

Códigos ANSI

50 50P 50N

51   51P 51N

46

87

Protecciones

Protecciones

SEL-421 Relay

Bus

Line

Bus

3

1

52

52

3

SEL-2600

Symbol	Description
21	Phase & Ground Distance
50	Instantaneous Overcurrent
67	Directional Overcurrent
51	Time-Overcurrent
68	Out-of-Step Trip and / or Block
79	Single- / Three-Pole Reclosing
50BF	Dual Circuit Breaker Failure
25	Synchronism Check
49	Thermal Element

- Password Separation of Protection and Automation

- Expanded SELOGIC® Control Equations

- Event Reports and Oscillography

- Sequential Events Recorder

- Dual Breaker Condition Monitor

- Station Battery Monitor

- DNP3 and/or IEC 61850*

- High-Accuracy Metering

- MIRRORED BITS® Communications

- Synchrophasors

- Fault Locator

- CCVT Transient Overreach and Load Encroachment Supervision

- Remote and Local Control Switches

- Advanced Local Display

* Optional Feature

Protecciones

RESUMEN DE FUNCIONES

Relé de Sobreintensidad Direccional MiCOM P127
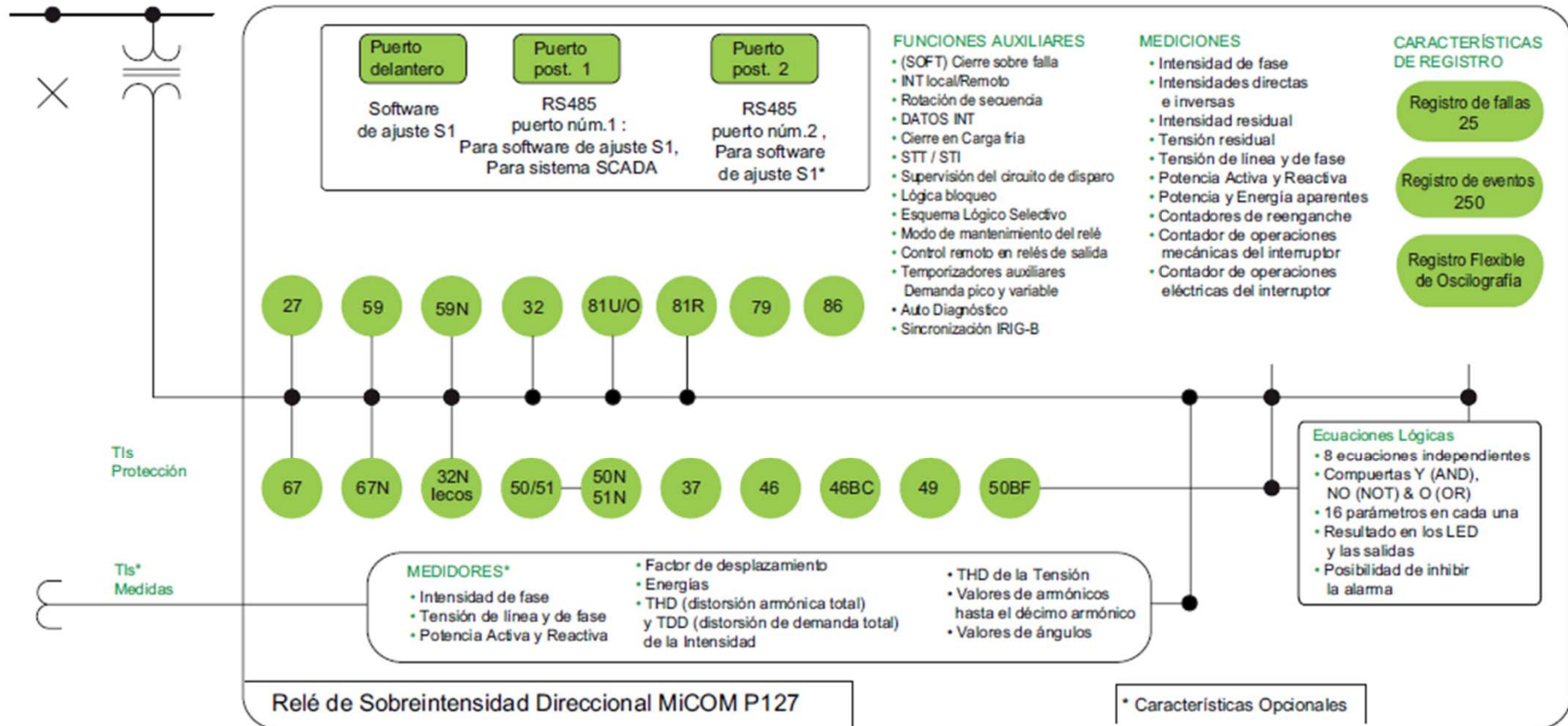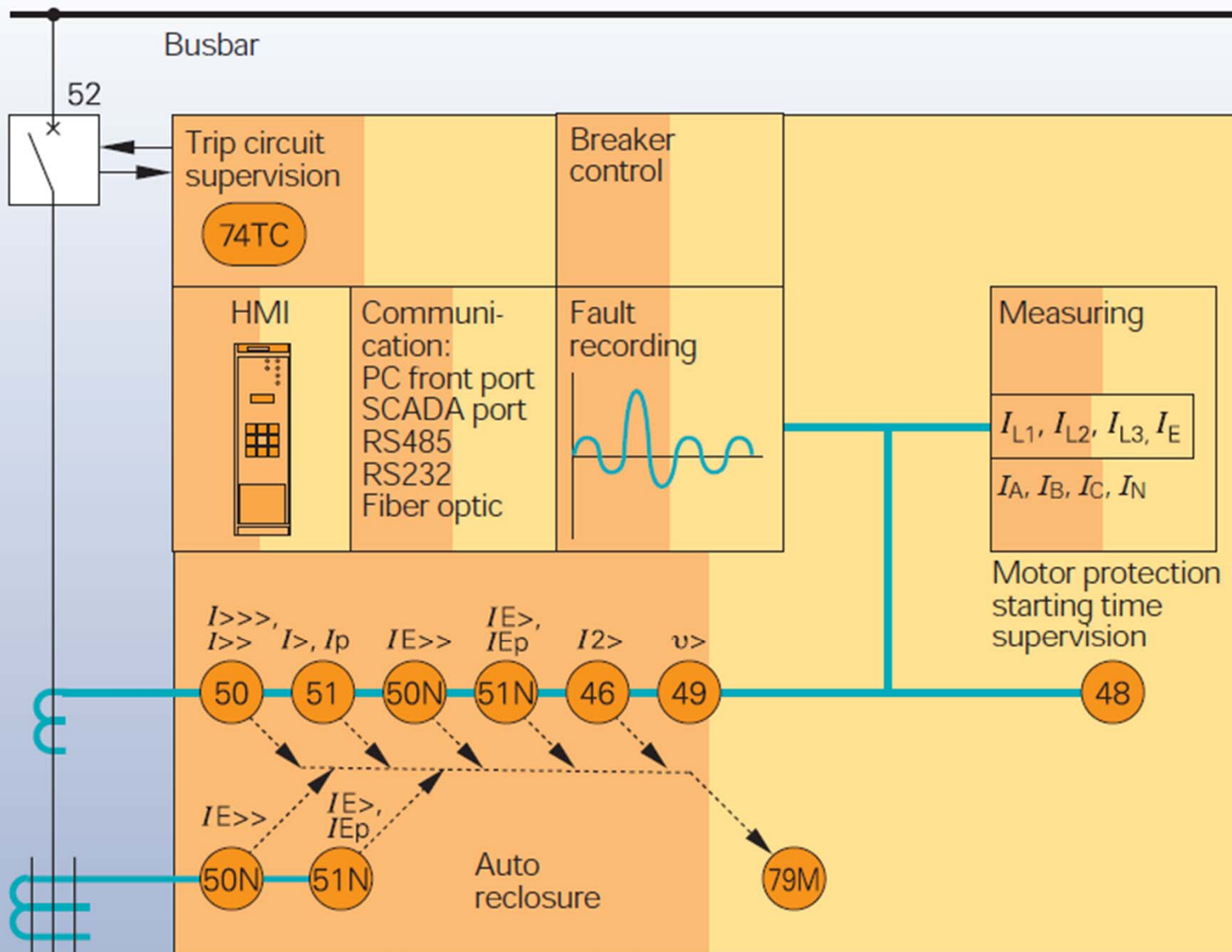
Protecciones

Protecciones

功　　能	ANSI 代码	MiCOM P120	MiCOM P121	MiCOM P122	MiCOM P123
单相或接地过流保护	50/51 和 50N/51N	×			
三相和接地过流保护	50/51 和 50N/51N		×	×	×
热过负荷保护	49			×	×
低电流保护	37			×	×
负序过流保护	46				×
一次回路断线检测(I$_2$/I$_1$)				×	×
负载冷启动				×	×
继电器输出闭锁	86	×	×	×	×
定值组		1	1	2	2
断路器失灵检测	50BF			×	×
断路器监视				×	×
跳闸回路监视				×	×
闭锁逻辑				×	×
可编程输出逻辑				×	×
自动重合闸（4次）	79				×
测量（实时有效值）		×	×	×	×
事件记录（75个）				×	×
故障记录（5个）				×	×
故障录波（3秒）				×	×
通讯功能		×	×	×	×

Protecciones
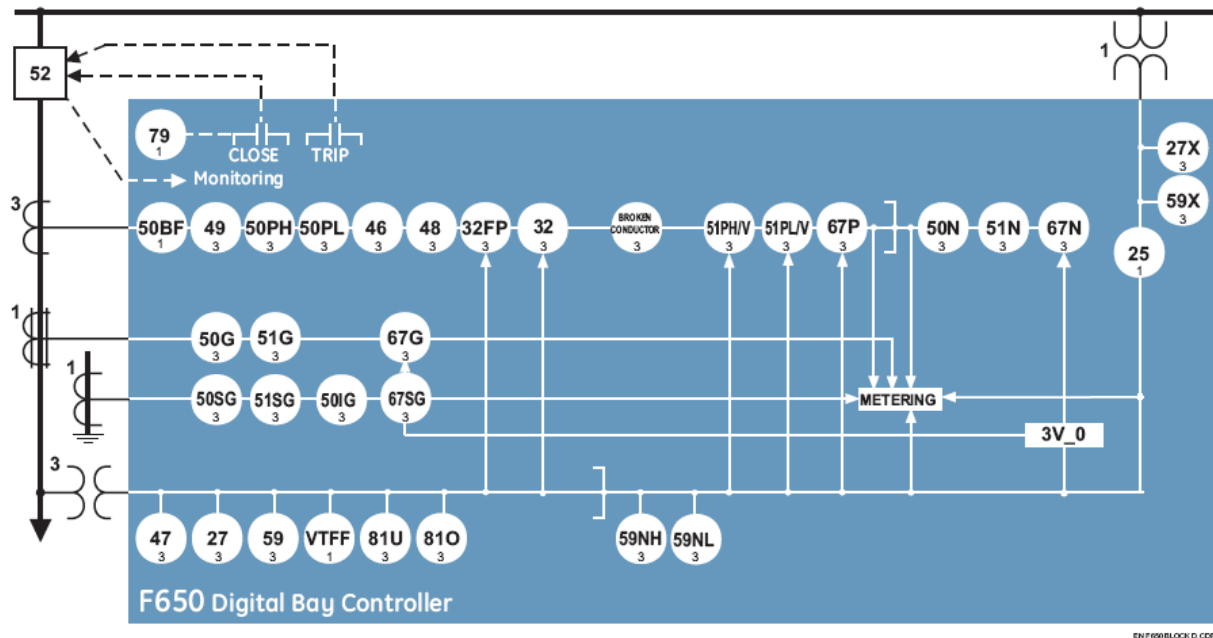
DEVICE	COMMON PROTECTION ELEMENTS
25	Synchrocheck
27/27X	Bus/Line Undervoltage
32	Sensitive Directional Power
32FP	Forward Power
46	Negative Sequence Time Overcurrent
49	Thermal Image - overload protection
47	Negative Sequence Voltage
50 BF	Breaker Failure
50PH/PL	Phase Instantaneous Overcurrent (High/Low)
50N	Neutral Instantaneous Overcurrent
50G	Ground Instantaneous Overcurrent
50SG	Sensitive Ground Instantaneous Overcurrent
50IG	Isolated Ground Instantaneous Overcurrent
51N	Neutral Time Overcurrent
51G	Ground Time Overcurrent
51SG	Sensitive Ground Time Overcurrent
51PH/V	Voltage Restraint Phase Time Overcurrent
59/59X	Bus/Line Overvoltage
59NH/NL	Neutral Overvoltage - High/Low
67P	Phase Directional Overcurrent
67N	Neutral Directional Overcurrent
67G	Ground Directional Overcurrent
67SG	Sensitive Ground Directional Overcurrent
81 U/O	Under/Over Frequency
	Broken Conductor Detection
VTFF	VT Fuse Failure Detection

Protecciones

Functional Block Diagram

D60 Line Distance Protection System
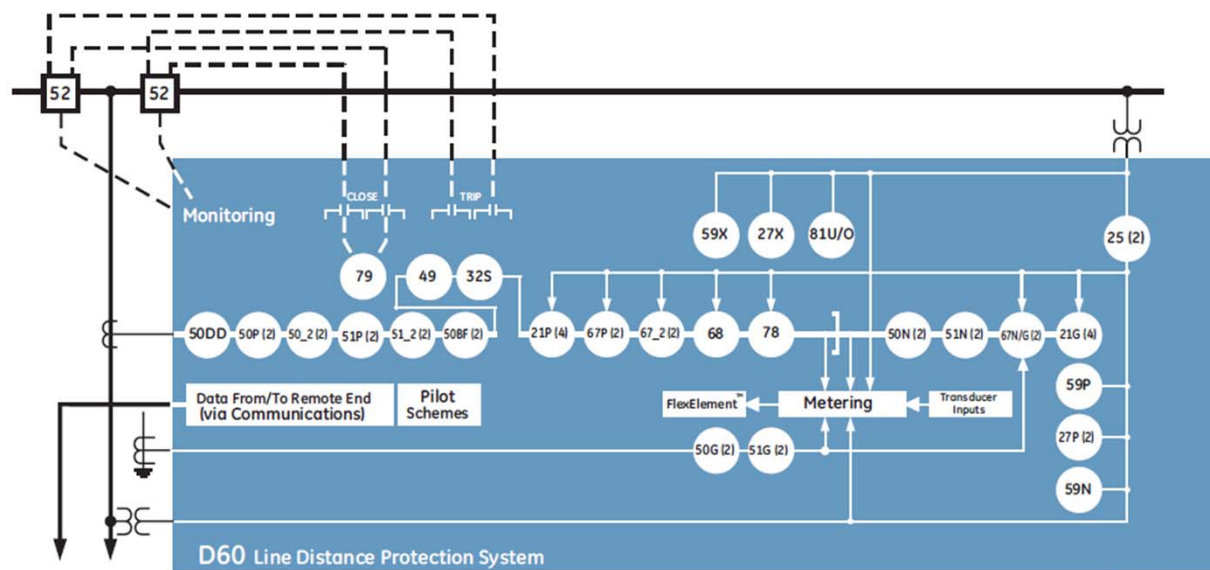
Device Number	Function
21G	Ground Distance
21P	Phase Distance
25	Synchronism Check
27P	Phase Undervoltage
27X	Auxiliary Undervoltage
32	Sensitive Reverse Power
49	Thermal Overload
50BF	Breaker Failure
50DD	Current Disturbance Detector
50G	Ground Instantaneous Overcurrent
50N	Neutral Instantaneous Overcurrent
50P	Phase Instantaneous Overcurrent
50_2	Negative Sequence Instantaneous Overcurrent
51G	Ground Time Overcurrent
51N	Neutral Time Overcurrent
51P	Phase Time Overcurrent
51_2	Negative Sequence Time Overcurrent
52	AC Circuit Breaker
59C	Compensated Overvoltage
59N	Neutral Overvoltage
59P	Phase Overvoltage
59X	Auxiliary Overvoltage
59_2	Negative Sequence Overvoltage
67N	Neutral Directional Overcurrent
67P	Phase Directional Overcurrent
67_2	Negative Sequence Directional Overcurrent
68	Power Swing Blocking
78	Out-of-Step Tripping
79	Automatic Recloser
81U/O	Under /Over Frequency
ROCOF	Rate of change of frequency

Protecciones
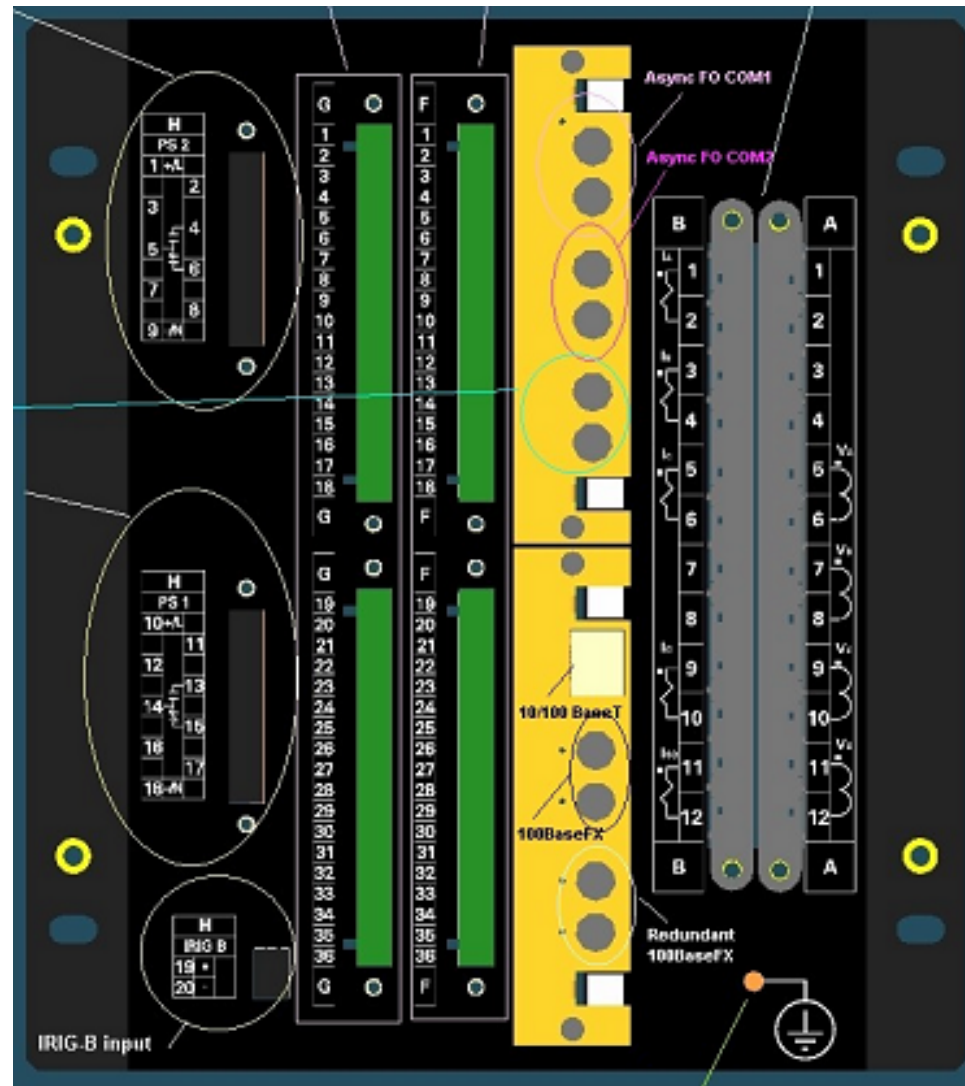
Protecciones

Ordering

F650	*	*	*	F	*	G	*	*	*	Description
F650										Digital bay management device
	B									Basic display (4 x 20 characters)
	M									Graphical mimic display (240 x 128 pixels)
										Rear Serial Communications Board 1
		F								None
		A								Redundant RS485
		P								Redundant plastic F.O.
		G								Redundant glass F.O.
		X								Redundant RS485 + remote CAN bus I/O (*)
		Y								Redundant plastic F.O. + remote CAN bus I/O (*)
		Z								Redundant glass F.O. + remote CAN bus I/O (*)
										Rear Ethernet Communications board 2
			B							10/100 BaseT
			C							10/100 BaseT + 10/100 BaseF
			D							10/100 BaseT + redundant 10/100 BaseF
										I/O board 1
					1					16 inputs + 8 outputs
					2					8 Inputs, 4 circuits for circuit supervision, 6 Outputs + 2 outputs with circuits for trip current supervision (latching)
					4					32 digital inputs
					5					16 digital inputs + 8 analog
										I/O board 2
							0			None
							1			16 Inputs + 8 Outputs
							4			32 digital inputs
							5			16 digital inputs + 8 analog
										Auxiliary Voltage
								LO		24-48 Vdc (range 19.2 - 57.6)
								HI		110-250 Vdc (range 88-300)120-230 Vac (range 102-264)
								LOR		Redundant LO
								HIR		Redundant HI
										Language
									-	English/English
									F	French/English
									P	Russian/English

Protecciones
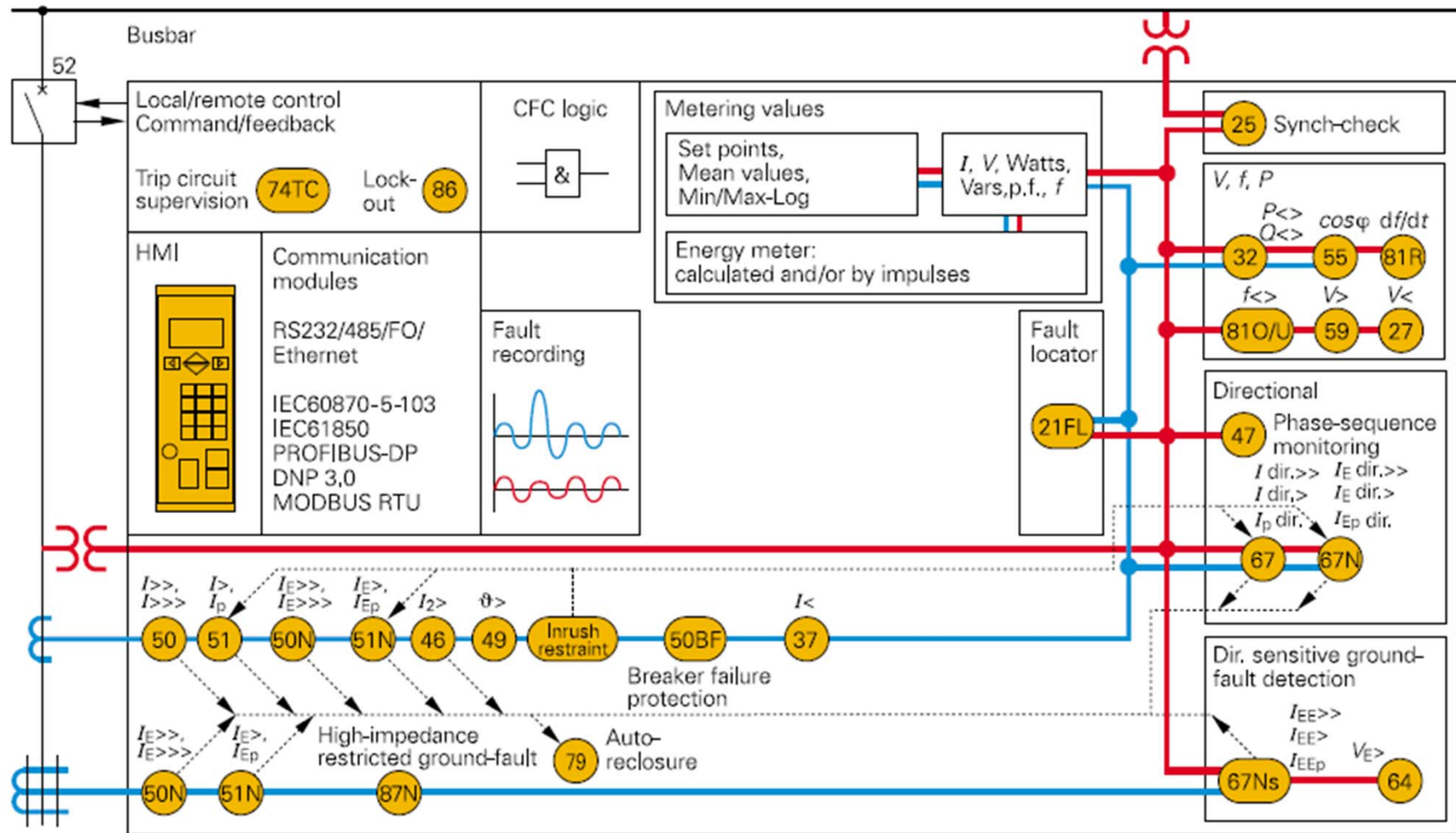
Protecciones

Equipos SIPROTEC 5 y campos de aplicación

Tipos de equipo

[dw_sip5_anwendung, 5, es_ES]
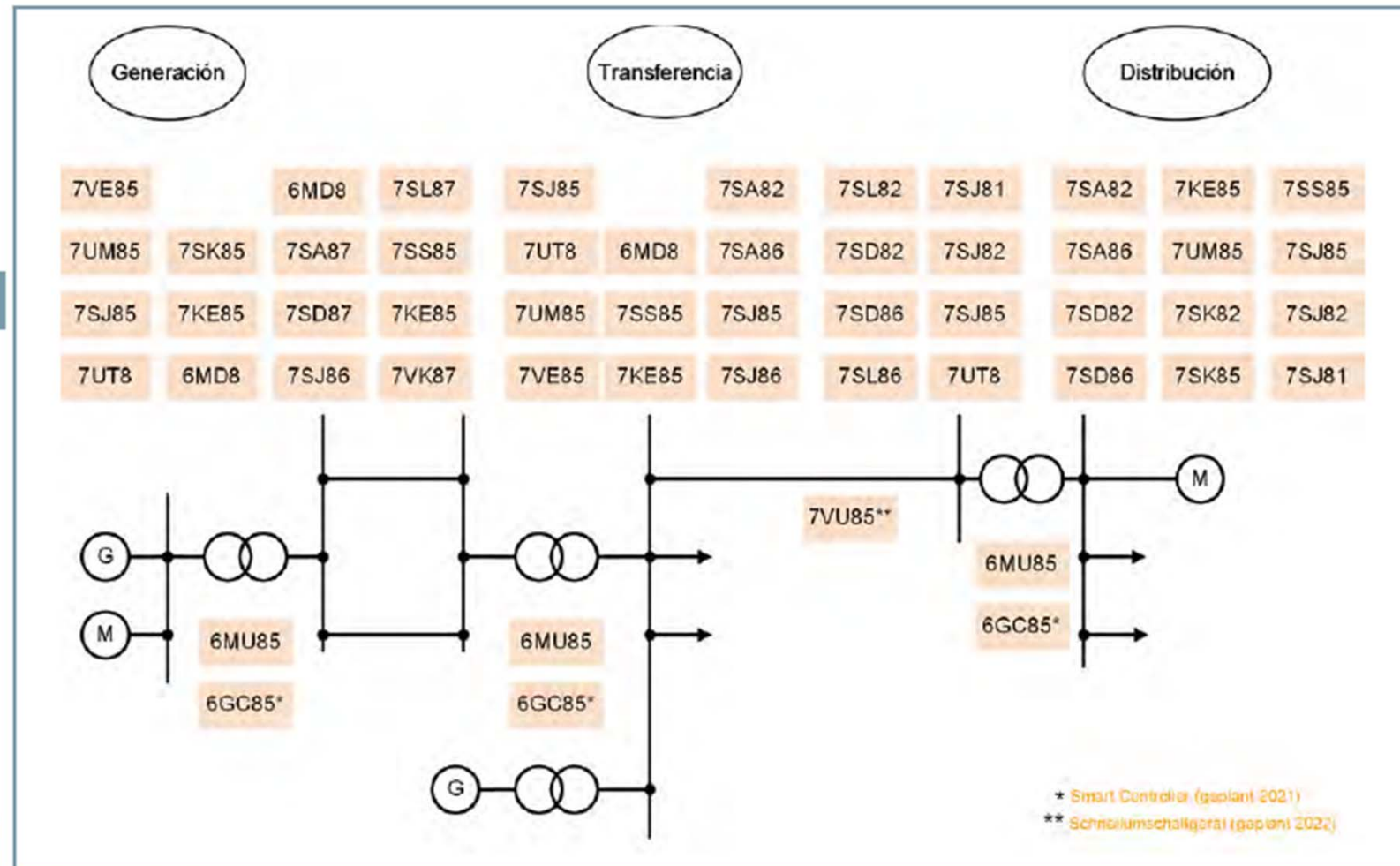
Protecciones

SEL-587 RELAY FUNCTIONS