



# ELECTRIC CONTROLS

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### F650 디지털보호계전기

#### 개요 :

F650 디지털보호계전기는 수배전반의 Feeder에 대한 보호계전기의 기능을 수행하는 장비이다. 이 디지털보호계전기는 피더에 대한 보호계전기능외에 메터링, 제어기능도 보유하고 있다.

F650은 LCD 모니터 화면에서 싱글라인 다이어그램으로 다양한 피더의 링 버스와 각 차단기에 대한 모니터 감시기능을 가지고 있다. 다양한 옵션기능으로 다양한 Application이 가능하다. 즉, IEC61850 프로토콜의 이중화 네트워크 기능으로 더욱 신뢰성 있는 보호계전기의 기능 구축이 가능하다.

#### 주요 특징 :

- 3단계 보호 계전 기능 보유
- Ethernet Card 내장으로 100Mbps 통신 가능
- Web browser 홈페이지 내장하여 계측, 알람, Snapshot 감시 기능 보유
- GPS시간 동기화 기능 보유
- 제어전원의 2중화 (AC 110~220V, DC 24~250V)
- IEC61850을(표준 프로토콜) 적용하여 별도의 Interface Unit 불 필요
- Sampling Rate(분석)-64 Sampling (1 cycle)
- Logic program가능 :
- 입력16개,출력8개 (확장: 입력16,출력8개)



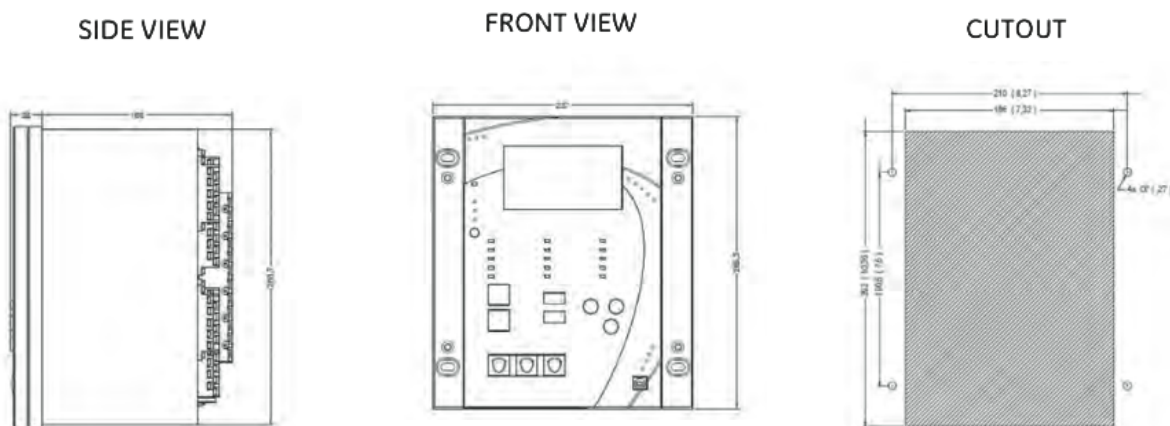
#### Specification :

- 프로세서 : 32Bit RISC 마이크로 프로세서
- 저장방식 : 비휘발성 Flash Memory
- 통신방식 : RS-232, RS-485, Ethernet, 광통신
- 프로토콜 : Modbus-RTU, DNP3.0, TCP/IP 및 UCA2.0/IEC61850
- 통신속도 : 19,200BPS, 115,000BPS, 10/100MBPS
- 통신거리 : 1,200Meter
- 연결대수 : Serial 방식- 32개, Ethernet 방식- 256개
- 취부방식 : Panel-Mount 구조
- 주요 기능 : 보호계전기(PROTECTION), 제어 (CONTROL), 감시 (MONITORING), 분석(ANALYSIS) 및 계측(METERING) 기능

#### Application :

- Primary protection and control for distribution feeders on solidly grounded, high impedance grounded or resonant (Peterson Coil) grounded systems
- Bus blocking/Interlocking schemes
- High-speed fault detection for arc flash mitigation
- Throw over schemes (bus transfer scheme applications)
- Load shedding schemes based on voltage and frequency elements
- Back-up protection for transmission lines, feeders and transformers
- Distributed Generation (DG) interconnect protection, including active and passive anti-islanding

#### Dimension of Layout :



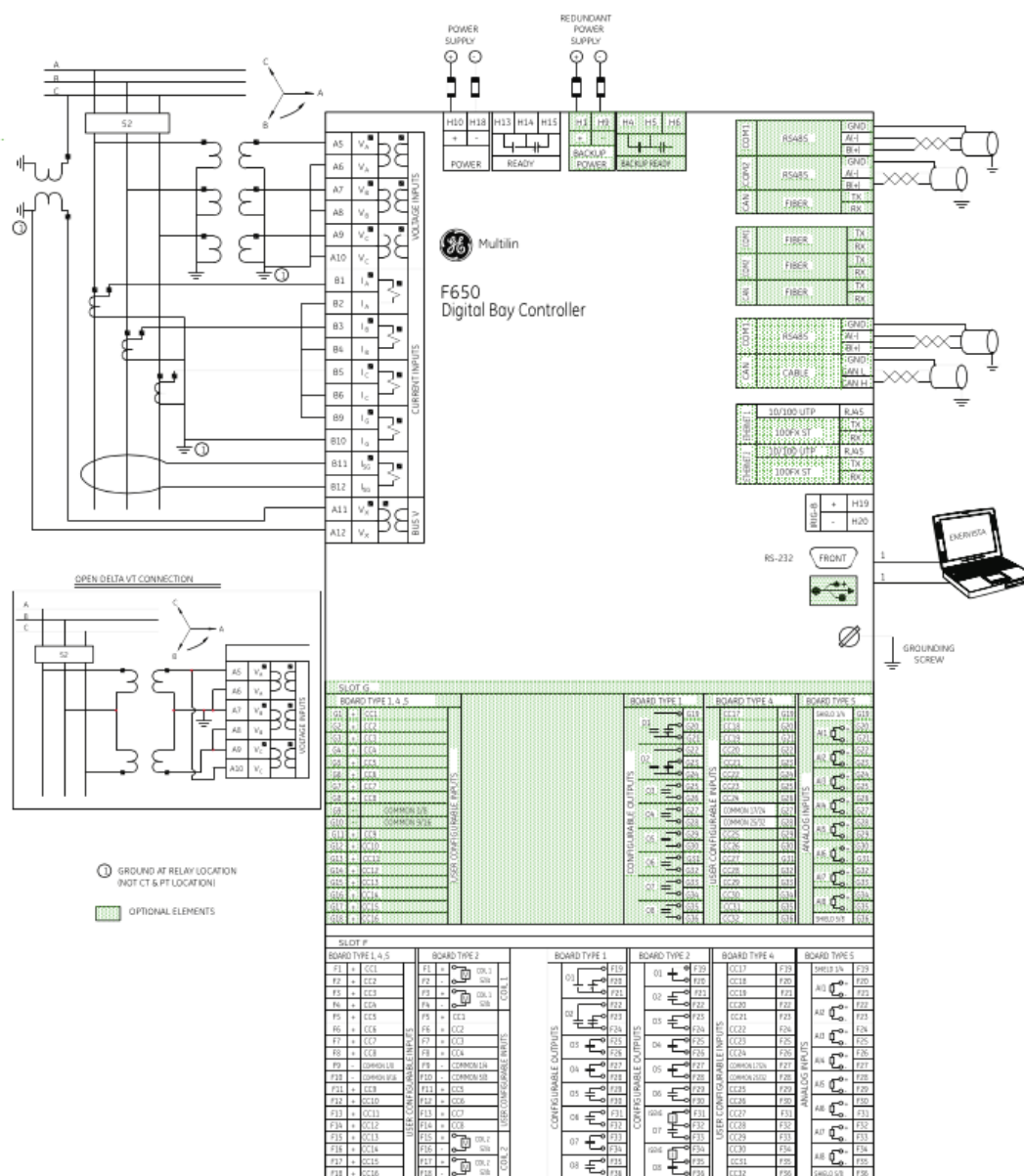


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Connection Diagram :



User Interface :



## Display

- Graphic 16×40 or text 4×20 LCD display
- Fluorescent backlight to improve visibility

## LEDs

- Multicolor programmable LEDs with label panel
- Local/ Remote/Off push button with LEDs

## Keyboard & Shuttle

- Local/ Remote/Off push button with LEDs
- Key control for easy navigation
- Ergonomic programmable Keys

## Front Port

- Electrically isolated front USB communication port

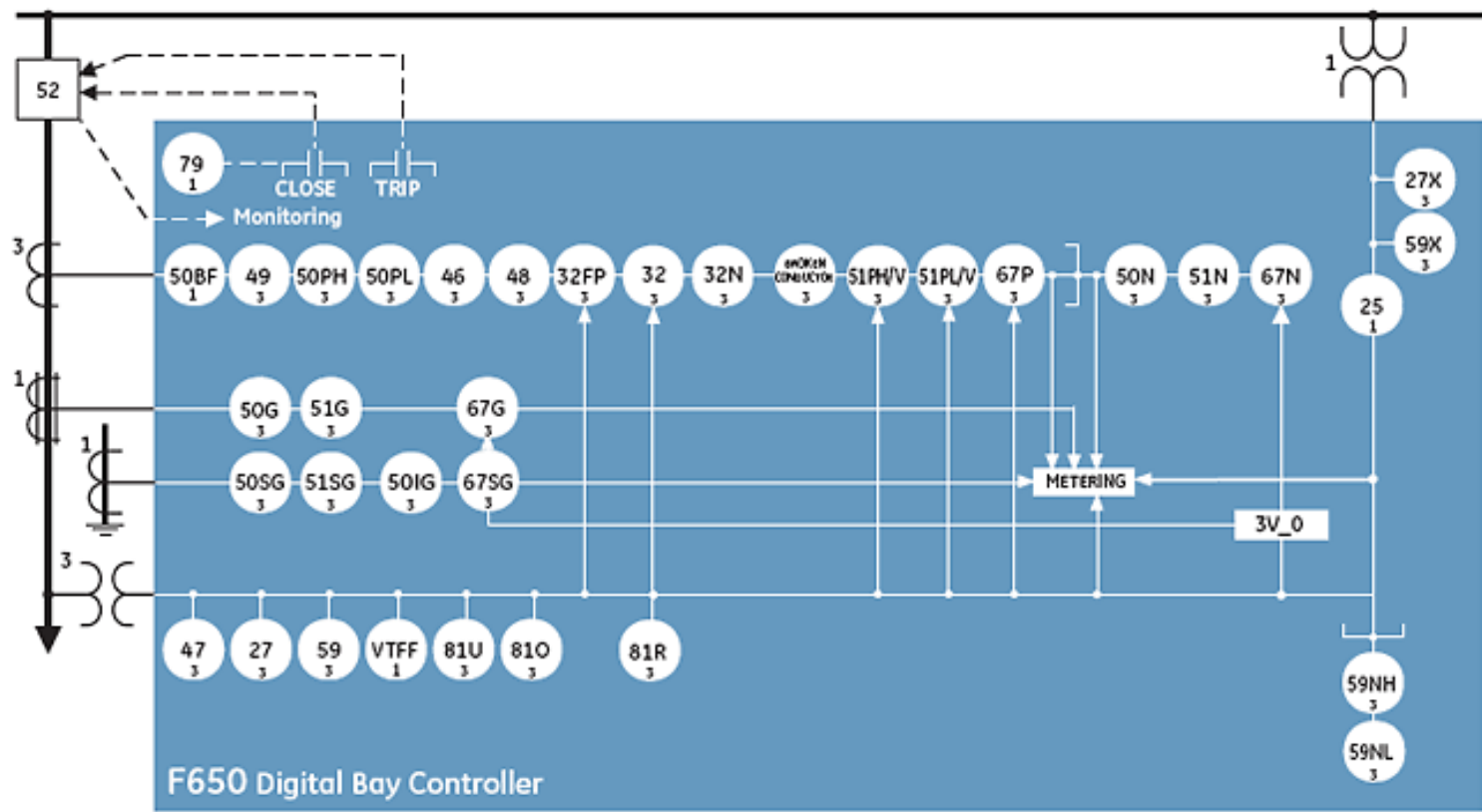


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## Protection 과 Control



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25	Synchrocheck	51N	Neutral Time Overcorrect
27/27X	Bus/Line Undervoltage	51G	Ground Time Overcorrect
32	Sensitive Directional Power	51SG	Sensitive Ground Time Overcorrect
32FP	Forward Power	51PH/V	Voltage Restraint Phase Time Overcurrent
32N	Wattmetric zero-sequence directional	51PL/V	
46	Negative Sequence Time Overcurrent	59/59X	Bus/Line Overvoltage
47	Negative Sequence Voltage	59NH/NL	Neutral Overvoltage - High/Low
48	Blocked Rotor	67P	Phase Directional Overcurrent
49	Thermal Image - overload protection	67N	Neutral Directional Overcurrent
50BF	Breaker Failure	67G	Ground Directional Overcurrent
50PH/PL	Phase Instantaneous Overcurrent(High/Low)	67SG	Sensitive Ground Directional Overcurrent
50N	Neutral Instantaneous Overcurrent	79	Autorecloser
50G	Ground Instantaneous Overcurrent	81U/O	Under/Over Frequency Broken Conductor
50SG	Sensitive Ground Instantaneous Overcorrect	N/A	Load Encroachment
50IG	Isolated Ground Instantaneous Overcurrent	81R	Frequency Rate of Change




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## Option Card :

<b>Display</b>	B - Basic display (4×20 characters)
	M - Graphic Display with Standard Symbols(240×128 pixels)
	N - Graphic Display with IEC Symbols(240×128 pixels)
<b>Serial Comm. Board 1(Modbus)</b> 	F - Without rear communications
	A - Redundant RS485
	P - Redundant Plastic Fiber Optic
	G - Redundant Glass Fiber Optic
	X - Comm dual RS485 + CAN for remote I/O
	Y - Comm dual plastic FO + CAN for remote I/O
	Z - Comm dual glass FO + CAN for remote I/O
<b>Ethernet Comm. Board 2(DNP)</b>	B - 10/100 Base TX
	C - 10/100 Base TX + 100 Base FX
	D - 10/100 Base TX + Redundant 100 Base FX
	E - Redundant Ethernet 10/100 Base TX
<b>I/O Board 1</b>	1 - 16 Inputs + 8 Outputs
	2 - 8 Inputs + 8 Outputs, 2 trip coil supervision
	4 - 32 Digital Inputs
	5 - 16 Digital Inputs + 8 Analog Inputs
<b>I/O Board 2</b>	0 - Without a second I/O board
	5 - 16 Digital Inputs + 8 Analog Inputs
<b>Auxiliary Voltage</b>	LO - Source : 24-48VDC(range : 19.2 - 57.6)
	HI - Source : 110-250vdc(range : 88-300); Source:120-230VAC(range : 88-264)
	LOR - Redundant LO
	HIR - Redundant HI
<b>Communication Protocol</b>	Modbus RTU, TCP/IP, DNP3.0 Level 2, IEC 60870
	3 - IEC 60870 -5-103, Modbus RTU, TCP/IP
	6 - IEC 61850, Modbus RTU & TCP/IP, DNP 3.0 Level 2

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