



Reyrolle
Protection
Devices

7SG13 – Delta

Protection and Control Relays

Answers for energy

7SG13 Delta

Protection and Control Relays



Description

The Delta range of feeder manager relays provides integrated protection, control, monitoring and measuring functions.

The Delta range provides three operational areas:

1. Comprehensive protection of the power system using a wide range of functions, all of which can be operated simultaneously.
2. Plant control, indication and analogue values can be indicated on front facia displays, LEDs are used for alarm and trip indication.
3. Display and recording of measurements, together with sequence of event and disturbance recording of faults.

Our proven experience in feeder protection and the simplicity of operation that is the trademark of Reyrolle protection relays now benefits from the addition of integrated control facilities.

The Delta provides integrated control and protection that will fit directly into circuit breaker panels, eliminating complicated circuit breaker wiring.

This adds cost-effectiveness to the comprehensive range of facilities provided by the Delta.

Communication using the IEC 60870 or Modbus standards allows remote updating of settings and integrated access by the control system for time-tagged events, measurands and fault disturbance.

Function Overview

Comprehensive protection, control, monitoring and measuring functions.

Integrated trip circuit supervision.

Circuit breaker failure protection.

Optional number of inputs and outputs.

Continuous self monitoring.

User Interface

20 character x 2 line backlit LCD
Menu navigation keys

1 fixed LED.
16 or 32 programmable LEDs.

Monitoring Functions

Analogue values can be displayed on the LCD screen. In addition most values can be obtained via the data communications channel(s).

Primary and secondary currents
Primary and secondary voltages*
Direction*
Frequency*
Real power (Watts)*
Reactive power (VAR)*
Apparent power (VA)*
Power factor*
Maximum, minimum & average Demand
Energy (Watt-hours)*
Status inputs
Output contacts
ARC sequence
Trip counters
I²t counter

* Applicable to relays with VT inputs

Description of Functionality

Phase fault 50/51

IDMTL/DTL and DTL elements provide overcurrent protection, each with independent current settings and delays. Both IEC and ANSI curves are supported. The IDMT stage has a programmable reset with either a definite time or decaying reset to improve grading with electromechanical protection.

Earth fault 50N/51N 50G/51G

Two earth fault measurement functions are available:

One method directly measures the earth current from an independent CT or the residual connection of the 3 line CTs.

The second method internally calculates the earth current from the 3 phase CTs.

Both methods provide IDMTL/DTL and Overcurrent functions, each with independent current settings and

delays. IEC and ANSI curves are supported along with a programmable reset delay.

Thermal Overload 49

The thermal algorithm calculates the thermal state from the measured currents and can be applied to cables and transformers. A hot/cold ratio setting enables the system to operate reliably near the thermal capacity and alarms are available for thermal overload and thermal capacity.

Negative Sequence Overcurrent 46IT + DT

Independent settings with IDMTL or DTL delays are provided for the negative sequence overcurrent. These can be used to detect unbalances on the system or remote earth faults with a Delta-star transformer in circuit.

Phase Unbalance/Broken Conductor 46

With the circuit breaker closed, if any one or two of the line currents falls below setting it may be due to a broken conductor. This condition may be alarmed or used to trip the circuit breaker.

Circuit Breaker Fail 50BF

The circuit breaker fail function may be triggered from a trip signal from the Delta or from an external device. It operates by monitoring the current following a trip signal and issues an output if the current does not stop within a specified time interval. This alarm can be used to operate an output contact to retrip the circuit breaker. A further time delay enables the back-tripping of an upstream circuit breaker.

Trip circuit supervision 74TC

The trip circuit is monitored by a status input. This is linked to an alarm and may be configured to operate an output relay.

CT supervision 74CT

The CT supervision considers an absence of current in one phase together with the presence of current in the other two phases for a settable time as a CT failure. This is linked to an alarm and may be configured to operate an output relay.

Circuit breaker maintenance

Two circuit breaker operations counters are provided. One is used for the overall number of operations and the other for the number of operations since the last reset.

A summation of I^2t provides a measure of the contact erosion, indicating the energy broken by the circuit breaker. Configurable values for contact separation time and definite clearance time enable an accurate record for different types of circuit breaker.

Operations count and I^2t alarm levels can be set which, when reached, can be used as an input to a condition-based maintenance regime.

Measurement and Trending

Analogue values can be displayed in primary or secondary quantities on the fascia LCD screen. In addition the values can be obtained via the IEC60870-5-103 communications.

Plant control

The circuit breaker control function uses the standard fascia push buttons or via the remote communications. 16 or 32 programmable LEDs are available for circuit breaker status indication.

The 'Out-of-service' position prevents tripping and control operations from taking place, but allows changes to settings and front of panel indication for test purposes. Double point indications can be used for plant status indication, which results in open, close, transitional and DBI (Don't Believe It) states.

Optional Functionality

Directional control 67/67N

Phase fault and earth fault elements can be made directional.

Each stage can be separately selected as forward, reverse or non-directional.

The directional polarisation for the phase fault elements is derived from the quadrature voltage.

For the calculated earth fault element, the user can select whether the directional polarisation is provided by the calculated residual voltage or the negative phase sequence voltage.

Under and Over voltage 27/59

Four stages of under/over voltage protection are provided with independent DTL delays. Each stage can be independently selected as an over or under voltage element.

Negative Sequence Overvoltage 47

Two independent settings with DTL delays are provided for the negative sequence overvoltage, which may be used in protection schemes for isolated networks.

Under and Over frequency 81

Four stages of under/over frequency detection are provided with independent DTL delays. Each stage can be independently selected as an over or under frequency element.

Neutral Over voltage 59NIT + NDT

Calculated from the 3 line VTs the neutral overvoltage can be used to detect earth faults in high impedance earthed or isolated systems.

VT supervision 74VT

The VT supervision uses a combination of negative sequence voltage and negative sequence current to detect a VT fuse failure. This condition may be alarmed or used to inhibit voltage dependent functions.

Additional Functionality

Auto-reclose 79

The Delta incorporates a 5 trip/4 close auto-reclose sequence with 3 pole tripping which can be initiated by an internal or external signal. Each trip is programmable as either delayed or instantaneous. Programmable dead times and reclaim time with a wide setting range.

Data Storage and Communication

Sequence of event records

Up to 500 events are stored and time tagged to 1ms resolution. These are available via the communications.

Fault records

The last 10 fault records are available from the fascia with time and date of trip, measured quantities and type of fault.

Disturbance recorder

The waveform recorder may be triggered from a protection function or external input and has a configurable pre-fault trigger. Up to 5 seconds of fault waveforms may be stored with associated analogue and digital values. This is user configurable as five 1-second records, two 2-second records or one 5-second record.

In addition the demand history for the last 24 hours can be obtained.

Communications

Two fibre-optic communications ports are provided on the rear of the relay. They are optimised for 62.5/125µm glass-fibre, with BFOC/2.5 (ST®) bayonet style connectors.

In addition users may interrogate the relay locally with a laptop PC and the RS232 port on the front of the relay. The relay can be user selectable to either IEC 60870-5-103 or Modbus RTU as its communications standard.

Reydisp Evolution

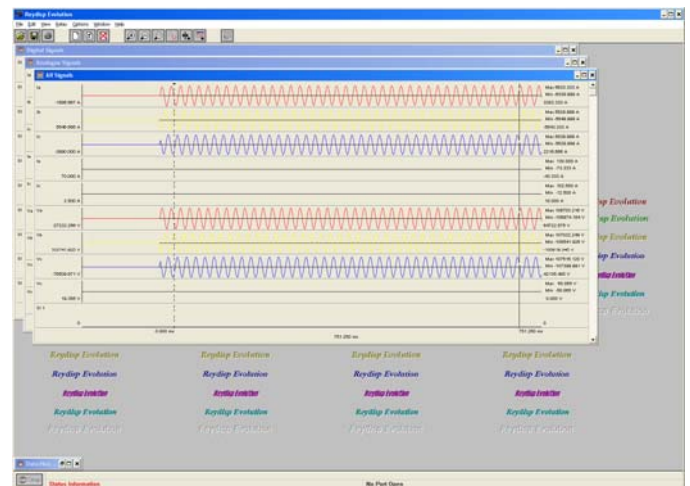


Fig 2. Typical ReyDisp Evolution screenshot

This support software is common to the entire range of Reyrolle numeric products. It provides the means for the user to apply settings to the Delta as well as to retrieve settings, instruments, events, waveforms and 24 hour data.

Technical Information

For full technical data refer to the Performance Specification of the Technical Manual.

Inputs and Outputs

Characteristic energising quantity

AC Current	1, 5 A
AC Voltage	63.5 V line-neutral, 110 V line-line

Thermal Withstand	
AC Current Inputs	
continuous	3.0 xIn
10 minutes	3.5 xIn
5 minutes	4.0 xIn
2 minutes	6.0 xIn
1 second	250 A
1 cycle	625 A peak
AC Voltage Inputs	
continuous	300 V

Burden	
AC Current Inputs	
5A Phase/Earth	≤ 0.3 VA
1A Phase Earth	≤ 0.1 VA
AC Voltage Inputs	
	≤ 0.01 VA

DC Auxiliary Supply

Nominal Voltage	Operating Range V dc
30V	24 to 37.5 V
48/110V	37.5 to 137.5 V
220 V	178.0 to 280.0 V
110/220V	88 to 275 V

Operate State	Burden
Quiescent (Typical)	11 W
Maximum	14 W

Burdens are measured at nominal rating.

Allowable superimposed ac component	≤12% of dc voltage
Allowable breaks/dips in supply (collapse to zero from nominal voltage)	≤20 ms

Status inputs

Nominal Voltage	Operating Range V dc
30V	24 to 37.5V
48V	37.5 to 60V
110 V	87.5 to 137.5V
220V	175 to 280V

The binary input voltage need not be the same as the main energising voltage.

The 30V and 48V inputs meet the requirements of ESI48-4 ESI 1. However, the 110V and 220V inputs will operate with a DC current of less than 10mA. Where 110V or 220V inputs compliant with ESI48-4 ESI 1 are required, a relay with 48V binary inputs can be supplied with external series resistors as follows:

Nominal Voltage	Resistor Value	Wattage
110V	2k Ω ± 5%	2.5 W
220 V	8k Ω ± 5%	6.0 W

Parameter	Value
Minimum DC current for operation (30V and 48V inputs only)	10 mA
Reset/Operate Voltage Ratio	≥ 90 %
Typical response time	< 5 ms
Typical response time when used to energise an output relay contact	< 15 ms
Minimum pulse duration	40 ms

Each binary input has an associated timer that can be programmed to give time delayed pick-up and time delayed drop-off. When set to a minimum of 20ms the binary inputs will provide immunity to an AC input signal and will not respond to the following:

250V RMS 50/60 Hz applied for two seconds through a 0.1 μ F capacitor.

500 V RMS 50/60 Hz applied between each terminal and earth. Discharge of a 10 μ F capacitor charged to maximum DC auxiliary supply voltage.

Output Relays

Carry continuously	5A ac or dc
Make and carry (L/R ≤ 40 ms and V ≤ 300V)	20A ac or dc for 0.5s 30A ac or dc for 0.2s
Breaking Capacity (≤ 5 A and ≤ 300 V):	
AC Resistive	1250 VA
AC Inductive	250 VA at p.f. ≤ 0.4
DC Resistive	75 W
DC Inductive	30 W at L/R ≤ 40ms 50 W at L/R ≤ 10ms

Minimum number of operations	1000 at maximum load
Minimum recommended load	0.5 W limits 10mA or 5V

Mechanical

Vibration(Sinusoidal)IEC 60255-21-1 Class 1

0.5 gn, Vibration response	≤ 5% variation
1.0 gn, Vibration endurance	

Shock and Bump IEC 60255-21-2 Class 1

5 gn, Shock response, 11ms	≤ 5% variation
15 gn, Shock withstand, 11ms	
10 gn, Bump test, 16ms	

Seismic IEC 60255-21-3 Class 1

1 gn, Seismic Response	≤ 5% variation
------------------------	----------------

Mechanical Classification

Durability	In excess of 10 ⁶ operations
------------	---

Recommended load

Minimum recommended load	0.5 W, limits 10 mA or 5 V
--------------------------	----------------------------

Electrical Tests

Insulation IEC 60255-5

RMS levels for 1 minute

Between all terminals and earth	2.0 kV
Between independent circuits	2.0 kV
Across normally open contacts	1.0 kV

Transient Overvoltage

IEC 60255-5

Between all terminals and earth or between any two independent circuits without damage or flashover	5 kV 1.2/50 μs 0.5 J
---	----------------------------

High Frequency Disturbance

IEC 60255-22-1 Class III

2.5kV, Longitudinal mode	≤3% variation
1.0kV, Transverse mode	

Electrostatic Discharge

IEC 60255-22-2 Class III

8kV, Contact discharge	≤5% variation
------------------------	---------------

Fast Transient

IEC 60255-22-4 Class IV

4kV, 5/50ns, 2.5 kHz, repetitive	≤3% variation
----------------------------------	---------------

Radio Frequency Interference

IEC 60255-22-3

10 V/m, 80 to 1000 MHz	≤5% variation
------------------------	---------------

Conducted RFI

IEC 60255-22-6

10 V, 0.15 to 80 MHz	≤5% variation
----------------------	---------------

Conduct limits

IEC 60255-25

Frequency Range	Limits dB(μV)	
	Quasi-peak	Average
0.15 to 0.5 MHz	79	66
0.5 to 30 MHz	73	60

Radiated limits

IEC 60255-25

Frequency Range	Limits at 10 m Quasi-peak, dB(μV/m)
30 to 230 MHz	40
230 to 10000 MHz	47

Environmental

Temperature IEC 68-2-1/2

Operating	-10 °C to +55 °C
Storage	-25 °C to +70 °C

Humidity IEC 68-2-3

Operational test	56 days at 40 °C and 95% RH
------------------	-----------------------------

Protection Elements

General Accuracy

Reference Conditions	
Parameter	Reference or Value
General	IEC 60255-3
Current Settings	100% of I_n
Time Multiplier	1.0
Current input (IDMTL)	2x to 20x I_s
Current input (DTL)	5x I_s
Auxiliary supply	Nominal
Frequency	50 Hz
Ambient temperature	20 °C

General Settings	
Parameter	Value
Transient Overreach of Highset/Lowset ($X/R = 100$)	$\leq 5\%$
Disengaging Time ⁽¹⁾	< 42 ms
Overshoot Time	< 40 ms

Output contacts have a minimum dwell time of 100ms, after which the disengage time is as above.

Accuracy influencing factors

Temperature	
10 °C to +55 °C	$\leq 5\%$ variation
Frequency	
47 Hz to 52 Hz	Setting: $\leq 5\%$ variation Operate time: $\leq 5\%$ variation

Phase Overcurrent protection

Characteristic	
IDMTL (IEC)	Normal Inverse (NI), Very Inverse (VI), Extremely Inverse (EI), Long Time Inverse (LTI)
IDMTL (ANSI)	Moderately Inverse (MI), Very Inverse (VI), Extremely Inverse (EI)
DTL	
Level	
I_s Settings	0.05 to 2.50 step 0.05 I_n
Accuracy	Operate : 105% of setting $\pm 5\%$ or ± 10 mA Reset: $\geq 95\%$ of operate current
Repeatability	$\pm 1\%$
IDMTL Delay	
T.M. Setting	0.025x to 1.600x

Operate time	see curves below
Accuracy	$\pm 5\%$ or ± 30 ms
Repeatability	$\pm 1\%$
DTL Delay	
Settings	Operate: 0.00 to 20.00 sec Reset: 0.0 to 60.0 sec
Accuracy	$\pm 1\%$ or ± 10 ms
Repeatability	$\pm 1\%$
Characteristic	DTL
Level	
Settings	0.05 to 25.00 I_n
Accuracy	Operate: 100% of setting $\pm 5\%$ or ± 10 mA Reset: $\geq 95\%$ of operate current
Repeatability	$\pm 1\%$
Delay	
Settings	0.00 to 864000.00 sec
Accuracy	± 5 ms
Repeatability	$\pm 1\%$

Earth-fault protection (50N/51N) (50G/51G) As phase Overcurrent protection

Thermal protection (49)

Characteristic	Using IEC 60255-8 curves
Level	
Settings	0.1 to 3.0 I_n
Accuracy	Operate: 100% of setting $\pm 5\%$ Reset: $\geq 95\%$ of operate current
Repeatability	$\pm 1\%$
Delay	
Time constant	1.0 to 1000.0 mins
Accuracy	$\pm 5\%$ or ± 100 ms
Repeatability	± 100 ms

Negative phase sequence (NPS) Overcurrent protection (46IT / 46DT)

Characteristic	Normal Inverse (NI), Very Inverse (VI), Extremely Inverse (EI), Long Time Inverse (LTI), Moderately Inverse (MI), Very Inverse (VI), Extremely Inverse (EI)
Level	
Setting	0.05 to 2.50 I_n
Accuracy	Operate: 105% of setting $\pm 5\%$ or ± 10 mA Reset: $\geq 95\%$ of operate current
Repeatability	$\pm 1\%$
IDMTL Delay	
T.M. Setting	0.025x to 1.600x
Accuracy	$\pm 5\%$ or ± 30 ms
Repeatability	$\pm 5\%$
Characteristic	DTL
Level	
Setting	0.05 to 2.50 I_n

Accuracy	Operate: 105% of setting ± 5% or ± 10mA Reset: ≥ 95% of operate current
Repeatability	±1%
Delay	
Settings	0.00 to 864000.00 sec
Accuracy	± 5% or ± 30 ms
Repeatability	± 5%

Broken Conductor protection (46)

Level	
Setting	20 to 100%
Accuracy	Operate: 100% of setting ± 5% Reset: ≥ 95% of operate current
Repeatability	±1%
Delay	
Settings	0.02 to 1000.00 sec
Accuracy	± 5 ms
Repeatability	± 1%

NPS Overvoltage (47)

Characteristic	DTL
Level	
Setting	0.01 to 2.00 Vn
Hysteresis	0 to 80 %
Accuracy	Operate: 100% of setting ± 1% or ± 0.25V Reset: ≥ 95% of operate voltage
Repeatability	± 1%
Delay	
Settings	0.1 to 864000.0 sec
Accuracy	± 1% or ± 10ms
Repeatability	± 1%

Under/Over voltage (27/59)

Characteristic	DTL
Level	
Settings	0.01 to 2.50 Vn
Hysteresis	0 to 80 %
Accuracy	Operate: 100% of setting ± 1% or ± 0.25V Reset: ≥ 95% of operate voltage
Repeatability	± 1%
Delay	
Settings	0.0 to 864000.0 sec
Accuracy	± 1% or ± 10ms
Repeatability	± 1%

Under/Over frequency (81)

Characteristic	DTL
Level	
Setting	40 to 70 Hz
Accuracy	Operate: 100% of setting ± 10mHz Reset: ± 20mHz of operate frequency
Repeatability	± 1%
Delay	
Settings	0.1 to 864000.0 sec
Accuracy	± 1% or ± 10ms
Repeatability	± 1%

Neutral Voltage Displacement (59NIT / 59NDT)

Characteristic	IDMTL
Level	
Setting	0.01 to 2.00 Vn
Accuracy	Operate: 100% of setting ± 2% or ± 0.25V Reset: ≥ 95% of operate voltage
Repeatability	± 1%
IDMTL Delay	
T.M. Setting	0.025x to 1.600x
Accuracy	± 1% or ± 10ms
Repeatability	± 1%
Characteristic	DTL
Level	
Setting	0.01 to 2.00 Vn
Accuracy	Operate: 100% of setting ± 2% or ± 0.25V Reset: ≥ 95% of operate voltage
Repeatability	± 1%
Delay	
Settings	0.1 to 864000.0 sec
Accuracy	± 1% or ± 10ms
Repeatability	± 1%

CT Supervision

Characteristic	DTL
Level	
Inps	0.05 to 1.00 In
Vnps	0.01 to 1.00 Vn
Accuracy	Operate: 95% of setting ± 5% Reset: ≤ 105% of operate current
Repeatability	±1%
Delay	
Settings	0.02 to 1000.00 sec
Accuracy	± 5 ms
Repeatability	± 1%

VT Supervision

Characteristic	DTL
Level	
Inps	0.05 to 1.00 In
Ipps	0.05 to 20.00 In
Accuracy	Operate: 95% of setting \pm 5% Reset: \leq 105% of operate current
Repeatability	\pm 1%
Delay	
Settings	0.03 to 1000.00 sec
Accuracy	\pm 5 ms
Repeatability	\pm 1%

Circuit Breaker Failure (50BF)

Characteristic	DTL
Level	
Setting	0.05 to 2.00 In
	Operate: 100% of setting \pm 5% or 10mA
	Reset: \geq 95% of operate current
Repeatability	
Delay	
Settings	Re-trip 0 to 60000 msec Back-trip 0 to 60000 msec
Accuracy	\pm 5 ms
Repeatability	\pm 1%

Auto-reclose (79)

No. of shots	0 to 4
Delay	
Setting	Deadtime 0.0 to 900.0 sec Close Pulse 0.0 to 20.0 sec Reclaim 0.0 to 600.0 sec Reclose Block 0.0 to 600.0 sec Lockout 0.0 to 600.0 sec
Accuracy	\pm 1 % or \pm 10 ms
Repeatability	\pm 1%

Case Dimensions

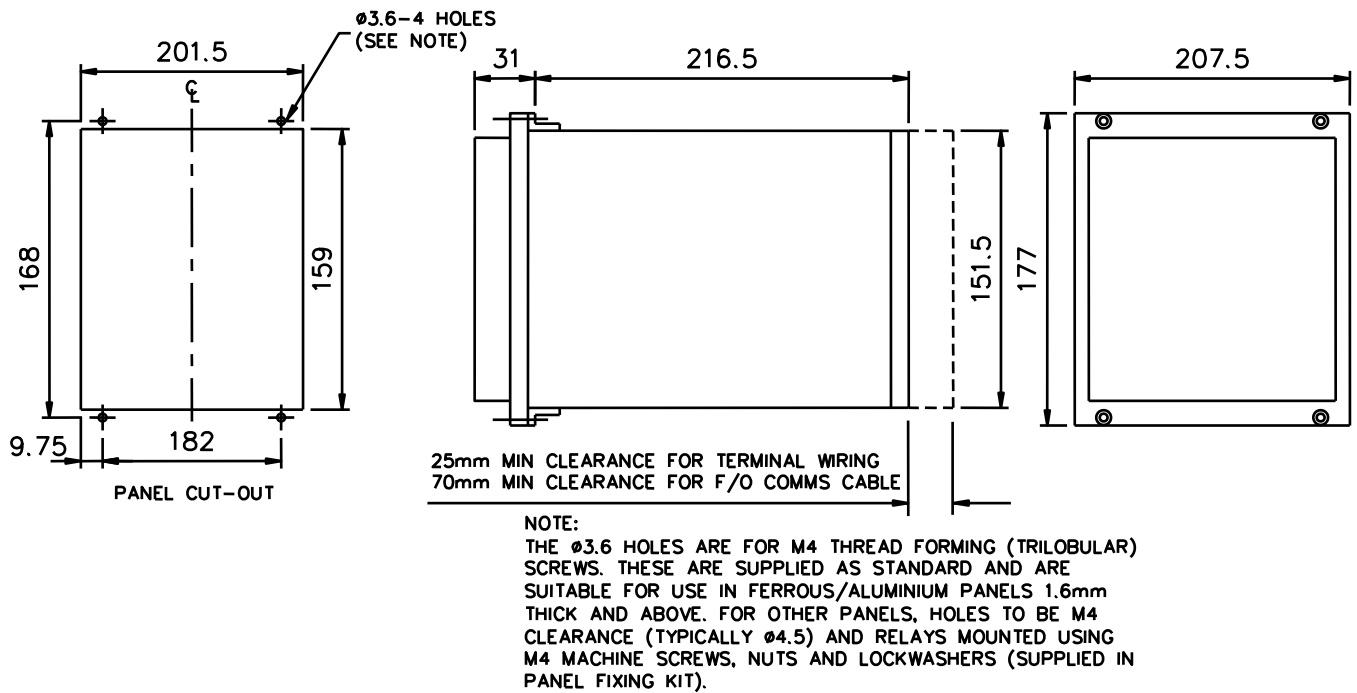


Fig 3. Overall Dimensions and panel drilling for Epsilon E8 case

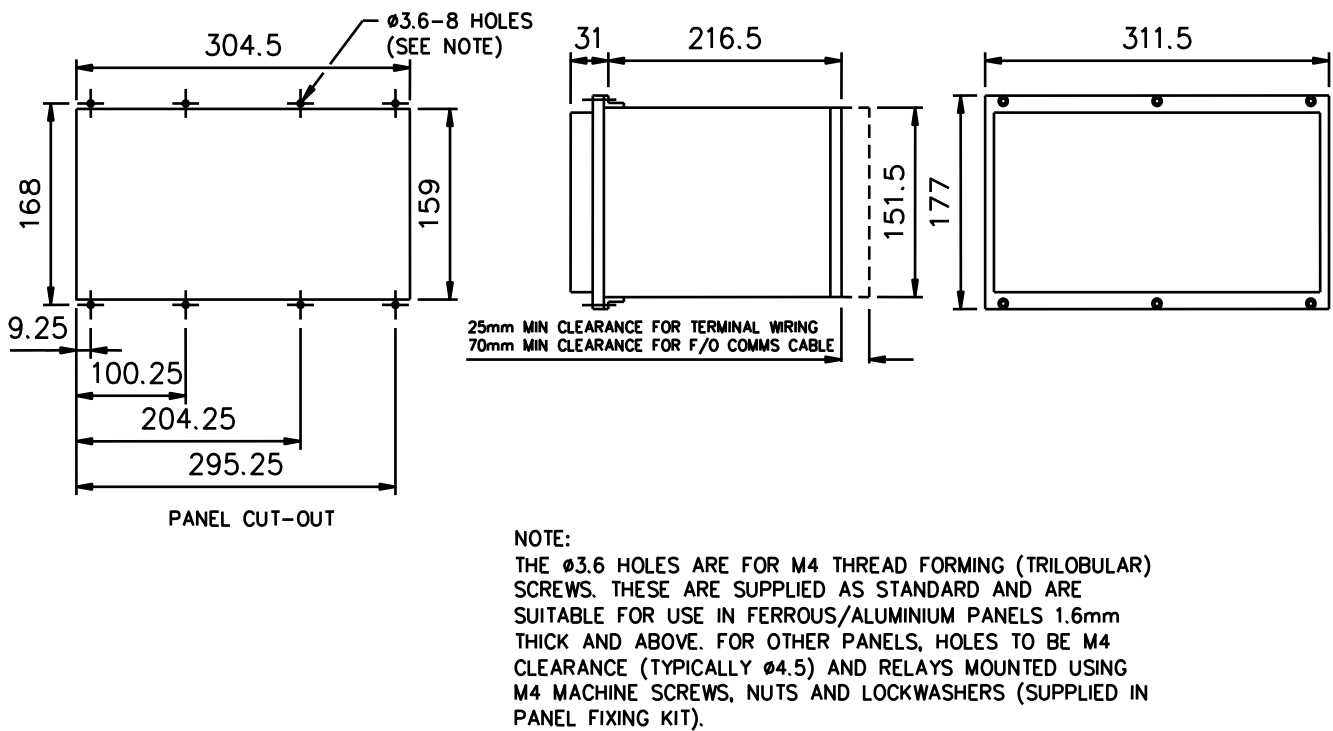


Fig 4. Overall Dimensions and panel drilling for Epsilon E12 case

Typical Connection Diagrams

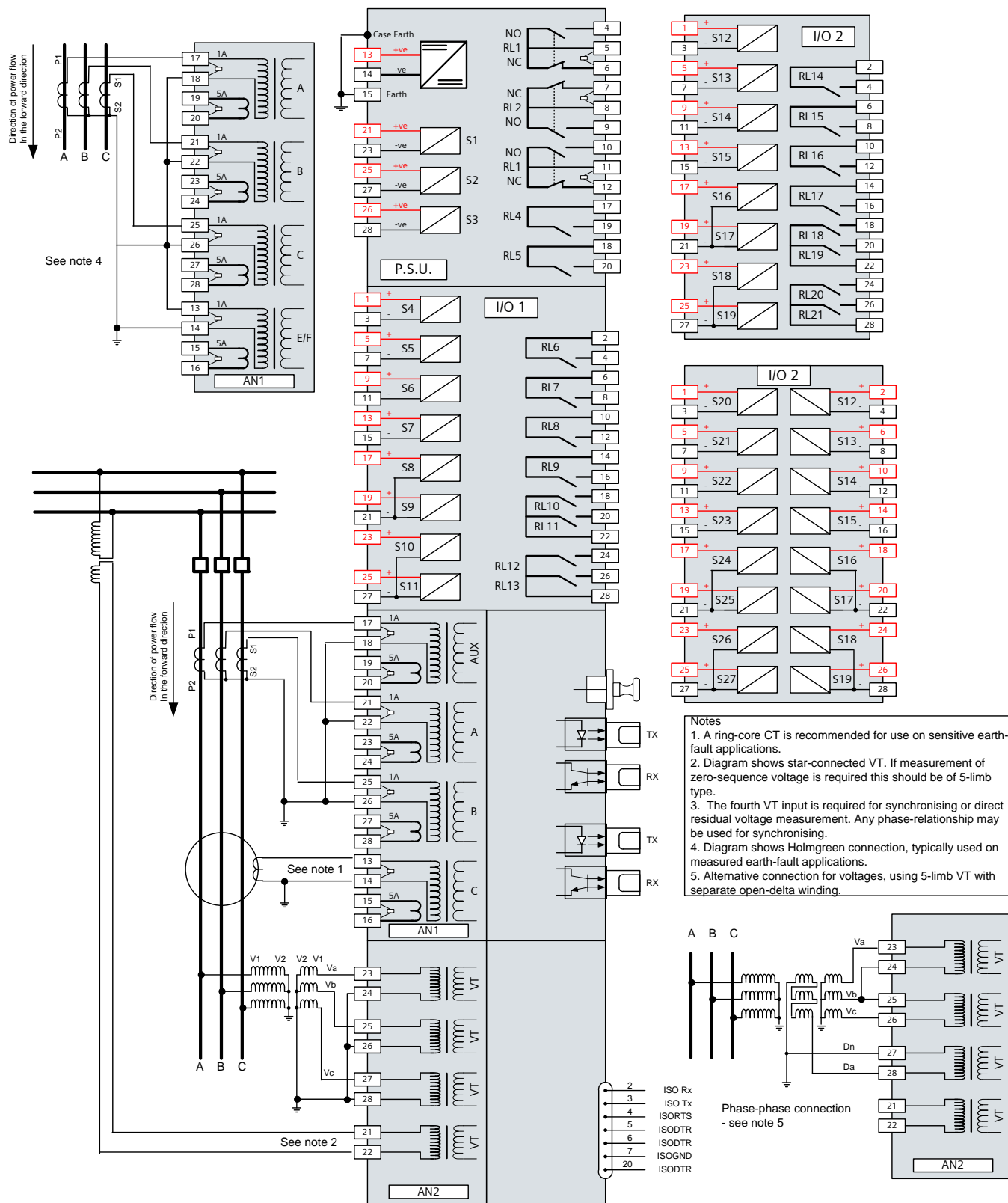


Fig 5. Typical Connection Diagrams

Ordering Information – 7SG13 Delta

Product description	Variants	Order No.
---------------------	----------	-----------

FM0-00X

Feeder manager relay providing a range of protective functions.

Relay type

FM0-0XX - Standard functionality

Feeder manager relay providing integrated protection, monitoring and measuring functions with standard 20 character x 2 line LCD and LED indication.

Measurements and instrumentation

- Current

Basic protection functionality - included in all models

- Phase fault overcurrent (50/51)
- Earth-fault overcurrent (residual calculation) (50N/51N)
- Earth-fault overcurrent (measured) (50G/51G)
- Thermal overload (49)
- NPS overcurrent DTL + IDMTL/INST (46IT + DT)
- Phase unbalance / broken conductor (46)
- Circuit breaker fail (50BF)

Supervision functions

- Trip circuit supervision (74TC)

Protection options

Option 05 – Standard functionality

Auxiliary supply /binary input voltage

- 30 V DC auxiliary, 30 V DC binary input
- 30 V DC auxiliary, 48 V DC binary input
- 48/110 V DC auxiliary, 30 V DC binary input
- 48/110 V DC auxiliary, 48 V DC binary input ¹⁾
- 48/110 V DC auxiliary, 110 V DC low burden binary input
- 220 V DC auxiliary, 110 V DC low burden binary input
- 220 V DC auxiliary, 220 V DC low burden binary input

I/O range

- 3 Binary Inputs / 5 Binary Outputs (incl. 3 changeover)
- 11 Binary Inputs / 13 Binary Outputs (incl. 3 changeover)
- 19 Binary Inputs / 21 Binary Outputs (incl. 3 changeover)
- 27 Binary Inputs / 29 Binary Outputs (incl. 3 changeover)
- 27 Binary Inputs / 13 Binary Outputs (incl. 3 changeover)

Frequency

50Hz

Nominal current

1/5 A

Voltage inputs

Not available

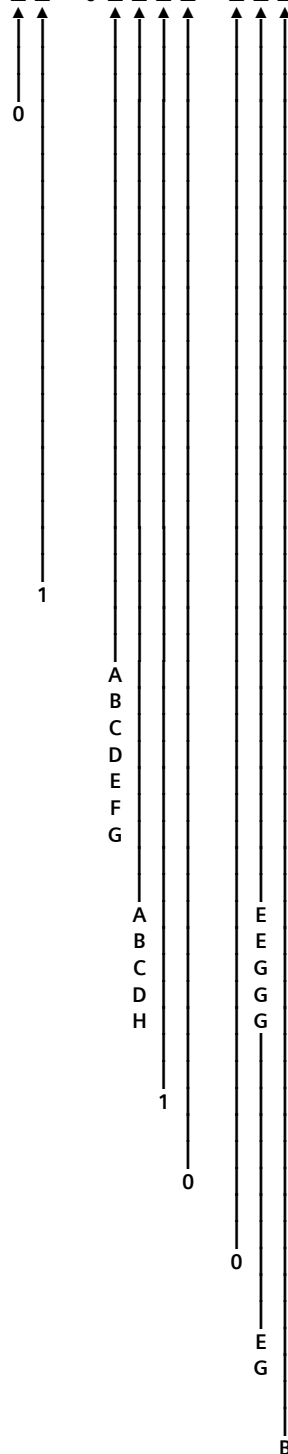
Housing size

- Case size E8 (4U high)
- Case size E12 (4U high)

Communication interface

Fibre optic (ST-connector) / IEC 60870-5-103 or Modbus RTU

7 S G 1 3 □ □ - 0 □ □ □ □ - □ □ □ 0



Ordering Information – 7SG13 Delta

Product description	Variants	Order No.
FM0-01X Feeder manager relay providing a range of protective functions.	<p><u>Relay type</u> FM0-OXX - Standard functionality Feeder manager relay providing integrated protection, monitoring and measuring functions with standard 20 character x 2 line LCD and LED indication.</p> <p><u>Measurements and instrumentation</u> - Current</p> <p><u>Basic protection functionality - included in all models</u> - Phase fault overcurrent (50/51) - Earth-fault overcurrent (residual calculation) (50N/51N) - Earth-fault overcurrent (measured) (50G/51G) - Thermal overload (49) - NPS overcurrent DTL + IDMTL/INST (46IT + DT) - Phase unbalance / broken conductor (46) - Circuit breaker fail (50BF)</p> <p><u>Supervision functions</u> - Trip circuit supervision (74TC) - CT supervision (74CT)</p> <p><u>Protection options</u> Option 11 - Standard functionality plus</p> <p><u>Measurements and instrumentation</u> - Voltage - Power - Energy</p> <p><u>Protection functionality</u> - Directional detection for phase-fault (67) - Directional detection for earth-fault (67N) - 3 phase under/overvoltage (27/59) - Under/Over frequency (81) - Neutral voltage displacement (59N) - NPS overvoltage (47) - Neutral overvoltage DTL + IDTML/INST (59NIT + NDT)</p> <p><u>Supervision functions</u> - VT supervision (74VT)</p> <p>Option 12 - Standard functionality plus</p> <p><u>Measurements and instrumentation</u> - Voltage - Power - Energy</p> <p><u>Protection functionality</u> - Directional detection for phase-fault (67) - Directional detection for earth-fault (67N) - 3 phase under/overvoltage (27/59) - Under/Over frequency (81) - Neutral voltage displacement (59N) - NPS overvoltage (47) - Neutral overvoltage DTL + IDTML/INST (59NIT + NDT)</p> <p><u>Control functions</u> - Autoreclose (79)</p> <p><u>Supervision functions</u> - VT supervision (74VT)</p>	<p>7 S G 1 3 □ □ - 0 □ □ □ □ - □ □ □ 0</p> <p>↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑</p> <p>0</p> <p>3</p> <p>4</p>

, continued on following page

Product description	Variants	Order No.
---------------------	----------	-----------

FM0-01X

(continued from previous page)

7 S G 1 3 □ □ - 0 □ □ □ - □ □ □ 0

Auxiliary supply /binary input voltage
 30 V DC auxiliary, 30 V DC binary input
 30 V DC auxiliary, 48 V DC binary input
 48/110 V DC auxiliary, 30 V DC binary input
 48/110 V DC auxiliary, 48 V DC binary input 1)
 48/110 V DC auxiliary, 110 V DC low burden binary input
 220 V DC auxiliary, 110 V DC low burden binary input
 220 V DC auxiliary, 220 V DC low burden binary input

I/O range
 11 Binary Inputs / 13 Binary Outputs (incl. 3 changeover)
 19 Binary Inputs / 21 Binary Outputs (incl. 3 changeover)
 27 Binary Inputs / 29 Binary outputs (incl. 3 changeover)
 27 Binary Inputs / 13 Binary Outputs (incl. 3 changeover)

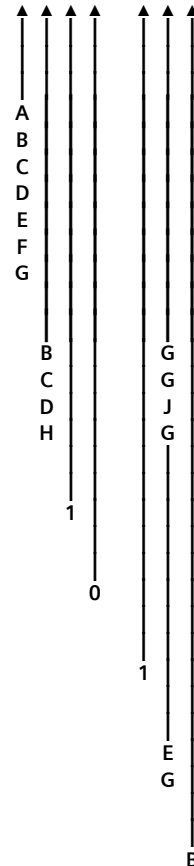
Frequency
 50Hz

Nominal current
 1/5 A

Voltage inputs
 63.5/110 V AC

Housing size
 Case size E8 (4U high)
 Case size E12 (4U high)

Communication interface
 Fibre optic (ST-connector) / IEC 60870-5-103 or Modbus RTU



1) High burden 110V & 220V binary inputs compliant with ES148-4 ESI 1 available via external dropper resistors with 48V binary input version
 110/125 V application, order combination of the following resistor boxes to suit number of binary inputs
 VCE:2512H10064 (9 inputs, 110V)
 VCE:2512H10065 (5 inputs, 110V)
 VCE:2512H10066 (1 inputs, 110V)
 220/250 V application, order resistor box VCE:2512H10066 in addition
 VCE:2512H10067 (5 inputs, 220V)
 VCE:2512H10068 (1 inputs, 220V)
 Refer to website for application note about ES148-4 compliance

Published by and copyright © 2010:
Siemens AG
Energy Sector
Freyeslebenstrasse 1
91058 Erlangen, Germany

Siemens Protection Devices Limited
P.O. Box 8
North Farm Road
Hebburn
Tyne & Wear
NE31 1TZ
United Kingdom
Phone: +44 (0)191 401 7901
Fax: +44 (0)191 401 5575
www.siemens.com/energy

For more information, please contact our
Customer Support Center.
Phone: +49 180/524 70 00
Fax: +49 180/524 24 71 (Charges depending on provider)
E-mail: support.energy@siemens.com

Power Distribution Division Order No. E53000-K7076-C8-1
Printed in Fürth

Printed on elementary chlorine-free bleached paper.

All rights reserved.

Trademarks mentioned in this document are the property of Siemens AG, its affiliates, or their respective owners.

Subject to change without prior notice.

The information in this document contains general descriptions of the technical options available, which may not apply in all cases. The required technical options should therefore be specified in the contract.