

7SG17 Rho 3

Multifunction Protection Relays

Document Release History

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Pre release

2010/02	Document reformat due to rebrand

Software Revision History

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1 INTRODUCTION

Rho 3 series of relays has been developed primarily to provide a multi function protection system for 3-phase a.c. induction motors, typically for those employed on high voltage systems with ratings in excess of 75kW. The principal protection functions are those related to thermal overload and this function, along with many of the others incorporated in Rho 3, are suitable for protecting other items of plant, eg cables, power transformers, etc. The relay incorporates comprehensive thermal characteristics to IEC60255-8 (thermal electrical relays). A series of Rho 3 variants is available specifically for plant other than motors. The only difference between Rho 3 supplied for non-motor applications and those for motor applications is that on the latter there are two additional LED's available on the relay fascia plate engraved "Motor Starting" and "Motor Running". These are not included on the Rho 3 relays supplied for nonmotor applications. All setting and programming features, also the input/output, relay configuration and the communication features are identical. Any features in the setting menu which is specific to motors need not be selected when a Rho 3 for non-motor application is employed for protecting other plant, eg cables, transformers, capacitor banks, etc. In the following, information is given about the application of Rho 3 for non-motor electrical plant. For all other data refer to the main Technical Manual.

2 NON-MOTOR APPLICATIONS

2.1 Negative phase

sequence/unbalanced current Other than generators and motors, electrical plant is usually tolerant of negative phase sequence current (ie resulting from 3-phase unbalanced currents). For these applications the negative phase sequence (n.p.s.) current weighting factor must be set to zero, the thermal protection then uses the average of the three RMS phase currents instead of an equivalent current compiled from positive phase sequence (p.p.s) and n.p.s. current x a weighting factor.

The unbalanced current function need not be selected, it is available should this feature be considered useful (eg phase difference or n.p.s overcurrent).

2.2 Single phase Vs three phase thermal overload

If it is known that the three phases can have significantly different loads and that the three phase conductors of the electrical plant being protected are independent, eg single phase cables as apposed to 3- phase cables, then it may be considered that the averaging feature of Rho 3's thermal overload function may not be adequate to protect all three phases against overload damage. In this case a separate Rho 3 relay is required for each phase. Each relay must be employed connecting all three phase current inputs in series thus employing three relays in total for the three phases of the primary circuit. Drawing Rho 3/D5 attached shows the recommended schematic diagram for single phase protection. The three relays each have an earth fault c.t. input as well as three phase overcurrent inputs. The recommended scheme shows all three earth fault elements connected in series.

If instantaneous, sensitive earth fault is required and the c.t. residual connection application shown is employed (eg for power transformer primary circuit earth fault) it may be necessary to employ a stabilising resistor to prevent mal-operation at circuit switch-on. Drawing Rho 3/D4 shows the schematic distance for three phase overload, employing only one relay.

3 DIAGRAMS FOR NON-MOTOR APPLICATIONS

Figure 1: Rho 3/D4 - Typical schematic diagram for Rho 3 three phase thermal overload protection (non-motor applications)

Figure 2: Rho 3/D5 - Typical schematic diagram for Rho 3 single phase thermal overload protection (non-motor applications)

Figure 1: Rho 3/D4 - Typical schematic diagram for Rho 3 three-phase thermal overload protection (non-motor applications)

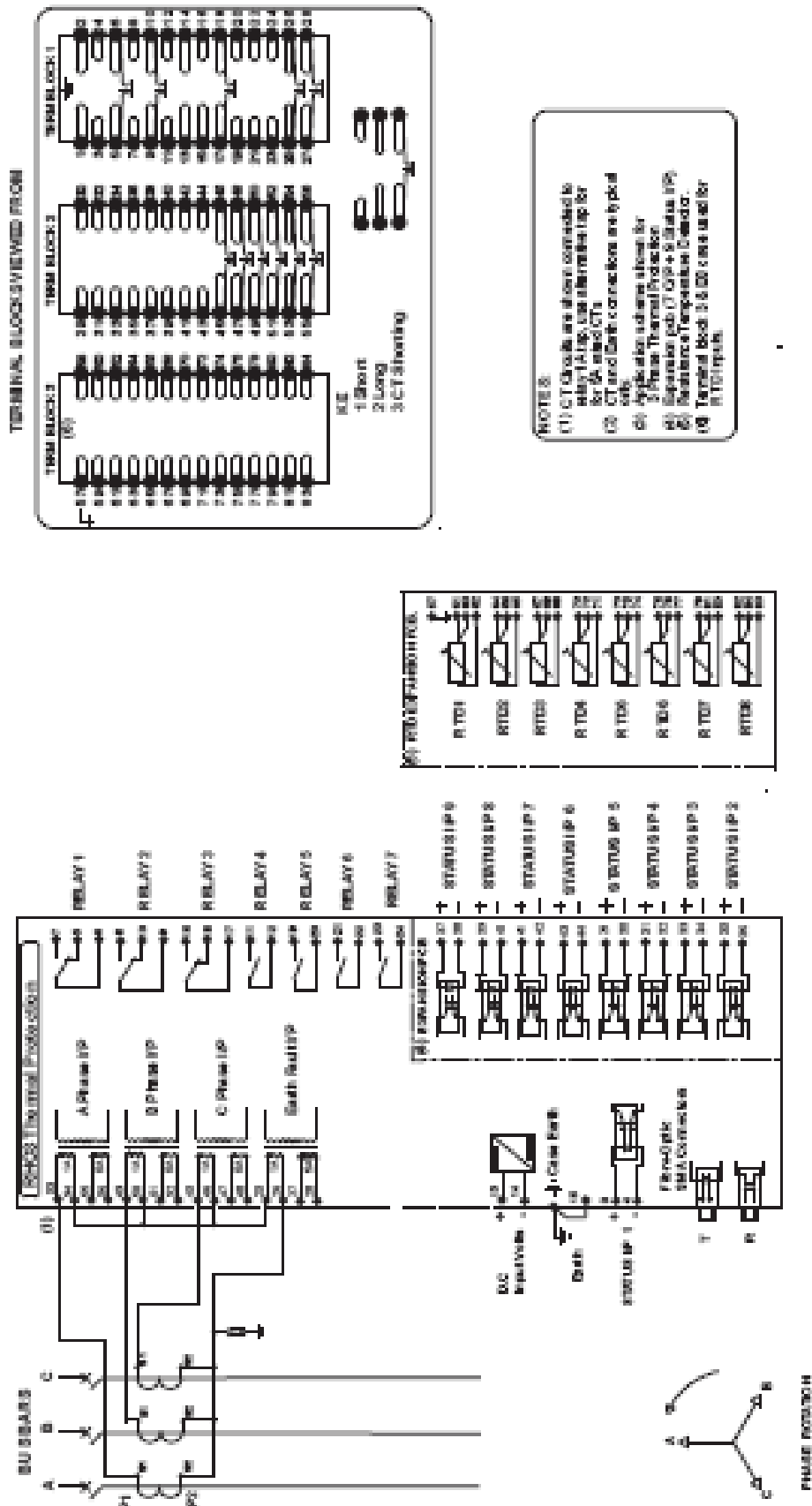
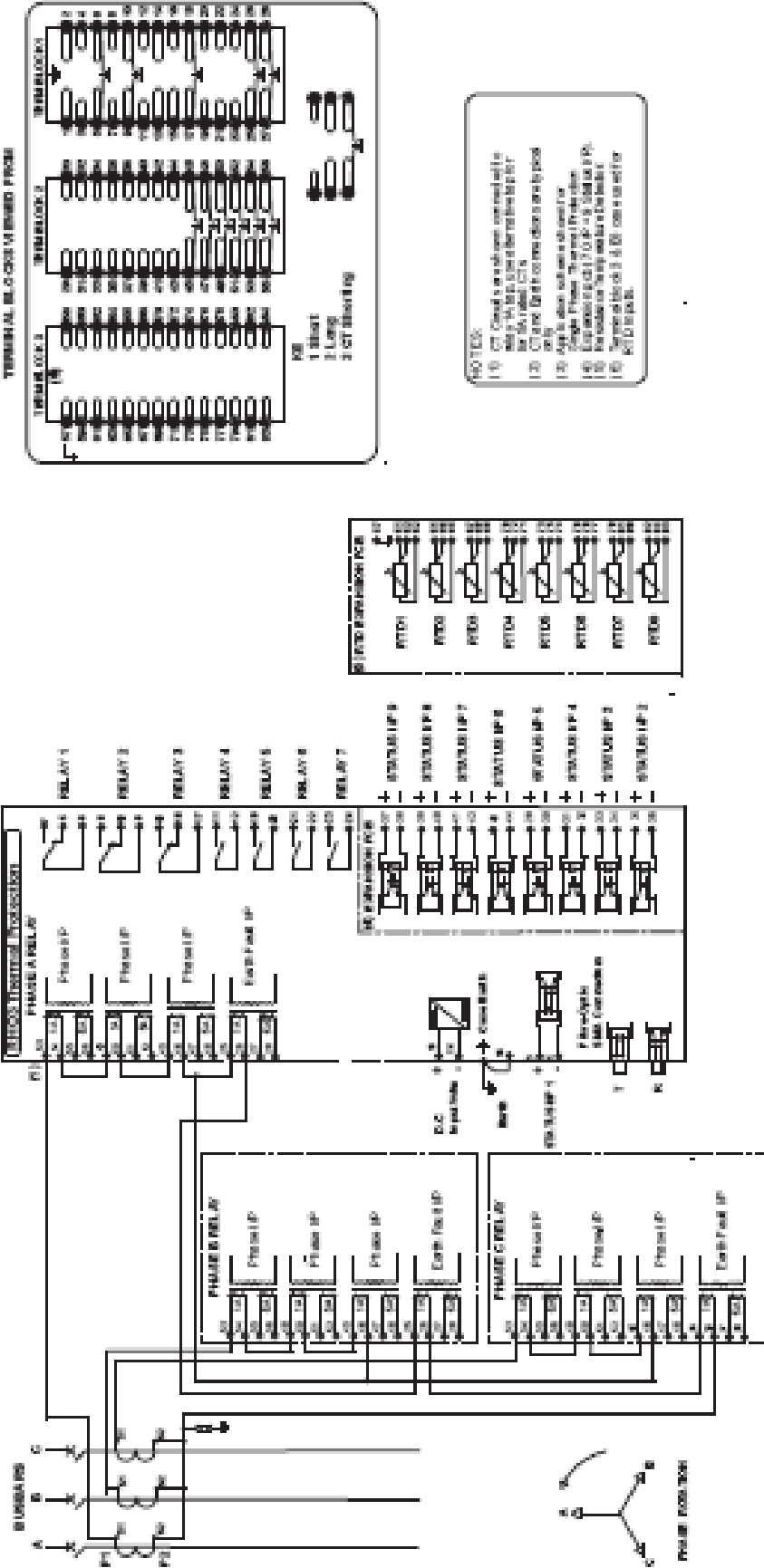
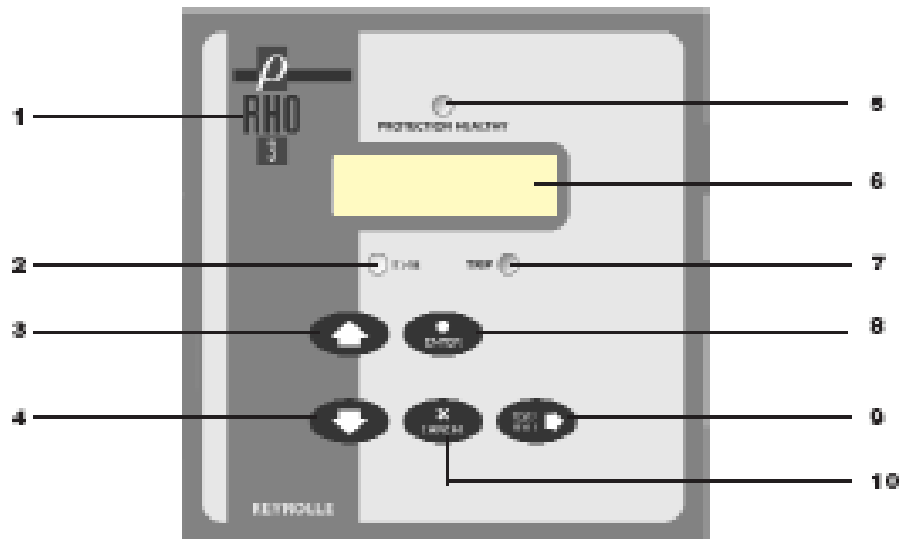


Figure 2: Rho 3/D5 - Typical schematic diagram for Rho 3 single phase thermal overload protection (non-motor applications)



4 INSTALLATION AND COMMISSIONING

Refer to section 7 of this technical manual for Rho 3 motor protection series.



- 1 Relay type
- 2 Yellow LED - protection starter pickup
- 3 Page-up key
- 4 Page-down key
- 5 Green LED protection healthy
- 6 LCD display (backlit)
- 7 Red LED - relay trip
- 8 Enter key
- 9 Test and reset key - also enables sub-menu access
- 10 Cancel key

(Figure 1 HMI for Rho 3 (Non-motor application)