The 7SR23 DAD provides comprehensive, configurable high impedance protections with enhanced functionality and performance. Relay functionality is accessed via a familiar user friendly interface. Housed in 4U high, size E6 or E8 cases, these relays provide protection, control, monitoring, instrumentation and metering with integrated input and output logic, data logging & fault reports. Communication access to relay functionality is via a front USB port for local PC connection or rear electrical RS485 port for remote connection. Additional rear port options are available.

### Function Overview

**Protection**

- 50G: Instantaneous/DTL Earth Fault
- 87REF: High Impedance REF
- 87/50: Phase Segregated Differential Protection

**Supervision**

- CT50: CT Supervision
- 74TCS: Trip Circuit Supervision

**Control**

- 86: Lockout

**Features**

- Password Protection – 2 levels
- User Programmable Logic Equations, via HMI
- Graphical Programmable Logic, via PC application
- Self Monitoring

### User Interface

- 20 character x 4 line backlit LCD
- Menu navigation keys
- 3 fixed function LEDs
- 8 or 16 Programmable Tri-colour LEDs (Option)

### Monitoring Functions

**Standard Monitoring Functionality**

- Primary differential current phases and earth
- Secondary differential current phases and earth
- Binary Input/Output status
- Trip circuit healthy/failure
- Time and date
- Starters
- Fault records
- Event records
- Waveform records

### Data Communications

**Standard Communications Ports**

Communication access to relay functionality is via a front USB port for local PC connection or rear electrical RS485 port for remote connection

**Optional Communications Ports**

- 2 rear ST fibre optic ports (2 x Tx/Rx) + IRIG-B port
- 1 rear RS485 + IRIG-B port
- 1 rear RS232 + IRIG-B port
- 2 rear electrical Ethernet RJ45 connectors
- 2 rear optical Ethernet duplex LC connectors

**Protocols**

- IEC60870-5-103, Modbus RTU, and DNP 3.0 protocols. User selectable with programmable data points.
- IEC61850 ethernet – optional.
- Ethernet Redundancy: RSTP, HSR & PRP - optional

**Data**

- Up to 5000 event records
- User configurable fault record duration
- Waveform records
- Measurands
- Commands
- Time synchronism
- Viewing and changing settings
Figure 2 illustrates the functionality available within the 7SR23. The relay can be configured to provide the following modes of operation:

- 3 Pole Diff + REF
- 3 Pole Diff + EF
- REF1 + REF2

### 87/50 Differential Protection - scheme
Two sets of differential protection are provided, 87/50-1 and 87/50-2.
Current inputs can be connected to provide overall phase segregated high impedance differential protection.
External series stabilising resistors and non-linear, voltage limiting, shunt resistors are required for each phase.
To facilitate ordering, installation and commissioning these external components can be provided in a separate optional ‘High Impedance Component Box’. See separate publication.
Output contacts of the relay are configured to trip the connected CBs and to short circuit the series stabilising resistors thereby ensuring that thermal ratings of the components are not exceeded.

### CT50 CT Supervision
The CT Supervision feature measures the unbalance current in the CT circuits. Any unbalance current may indicate an open circuit in the CT secondary connections.
The phase segregated elements have user selectable operate current and time delay settings. This allows the faulted phase(s) to be short circuited and/or alarmed.

### 50G Earth Fault
Earth current is directly measured current from an independent CT or the residual connection of the 3 line CTs (Holmgreen connection).
Elements have independent settings for pickup current, and time-delay.

### 87REF Restricted Earth Fault - scheme
Analogue inputs can be connected and configured to provide one or two high impedance restricted earth fault protections (87 REF).
Each 87REF protection requires an external series stabilising resistor and non-linear shunt resistor.

### In/Out Switching
When the protection is selected to ‘Switched Out’ the 87/50 functions are inhibited, trip contacts are disabled and contacts selected to the CT50 and ‘Switched Out’ functions are energized.

### 74TCS Trip Circuit Supervision
The trip circuits can be monitored via binary inputs connected in H4/H5/H6 or H7 schemes. Trip circuit failure raises an HMI alarm and output(s).

### Programmable User Logic
The user can map Binary Inputs and Protection operated outputs to Function Inhibits, Logic Inputs, LEDs and/or Binary Outputs.
The user can also enter up to 16 equations defining scheme logic using standard functions e.g. Timers, AND/OR gates, Inverters and Counters.
Each Protection element output can be used for Alarm/Indication and/or tripping.
In addition, the Reydisp Manager PC application provides graphical programming of user logic within the device.

### Function LED’s
Eight or sixteen user programmable tri-colour LED’s are provided eliminating the need for separate panel mounted indicators and associated wiring. Each LED can be user set to red, green or yellow allowing for indication of the associated function’s status. A slip-in pocket adjacent to the LEDs enables the user to insert customised labels. A printer compatible template is available.
3 phase high impedance differential protection is typically applied to busbars, connections, auto-transformers, reactors and motors. Restricted earth fault protection is typically applied to provide protection of transformer windings. See figure 6.

High impedance protection is recommended for all applications where faults must be cleared in the shortest possible time and where discrimination must be ensured. High impedance schemes can provide lower fault settings and better through fault stability than is possible with most other schemes.

The stability of the high impedance scheme is ensured because the applied operate voltage setting is greater than the maximum voltage that can appear across the relay circuit under through fault conditions. An external series stabilising resistor (RSTAB) is installed to provide a relay circuit operate voltage is above that required to guarantee stability. External non-linear resistors (Metrosils) are connected in parallel with the relay circuit to limit circuit over-voltages.

The relay current setting and the operating voltage of the relay/stabilising resistor combination is calculated taking into account:-

- Transient stability under through fault conditions as verified by calculation assuming worst case conditions.
- The required operate level for internal fault conditions.

The CT supervision function (CT50) provides monitoring of CT secondary wiring connections. CT supervision commonly supplements 3-phase differential protection as a fault in the CT secondary circuit wiring will cause unbalance current to flow during normal load conditions. Where the unbalance current is above the protection operate level this will cause unnecessary tripping of the protected zone. This is particularly relevant where current transformer wiring is switched as in some busbar protection arrangements. Detection of a CT secondary wiring fault is arranged to provide an alarm and/or inhibit the differential protection (87/50) after a time delay. The time delay is required such that the CT supervision function does not operate during internal fault conditions.
Determination of Stability

The stability of a current balance scheme using a high impedance relay circuit depends upon the relay voltage setting being greater than the maximum voltage which can appear across the relay during a through fault condition. This maximum voltage can be determined by means of a simple calculation which makes the following assumptions:

- One current transformer is fully saturated making its excitation impedance negligible.
- The resistance of the secondary winding of the saturated current transformer together with the leads connecting it to the relay circuit terminals constitute the only burden in parallel with the relay.
- The remaining current transformers maintain their ratio.

Thus the maximum voltage is given by:

\[
(1) \quad V = I_F \left( R_{CT} + R_L \right) \times T
\]

Where:
- \( V \) = Maximum voltage across relay circuit during through fault conditions.
- \( R_L \) = Resistance current transformer connection leads.
- \( R_{CT} \) = Current transformer secondary winding resistance
- \( I_F \) = Maximum steady state through fault current.
- \( T \) = Turns ratio of all current transformers (Primary turns / secondary turns)

For stability, the voltage setting of the relay \( V_s \) must be made equal to or exceed, the highest value of \( V \) calculated above.

Experience and extensive laboratory tests have proved that if this method of estimating the relay setting voltage is adopted, the stability of the protection will be very much greater than the value of \( I \) used in the calculation. This is because a current transformer is normally not continuously saturated and consequently any voltage generated by this current transformer will reduce the voltage appearing across the relay circuit.

Method of Establishing Relay Setting Current

Relay setting current is given by:

\[
(2) \quad I_s = P.O.C. - \left( \sum I_{\text{mag}} + I_{\text{NLR}} \right) / T
\]

Where:
- \( I_s \) = Relay setting current
- P.O.C. = Primary operate current (fault setting).
- \( I_{\text{mag}} \) = Current transformer magnetising currents at the value of \( V_s \).
- \( I_{\text{NLR}} \) = Current taken by the non-linear resistor/voltage limiting device at \( V_s \) (this value is usually small and often may be neglected).

Equation (2) should properly be the vector sum, however arithmetic addition is normally used.

Establishing the Value of Setting Resistors

Stabilising resistor value \( R_{\text{STAB}} \) is given by:

\[
(3) \quad R_{\text{STAB}} = \frac{V_s}{I_s}
\]

Where:
- \( V_s \) = Relay circuit operate voltage

Exact resistor values are not necessary, a higher standard resistance value may be chosen. A check is made to confirm that the finalized value of \( V_s \) provides stability and is compatible with the installed CTs ie:

\[
(4) \quad V < V_s < 0.5V \times \text{CT knee point voltage}
\]

The required watt-second rating of the resistor is established at setting and at the maximum fault rating – short time rating. The power dissipation of the resistors should be considered, they should be mounted vertically in a well ventilated location and clear of all other wiring and equipment.
Sequence of event records

Up to 5000 events are stored and time tagged to 1ms resolution.

Fault Records

The last 10 fault records are displayed on the relay fascia and are also available through the communication interface, with time and date of trip, measured quantities and type of fault.

Waveform recorder

The waveform recorder stores analogue data for all poles and the states of protection functions, binary inputs, LEDs and binary outputs with user settable pre & post trigger data. A record can be triggered from protection function, binary input or via data communications. 20 seconds of waveform storage is available. The waveform storage duration period is user configurable. Different storage periods can be selected for triggering from protection function, binary input or data comms.

Real Time Clock

The time and date can be set and are maintained while the relay is de-energised by a back up storage capacitor. The time can be synchronized from a binary input pulse, via the data communication channel(s) or from the optional IRIG-B port.
Reydisp Evolution is common to the entire range of Reyrolle numeric products. It provides a means for the user to apply settings, interrogate settings and also to retrieve events & disturbance waveforms from the relay.

Reydisp Evolution installation includes a Communications Editor to allow configuration of the serial protocol data points and a Language Editor to allow relay display text to be edited. This can be used to provide non-English language support using the European character set.

Reydisp Manager provides the functionality of Reydisp Evolution and also provides project management of multiple devices to allow engineering of IEC61850 projects. It also provides access to user logic within the devices via an easy to use graphical interface.
## Technical Data

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

## Inputs and Outputs

### Current Inputs

<table>
<thead>
<tr>
<th>Quantity</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Current IN</td>
<td>1/5A</td>
</tr>
<tr>
<td>Measuring Range</td>
<td>8 x ( \pm 10mA )</td>
</tr>
<tr>
<td>Instrumentation</td>
<td>( \pm 1% ) of IN or ( \pm 10mA )</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60Hz</td>
</tr>
<tr>
<td>Thermal Withstand: Continuous</td>
<td>4.0 x IN</td>
</tr>
<tr>
<td>Thermal Withstand: 1 Second</td>
<td>100A (1A) 350A (5A)</td>
</tr>
</tbody>
</table>
| Burden @ IN | \( \leq 0.1VA \) (1A input)  
\( \leq 0.3VA \) (5A input) |

### DC Auxiliary supply

- **Nominal voltage**: 30/48/110/220V dc
- **Operating Range V dc**: Range 24 to 290V dc
- **Allowable superimposed ac component**: 12% of DC voltage
- **Allowable breaks/dips in supply (collapse to zero)**: 50ms

### Auxiliary supply: Burdens

<table>
<thead>
<tr>
<th>Power Consumption</th>
<th>Quiescent (typical)</th>
<th>Quiescent (back-light on)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30V dc</td>
<td>7.5W</td>
<td>9.0W</td>
</tr>
<tr>
<td>48V dc</td>
<td>7.3W</td>
<td>8.8W</td>
</tr>
<tr>
<td>110V dc</td>
<td>6.8W</td>
<td>8.1W</td>
</tr>
<tr>
<td>220V dc</td>
<td>6.4W</td>
<td>7.7W</td>
</tr>
</tbody>
</table>

Typical for relay size E8.

When supplied with additional Ethernet communication interface the above burdens are increased by 2.5W.

### Binary Inputs

- **Operating Voltage**: 19V dc: Range 17 to 290V dc  
88V: Range 74 to 290V dc
- **Maximum dc current for operation**: 1.5mA

### Binary Outputs

<table>
<thead>
<tr>
<th>Operating Voltage</th>
<th>Voltage Free</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Mode</td>
<td>User selectable - Self or Hand Reset</td>
</tr>
<tr>
<td>Contact Operate / Release Time,</td>
<td>7ms / 3ms</td>
</tr>
</tbody>
</table>
| Making Capacity: Carry continuously | 5A ac or dc  
Make and carry (\( \leq 40 \text{~ms and } V \leq 300 \text{~V} \)) | 20A ac or dc for 0.5s  
30A ac or dc for 0.2s |
| Breaking Capacity (\( \leq 5 \text{~A and } \leq 300 \text{~V} \)): AC Resistive | 1250VA  
250VA at p.f. \( \leq 0.4 \)  
75W  
30W at LR \( \leq 40 \text{~ms} \)  
50W at LR \( \leq 10 \text{~ms} \) |
| AC Inductive | DC Resistive  
DC Inductive |

### Mechanical Tests

#### Vibration (Sinusoidal)

**IEC 60255-21-1 Class I**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibration response</td>
<td>0.5gn</td>
<td>( \leq 5 % )</td>
</tr>
<tr>
<td>Vibration endurance</td>
<td>1.0gn</td>
<td>( \leq 5 % )</td>
</tr>
</tbody>
</table>

#### Shock and Bump

**IEC 60255-21-2 Class I**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock response</td>
<td>5gn, 11ms</td>
<td>( \leq 5 % )</td>
</tr>
<tr>
<td>Shock withstand</td>
<td>15gn, 11ms</td>
<td>( \leq 5 % )</td>
</tr>
<tr>
<td>Bump test</td>
<td>10gn, 16ms</td>
<td>( \leq 5 % )</td>
</tr>
</tbody>
</table>

#### Seismic

**IEC 60255-21-3 Class I**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seismic response</td>
<td>1gn</td>
<td>( \leq 5 % )</td>
</tr>
</tbody>
</table>

#### Mechanical Classification

**Durability**: \( >10^6 \text{ operations} \)
## Electrical Tests

### Insulation

**IEC 60255-5**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between any terminal and earth</td>
<td>2.0kV AC RMS for 1min</td>
<td></td>
</tr>
<tr>
<td>Between independent circuits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Across normally open contacts</td>
<td>1.0kV AC RMS for 1min</td>
<td></td>
</tr>
</tbody>
</table>

### High Frequency Disturbance

**IEC 60255-22-1 Class III**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case, Aux Power &amp; I/O. Common mode</td>
<td>2.5kV</td>
<td>≤ 10%</td>
</tr>
<tr>
<td>Case, Aux Power &amp; I/O. Transverse mode</td>
<td>1.0kV</td>
<td>≤ 10%</td>
</tr>
<tr>
<td>RS485 Comms</td>
<td>1.0kV</td>
<td>No data loss</td>
</tr>
</tbody>
</table>

### Electrostatic Discharge

**IEC 60255-22-2 Class IV**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact discharge</td>
<td>8.0kV</td>
<td>≤ 5%</td>
</tr>
</tbody>
</table>

### Electrical Fast Transient / Burst Immunity

**IEC 60255-22-4 Class A (2002)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case, Aux Power &amp; I/O</td>
<td>4.0kV</td>
<td>≤ 10%</td>
</tr>
<tr>
<td>RS485 Comms</td>
<td>2.0kV</td>
<td>No data loss</td>
</tr>
</tbody>
</table>

### Surge Immunity

**IEC 60255-22-5**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog Inputs. Line to Earth</td>
<td>4.0kV</td>
<td></td>
</tr>
<tr>
<td>Case, Aux Power &amp; I/O. Line to Earth</td>
<td>2.0kV</td>
<td>≤ 10%</td>
</tr>
<tr>
<td>Analog Inputs. Line to Line</td>
<td>1.0kV</td>
<td></td>
</tr>
<tr>
<td>Case, Aux Power &amp; I/O. Line to Line</td>
<td>1.0kV*</td>
<td></td>
</tr>
<tr>
<td>RS485 Comms port. Line to Earth</td>
<td>1.0kV</td>
<td>No data loss</td>
</tr>
</tbody>
</table>

*Note 45ms pick up delay applied to binary inputs*

### Conducted Radio Frequency Interference

**IEC 60255-22-6**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.15 to 80MHz</td>
<td>10V</td>
<td>≤ 5%</td>
</tr>
</tbody>
</table>

### Radiated Radio Frequency

**IEC 60255-25**

<table>
<thead>
<tr>
<th>Type</th>
<th>Limits at 10m, Quasi-peak</th>
<th>Quasi-peak</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 to 230MHz</td>
<td>40dB(µV/m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>230 to 10000MHz</td>
<td>47dB(µV/m)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Conducted Radio Frequency

**IEC 60255-25**

<table>
<thead>
<tr>
<th>Type</th>
<th>Limits</th>
<th>Quasi-peak</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>80MHz to 1000MHz</td>
<td>10V/m</td>
<td></td>
<td>≤ 5%</td>
</tr>
</tbody>
</table>

### Radiated Immunity

**IEC 60255-22-3 Class III**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>80MHz to 1000MHz</td>
<td>10V/m</td>
<td>≤ 5%</td>
</tr>
</tbody>
</table>

### Magnetic Field with Power Frequency

**IEC 61000-4-8, Class V**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100A/m (0.126mT) continuous</td>
<td>50Hz</td>
<td></td>
</tr>
<tr>
<td>1000A/m (1.26mT) for 3s</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Environmental Tests

#### Temperature

**IEC 60068-2-1/2**

- Operating Range: -10°C to +55°C
- Storage range: -25°C to +70°C

#### Humidity

**IEC 60068-2-78**

- Operational test: 56 days at 40°C and 95% relative humidity

#### IP Ratings

**IEC 60529**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed with cover</td>
<td>IP 51 from front of relay</td>
</tr>
<tr>
<td>Installed with cover removed</td>
<td>IP 20 from front of relay</td>
</tr>
</tbody>
</table>
### Performance

#### 87/50 Differential Protection

<table>
<thead>
<tr>
<th>Setting Range</th>
<th>0.01...2.00 $x_l n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operate Level</td>
<td>100% $I_s$, ±5% or ±1% $x_l n$</td>
</tr>
<tr>
<td>Time Delay</td>
<td>0.00... 60s</td>
</tr>
</tbody>
</table>
| Basic Operate Time| 2 $x I_s$: 22ms ±5ms, 50Hz  
|                   | 2 $x I_s$: 20ms ±5ms, 60Hz  
|                   | 3 $x I_s$: 1 cycle ±5ms  
|                   | 5 $x I_s$: < 1 cycle |
| Reset Time        | < 50ms |
| Harmonic Rejection| 40:1 minimum (2nd to 15th harmonic) |
| Inhibited by      | CT50, Binary or Virtual Input |

#### CT50 CT Supervision

<table>
<thead>
<tr>
<th>Setting Range</th>
<th>0.005...2.00 $x_l n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operate Level</td>
<td>100% $I_s$, ±5% or ±1% $x_l n$</td>
</tr>
<tr>
<td>Time Delay</td>
<td>0.00... 60s</td>
</tr>
</tbody>
</table>
| Basic Operate Time| 2 $x I_s$: 22ms ±5ms, 50Hz  
|                   | 2 $x I_s$: 20ms ±5ms, 60Hz  
|                   | 3 $x I_s$: 1 cycle ±5ms  
|                   | 5 $x I_s$: < 1 cycle |
| Inhibited by      | Binary or Virtual Input |

#### 87REF Restricted Earth Fault

<table>
<thead>
<tr>
<th>Setting Range</th>
<th>0.01...2.00 $x_l n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operate Level</td>
<td>100% $I_s$, ±5% or ±1% $x_l n$</td>
</tr>
<tr>
<td>Time Delay</td>
<td>0.00... 60s</td>
</tr>
</tbody>
</table>
| Basic Operate Time| 2 $x I_s$: 22ms ±5ms, 50Hz  
|                   | 2 $x I_s$: 20ms ±5ms, 60Hz  
|                   | 3 $x I_s$: 1 cycle ±5ms  
|                   | 5 $x I_s$: < 1 cycle |
| Reset Time        | < 50ms |
| Harmonic Rejection| 40:1 minimum (2nd to 15th harmonic) |
| Inhibited by      | Binary or Virtual Input |

#### 50G Instantaneous & DTL Measured EF

<table>
<thead>
<tr>
<th>Elements</th>
<th>Measured Earth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Elements</td>
<td>2</td>
</tr>
<tr>
<td>Setting Range Is:</td>
<td>- $x_l n$</td>
</tr>
<tr>
<td>Measured E/F ‘G’</td>
<td>0.01...2 $x_l n$</td>
</tr>
<tr>
<td>Time Delay</td>
<td>0.00...60s</td>
</tr>
<tr>
<td>Operate Level</td>
<td>100% $I_s$, ±5% or ±1% $x_l n$</td>
</tr>
</tbody>
</table>
| Operate time      | 2 $x I_s$: 22ms ±5ms, 50Hz  
|                   | 2 $x I_s$: 20ms ±5ms, 60Hz  
|                   | 3 $x I_s$: 1 cycle ±5ms  
|                   | 5 $x I_s$: < 1 cycle |
| Operate time following delay | $t_{basic} + t_d$, ±1% or ±10ms |
| Inhibited by      | Binary or Virtual Input |
Case Dimensions

Fig 4. Case overall dimensions and panel drilling details (All dimensions in mm)

NOTES:

1) THE 3.6 HOLES ARE FOR M4 THREAD FORMING (TRILOBULAR) SCREWS. THESE ARE SUPPLIED AS STANDARD AND ARE SUITABLE FOR USE IN FERROUS / ALUMINIUM PANELS 1.6mm THICK AND ABOVE. FOR OTHER PANELS, HOLES TO BE M4 CLEARANCE (TYPICALLY 4.5 DIAMETER) AND RELAYS MOUNTED USING M4 MACHINE SCREWS, NUTS AND LOCKWASHERS (SUPPLIED IN PANEL FIXING KIT).

2) ACCESS CLEARANCE REQUIRED FOR OPTIONAL ETHERNET COMMS MODULE RETAINING SCREW
Fig 6. Typical Applications for the 7SR23 DAD
Ordering Information – 7SR23 DAD High Impedance Relay

DAD

High Impedance Protection

 Protection Product
 Circulating Current

Case I/O and Fascia
1) 4 CT, 9 BI, 8 BO, 8 LEDs E6 Case 2
4 CT, 19 BI, 16 BO, 16 LEDs E8 Case 3

Measuring Input
1/5 A, 50/60Hz

Auxiliary voltage
30 to 220V DC, binary input threshold 19V DC
30 to 220V DC, binary input threshold 88V DC

Communication Interface
Standard version – included in all models, USB front port, RS485 rear port
Standard version – plus additional rear F/O ST connectors (x2) and IRIG-B
Standard version – plus additional rear RS485 and IRIG-B
Standard version – plus additional rear RS232 and IRIG-B
Standard version – plus additional rear Electrical Ethernet RJ45 (x2)
Standard version – plus additional rear Optical Ethernet Duplex LC (x2)

Protocol
IEC 60870-5-103, Modbus RTU and DNP3.0 (user selectable setting)
IEC 60870-5-103, Modbus RTU and DNP 3.0 (user selectable) and IEC 61850

Protection Function Packages
50G Measured Earth Fault Protection
87/50 Phase Segregated High Impedance Differential Protection
87REF High Impedance Restricted Earth Fault Protection
CT50 CT Supervision
74TCS Programmable logic

1) BI = Binary Input, BO = Binary Output,
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