

ELECTRONIC MOTOR PROTECTION RELAYS



BHARTIA CUTLER-HAMMER

BHARTIA INDUSTRIES LIMITED
we care for you



ELECTRONIC MOTOR PROTECTION RELAYS

Electronic Multifunctional Motor Protection Relays are designed to monitor two/three phase motor currents by integral/external current transformers and processing it further through a Electronic Circuitry and delivering its control signal to the output part to interrupt power incase of abnormal conditions of motor.

SALIENT FEATURES

- Multifunctional Protections in Single Unit
- Adjustable Current Setting and Tripping time
- Low Power Consumption
- High Accuracy
- Ammeter Function through LED/Digital display
- Trip Indication through LED/Digital display
- DIN Rail/Panel Mounting
- Test Function
- Ambient Insensitive
- Selectable Definite/Inverse Time Current Characteristics
- Application over 60Amp can be implemented with external CTs

It can provide various protections for motors like Overload, Phase Loss, Locked Rotor, Phase Unbalance, Undercurrent, Phase Reversal, ground Fault etc.

The Over Current Relays are available from 0.5 to 60 Amp., extendable up to 960 Amp. using external CTs.

Applications include Pumps, HVAC, Conveyor System, Machinery and other single or three Phase equipment.

Model: BOCR SS

- Over Current
- Phase Loss
- Locked Rotor



| | | |
|---------------------------------|--------------|----------------------|
| Current Setting | Type | Range |
| | 05 | 0.5 ~ 6A |
| | 30 | 3.0 ~ 30A |
| | 60 | 5.0 ~ 60A |
| Time Setting | Over 60 | Ext. CT Option |
| | Start D-Time | 0.2 ~ 30 sec |
| Control Voltage (50/60 Hz) | Trip O-Time | 0.2 ~ 10 sec |
| | 220 V AC | 90 ~ 260V AC |
| Output Relay | 440 V AC | 320 ~ 480V AC |
| | Mode | Changeover (1SPDT) |
| Time-Current Characteristics | Rating | 3A/250V AC Resistive |
| | | Definite |
| Trip Indication | | LED |
| 2 Integral Current Transformers | | |

Model: BOCR SP1

- Over Current
- Phase Loss
- Locked Rotor



| | | |
|---------------------------------|--------------|----------------------|
| Current Setting | Type | Range |
| | 01 | 0.3 ~ 2A |
| | 10 | 1.0 ~ 12A |
| Time Setting | 20 | 5.0 ~ 25A |
| | Start D-Time | 10 sec (Fixed) |
| Control Voltage | Trip O-Time | 1 ~ 10 sec |
| | 110 V AC | 85 ~ 150V AC |
| Output Relay | 220 V AC | 180 ~ 260V AC |
| | Mode | 2 - SPST |
| Time-Current Characteristics | Rating | 3A/250V AC Resistive |
| | | Inverse |
| Trip Indication | | LED |
| 2 Integral Current Transformers | | |

Model: BOCR DS

- Over Current
- Phase Loss
- Locked Rotor



| | Type | Range |
|---------------------------------|------------------|----------------------|
| Current Setting | 05 | 0.5 ~ 6A |
| | 30 | 3.0 ~ 30A |
| | 60 | 5.0 ~ 60A |
| | 100 ~ (Over 60A) | Ext. CT Option |
| Time Setting | Start D-Time | 0.2 ~ 30 sec |
| | Trip O-Time | 0.2 ~ 10 sec |
| Control Voltage | 220 V AC | 90 ~ 260V AC |
| | 440 V AC | 320 ~ 480V AC |
| Output Relay | Mode | 2 - SPST |
| | Rating | 3A/250V AC Resistive |
| Time-Current Characteristics | Definite | |
| Trip Indication | LED | |
| 3 Integral Current Transformers | | |

Model: BOCR DS1

- Over Current
- Phase Loss
- Locked Rotor



| | Type | Range |
|---------------------------------|------------------|----------------------|
| Current Setting | 05 | 0.5 ~ 6A |
| | 30 | 3.0 ~ 30A |
| | 60 | - |
| | 100 ~ (Over 60A) | Ext. CT Option |
| Time Setting | Start D-Time | 0 ~ 50 sec |
| | Trip O-Time | 1.0 ~ 10 sec |
| Control Voltage | 110 V AC | 85 ~ 150V AC |
| | 220 V AC | 180 ~ 260V AC |
| Output Relay | Mode | 2 - SPST |
| | Rating | 3A/250V AC Resistive |
| Time-Current Characteristics | Inverse | |
| Trip Indication | LED | |
| 3 Integral Current Transformers | | |

Model: BOCR DS2

- Over Current
- Phase Loss
- Locked Rotor



| | Type | Range |
|---------------------------------|--------------|----------------------|
| Current Setting | 05 | 0.5 ~ 6A |
| | 30 | 3.0 ~ 30A |
| | 60 | 5.0 ~ 60A |
| | Over 60 | Ext. CT Option |
| Time Setting | Start D-Time | 1 ~ 50 sec |
| | Trip O-Time | 0.2 ~ 10 sec |
| Control Voltage (50/60 Hz) | 110 V AC | 85 ~ 150V AC |
| | 220 V AC | 180 ~ 260V AC |
| Output Relay | Mode | 2 - SPST |
| | Rating | 3A/250V AC Resistive |
| Time-Current Characteristics | Definite | |
| Trip Indication | LED | |
| 3 Integral Current Transformers | | |

Model: BOCR DS3

- Over Current
- Phase Loss
- Locked Rotor
- Phase Reversal



| | Type | Range |
|---------------------------------|--------------|----------------------|
| Current Setting | 05 | 0.5 ~ 6A |
| | 30 | 3.0 ~ 30A |
| | 60 | 5.0 ~ 60A |
| | Over 60 | Ext. CT Option |
| Time Setting | Start D-Time | 1 ~ 50 sec |
| | Trip O-Time | 0.2 ~ 10 sec |
| Control Voltage (50/60 Hz) | 110 V AC | 85 ~ 150V AC |
| | 220 V AC | 180 ~ 260V AC |
| Output Relay | Mode | 2 - SPST |
| | Rating | 3A/250V AC Resistive |
| Time-Current Characteristics | Definite | |
| Trip Indication | LED | |
| 3 Integral Current Transformers | | |

Model: BOCR SSD

- Over Current
- Phase Loss
- Locked Rotor



| | | |
|---------------------------------|------------------------------------|----------------------|
| Current Setting | Type | Range |
| | 01 | 0.5 ~ 6A |
| | 10 | 3.0 ~ 30A |
| Time Setting | 20 | 10 ~ 60A |
| | Start D-Time | 1 ~ 30 sec |
| Control Voltage | Trip O-Time | 0.5, 1 ~ 10 sec |
| | 110 V AC | 94 ~ 126V AC |
| Output Relay | 220 V AC | 187 ~ 253V AC |
| | Mode | 2 - SPST |
| Time-Current Characteristics | Rating | 3A/250V AC Resistive |
| | Definite | |
| Trip Indication | Digital Display | |
| Load Selection | Single / Three Phase by DIP switch | |
| 2 Integral Current Transformers | | |



Model: BOCR 3DE

- Over Current
- Under Current
- Phase Loss
- Phase Unbalance
- Phase Reversal
- Locked Rotor

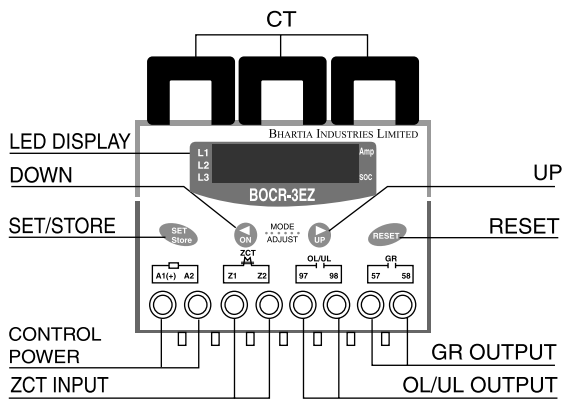


| | | | |
|---|---------------------------------------|---|--------------|
| Current Range | Over Current | 0.5 ~ 960A (Over 60A with External CTs) | |
| | Under Current | 0.5 ~ 59A/OFF (Over 60A with External CTs) 0.5 ~ 30 sec | |
| | Phase Unbalance | 5.0 ~ 50% (within 8 sec) | |
| | Phase Reversal | 0.1 ~ 30 sec | |
| | Phase Loss | within 3 sec | |
| | Locked Rotor | Lock: within 0.5 sec after D-time (in DEF set) Stall: 0.05 ~ 10 sec (in DEF set) | |
| Alert Setting | | 50 ~ 100% of OC setting | |
| Time Setting Range (O-Time) | Start Delay Time (D-Time) | 1 ~ 200 sec (Definite) | |
| | Trip Delay Time Setting Time (D-Time) | INV | 1 ~ 30 sec |
| | | DEF | 0.2 ~ 30 sec |
| Control Voltage | | 110V AC±15%, 220V AC±15%, 24V AC/DC | |
| Output Relay | OL/UL | 2 - SPST, 3A/250V AC Resistive | |
| | GR | 1 - SPST, 3A/250V AC Resistive | |
| Time Characteristics (selectable) | In/"tc"mode | Inverse | |
| | dE/"tc"mode | Definite | |
| Digital Ammeter | | | |
| Troubleshooting, Trip cause Memory, Display | | | |



Model: BOCR 3EZ

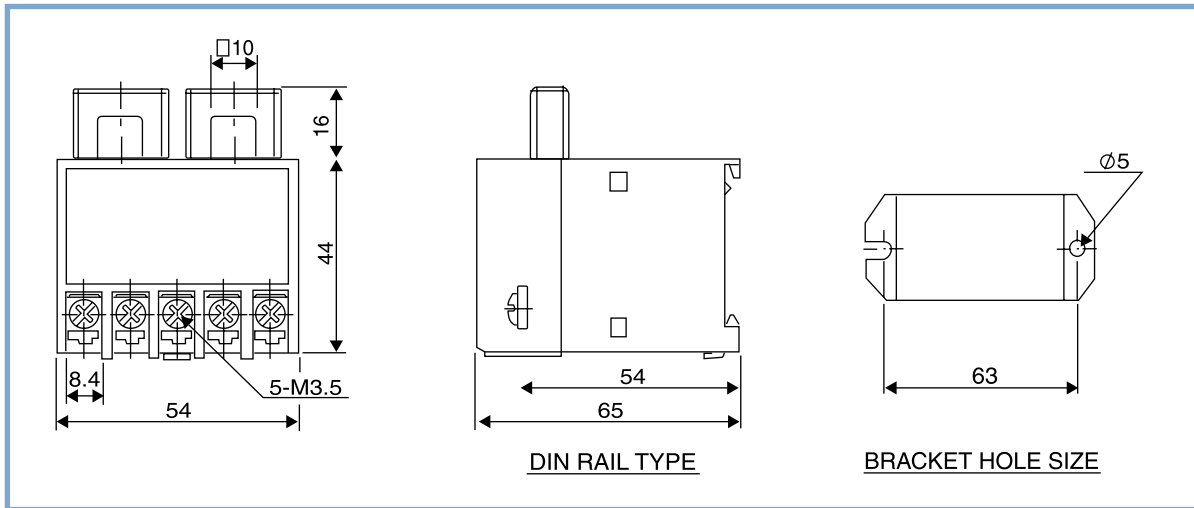
- Over Current
- Under Current
- Phase Loss
- Phase Unbalance
- Phase Reversal
- Locked Rotor
- Ground Fault



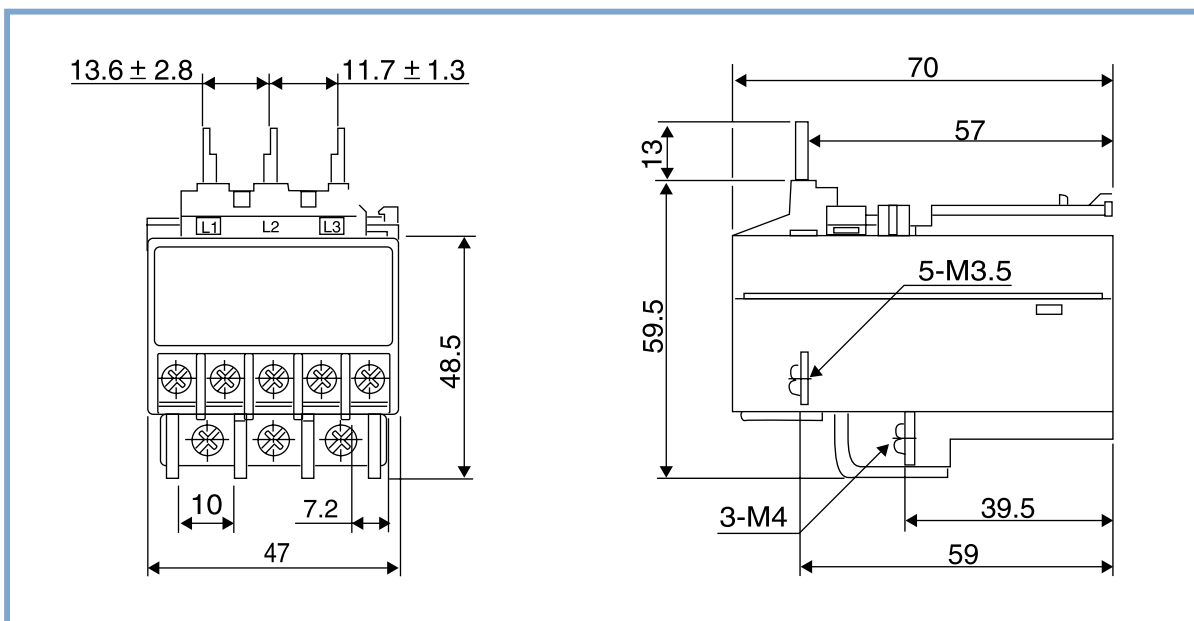
| | | | |
|---|---------------------|---|--------------|
| Current Range | Over Current | 0.5 ~ 960A (Over 60A with External CTs) | |
| | Under Current | 0.5 ~ 59A/OFF (Over 60A with External CTs) 0.5 ~ 30 sec | |
| | Phase Unbalance | 5.0 ~ 50% (within 8 sec) | |
| | Phase Reversal | 0.1 ~ 30 sec | |
| | Phase Loss | within 3 sec | |
| | Locked Rotor | Lock: within 0.5 sec after D-time (in DEF set) Stall: 0.05 ~ 10 sec (in DEF set) | |
| | Ground Fault | 0.02 ~ 3A | |
| Start Delay Time (D-Time) | | 1 ~ 200 sec | |
| Time Setting Range (O-Time) | Trip Delay (O-Time) | INV | 1 ~ 30 sec |
| | | DEF | 0.2 ~ 30 sec |
| Control Voltage | | 110V AC±15%, 220V AC±15%, 85 ~ 250V AC/Dc (Terminal Type) 24V AC/DC | |
| Output Relay | OL/UL | 1 - SPST, 3A/250V AC Resistive | |
| | GR | 1 - SPST, 3A/250V AC Resistive | |
| Time Characteristics (selectable) | In/"tc"mode | Inverse | |
| | dE/"tc"mode | Definite | |
| Digital Ammeter | | | |
| Troubleshooting, Trip cause Memory, Display | | | |



Dimension (mm)

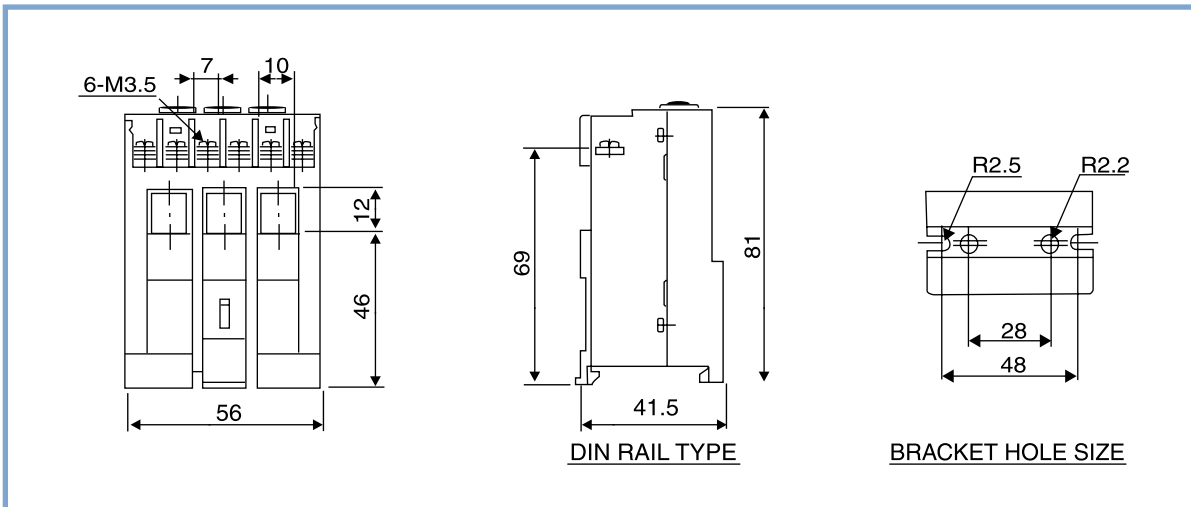


BOCR - SS

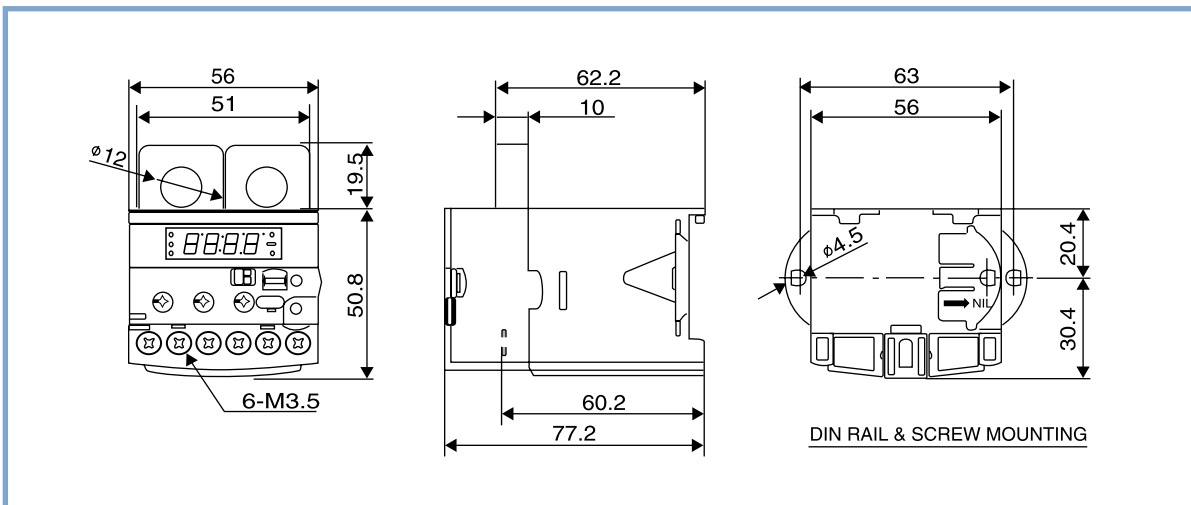


BOCR - SP1

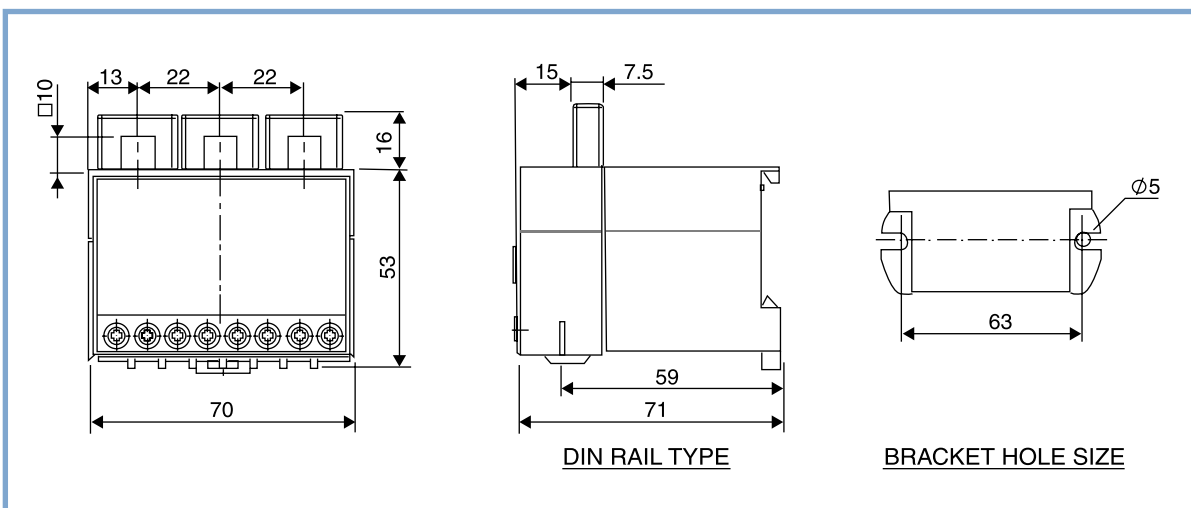
Dimension (mm)



BOCR - DS/DS1/DS2/DS3



BOCR - SSD



BOCR - 3DE/3EZ

BOCR - CAT NOS.

| Model | BIL Catalogue Nos. | Range | Control Voltage |
|------------|--|---|-----------------|
| BOCR - SS | MP21SS005* MP21SS030* MP21SS060* | 0.5 - 6A 3 - 30A 5 - 60A Over 60A with External CT | 220/440V AC |
| BOCR - SSD | MP22SSD005* MP22SSD030* MP22SSD060* | 0.5 - 6A 3 - 30A 10 - 60A | 110/220V AC |
| BOCR - SP1 | MP23SP1005* MP23SP1030* MP23SP1060* | 0.3 - 2A 1 - 12A 5 - 25A | 110/220V AC |
| BOCR - DS | MP31DS005* MP31DS030* MP31DS060* MP31DS100* | 0.5 - 6A 3 - 30A 5 - 60A Over 60A with External CT | 220/440V AC |
| BOCR - DS1 | MP32DS1005* MP32DS1030* MP32DS1100* | 0.5 - 6A 3 - 30A Over 60A with External CT | 110/220V AC |
| BOCR - DS2 | MP33DS2005* MP33DS2030* MP33DS2060* MP33DS2100* | 0.5 - 6A 3 - 30A 5 - 60A Over 60A with External CT | 110/220V AC |
| BOCR - DS3 | MP34DS3005* MP34DS3030* MP34DS3060* MP34DS3100* | 0.5 - 6A 3 - 30A 5 - 60A Over 60A with External CT | 110/220V AC |
| BOCR - 3DE | MP353DE800* | 5 - 960A Over 60A with External CT | 110/220V AC |
| BOCR - 3EZ | MP363EZ800* | 5 - 960A Over 60A with External CT | 110/220V AC |

Control Voltage Code: 110V AC - A4; 220V AC - B4; 440V AC - C1

* To complete Cat. No. suffix voltage code

For control voltage other than above, please contact nearest branch office.

BHARTIA INDUSTRIES LIMITED

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Resident Engineers Locations (Tel.)

| | | | | | | | | | |
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| Vijayawada | 98662-20504 | Vizag | 98493-99238 | Gwalior | 98268-03658 | | | | |

Since product improvement is a continuous process, the data furnished in this brochure may undergo revision without prior notice.