

IPD V05 PROTECTION RELAY

Integrated Protection Range

Description

The Ampcontrol IPD Integrated Protection Relay is an intelligent protection relay based on microprocessor technology.

The integrated relay provides the necessary functions required for protecting electrical outlets supplying underground mining machinery. All of the protection functions are combined into a compact, plug-in unit, which can be easily changed out to minimise down time in the event of a problem with the relay.

The IPD System consists of the IPD Relay, IPD Base Plate, Cable Connection Module (CCMD), Remote Termination Unit (RTU-D), a Remote Display Module (RDM), two 1000:1 Current Transformers, and an Earth Leakage Toroid.

The IPD Relay has four output relays. Relay MCR is used for the main contactor and Relay CBR is used for the circuit breaker. Relay RL3 can be turned off or configured to follow the Fan Interlock Drive output of the IPD Relay. Relay RL4 is used to activate the HV Insulation Test. All tripping logic and outlet control is performed by the IPD's microprocessor, so that virtually no external control is required.



Features

- Earth leakage protection
- Earth fault lockout protection
- Earth continuity protection
- Over-current /overload protection
- Short circuit protection
- Frozen/failed contactor protection
- Machine Communications
- Fan Interlocking on any outlet
- I.S. Remote Display Module (RDM) – Ex(ia)
- 28 Status messages to indicate what is required to energise the outlet.
- User friendly. Relay and Remote Termination Unit programmed from the RDM
- Automatic and Manual HV Insulation Test
- Microprocessor based
- Fail safe operation
- Diode or Remote Termination Unit operation
- 120 Event Log
- Local or remote operation
- Sequencing and remote communication via PLC link
- Plug-in for quick change out
- Thermal modelling
- Fully functional for a period of two (2) seconds during extreme control power dip or power loss.
- Relay & Digital Input Status to aid fault finding
- Continuous monitoring of the Earth Leakage toroid

Application

The IPD Integrated Protection Relay is approved for use in mining operations. For the protection of mining equipment in hazardous areas the relay is installed in a flameproof enclosure with the Remote Display Module being installed outside the enclosure. This is possible because of its intrinsically safe design.

In addition to providing a complete outlet protection solution, the IPD System can also be used to perform the following functions:

1. Machine Communication

The Remote Termination Unit (RTU-D) provides Machine Communications when installed between the pilot and earth at the machine end of the trailing cable. The relay parameters are automatically uploaded from the RTU-D in the remote machine when a cable is inserted into a power outlet.

2. Sequence Control

Through machine communication, the identity of the machine can be transferred via serial communications to a PLC. This allows the PLC to arrange sequencing particularly in longwall installations.

3. Fan Interlocking

A fan interlocking facility can be selected to prevent outlets from being energised until a mine ventilation fan is operational. This facility eliminates the need for dedicated outlets.

4. Cable Insulation Monitoring

The Insulation Test allows cable insulation levels to be trended as an aid to preventative maintenance.

5. Remote Data Communications

The IPD Integrated Protection Relay has the facility for connecting remote monitoring equipment. This can be in the form of peripheral equipment such as PLC's. For PLC applications each integrated protection relay is connected to a Serial Interface Module (IPSI-D), which has its output multi-drop connected to a DNET-IP2 Protocol Converter. The Protocol Converter provides the communications link to a PLC.

Specifications

General			
Auxiliary Supply Voltage	110vac ± 10% 10VA, 50Hz ± 2 Hz		
Dimensions	See IPD User Manual		
Ambient Temperature	0°C to 60°C		
Relay Contact Ratings	5A/190VAC 100VA maximum (MCR, CBR, RL3, RL4)		
Certification			
IECEX	IECEX ITA 07.0018X (refer to http://iecex.iec.ch/ for certificate)		
Earth Leakage Protection			
Trip Setting	100-500mA in 50mA increments		
Time Delay Setting	Instantaneous (<50ms), 100ms, then 150ms to 470ms in 40ms increments.		
Earth Continuity Protection			
Trip Threshold (Series)	> 45Ω		
Trip Threshold (Shunt)	< 1500Ω		
Time Delay Setting	80ms, 120ms, 160ms, 200ms, 300ms, 400ms, 500ms		
Pilot Cable Parameters	C < 0.3μF, L < 10mH, L/R<600uH/Ω		
Earth Fault Lockout Protection			
Lockout Resistance (IS Test)	415V < 4.15kΩ 1000V < 10kΩ 3.3kV < 33kΩ		
IS Test Time	1 second		
Lockout Resistance (Insulation Test)	Selectable at 0.1, 0.2, 0.5, 1, 2, 5, 10* and 15* MΩ and off (*Not recommend for use)		
Insulation Test Time	2 second		
Alarm Settings	Insulation Test Trip Setting x1.5		
Over-Current / Overload Protection			
Current Range	7.5 to 464 Amps (60 to 116 Amps in 4 Amp increments, times current multiplier)		
Current Multiplier	1/8, 1/4, 1/2, 1, 2, 4 times		
Time Multiplier	0.005, 0.01, 0.015, 0.02, 0.03, 0.04, 0.05, 0.075, 0.1, 0.15, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 1.0 times		
Cooling Multiplier	0.2, 0.3, 0.4, 0.5, 0.8, 1.0, 2.0, 5.0, 10, 20, 50 times		
Current Balance			
Trip Settings	5%, 10%, 20%, 50% and off		
Short Circuit Protection			
Trip Setting	3.0 to 10.0 times in 0.5 increments (times full load current)		
Trip Time	20, 40, 60, 80, 100, 120, 160ms		
Transient Delay Setting	DISABLED, 40, 60, 80, 100, 120ms		
Back EMF Timer			
Trip Delay Settings	2, 5, 10, 20 seconds		
Machine Numbers			
Machine Numbers	Can be allocated from 1 to 40		
Fan Current			
Threshold Level	32% to 96% in 8% increments (% of full load current)		
Undervoltage Protection			
Trip Setting	Selectable from 20% to 80% in 10% increments		
Trip Delay	800ms		
Serial Communications			
For information on Protocol and hardware requirements see DNET-IP2 Serial Communication System User Manual.			
Part Number	Description	Part Number	Description
162831	Integrated Protection Relay IPD1V05	161575	Module RTU D3 Remote Termination Unit
121115	IPD Base Plate	110142	Module IKD V01 Keypad Interface
110141	IPD Remote Display Module RDM-D	110143	Keypad IKD IS
101487	CCMA 110V Cable Connection Module	101270	DNET-IP2 Protocol Converter
110146	CCMD 415V Cable Connection Module	171107	DNET-IP2 Power Supply 85-285Vac V2
110147	CCMD 1000V Cable Connection Module	110144	IPSI-D IPD Serial Interface Module
110148	CCMD 3.3kV Cable Connection Module	101826	EFTM 415/1kV IPC Earth/Fault Test
101649	Toroid EL500/60/100T 500mA 60mm I.D.	121170	EFTM 3.3kV IPC Earth/Fault Test
101654	Toroid EL500/112/100T 500mA 112mm I.D.	101296	Fuse Holder C/W 3A/660V Fuse
101272	CT 1000/1 45mm Inner Diameter OL1 (1000:1)	117139	Fuse 3A/660V (Spare Item)
101703	CT 1000/1 88mm Inner Diameter OL2 (1000:1)		
Find Out More			
For more information on this product, contact Ampcontrol Customer Service on +61 1300 267 373 or customerservice@ampcontrolgroup.com or visit the Ampcontrol website: www.ampcontrolgroup.com			

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