

## IPE PROTECTION RELAY

### Integrated Protection Range

#### Application

The IPE Integrated Protection Relay provides the complete protection solution for electrical outlets in underground coal mines.

The integrated relay provides the necessary functions required for protecting electrical outlets supplying underground mining machinery, with compliance to AS/NZS 2081.2011 and is certified for use on outlets supplying loads in hazardous areas.

All of the protection functions are combined into a compact, plug-in unit, which can be easily changed out to minimise down time.

The IPE System consists of the IPE Relay, IPE Base, Remote Termination Unit (RTX), an interface platform (PIP), three 1000:1 Current Transformers, and an Earth Leakage Toroid.

The IPE Relay has three output relays, 2x MCR contacts for the main contactor control and 1x CBR relay used for circuit breaker control. The IPE relay incorporates Ampcontrol's latest machine recognition technology through the proven Remote Termination Unit (RTX).

The RTX pilot communications has improved noise tolerance, resulting in a more robust installation.

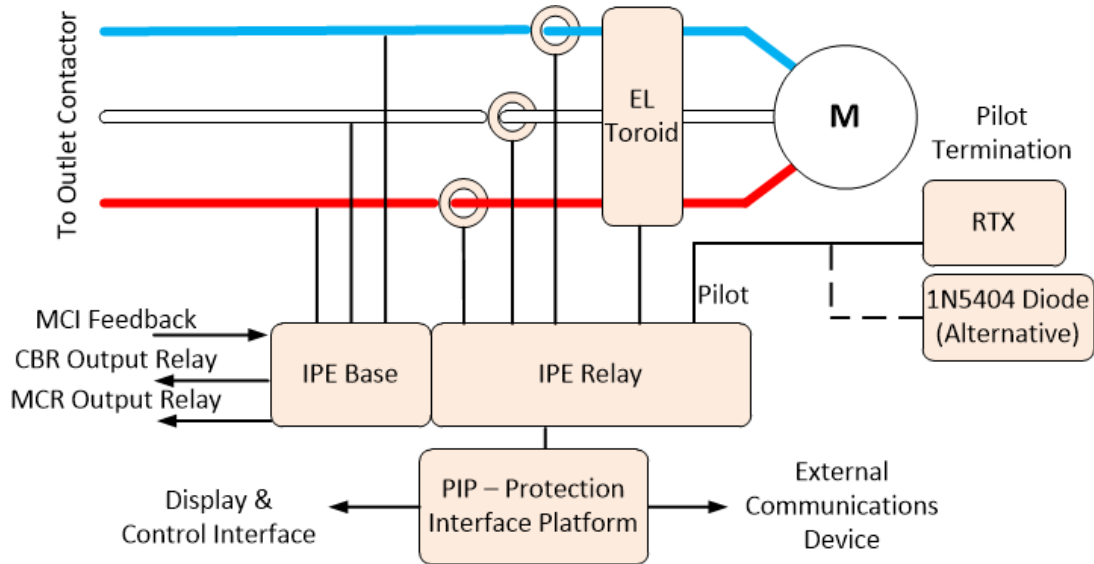
#### Features

- AS/NZS 2081: 2011 Compliance
- IEC 60079-0:2011 & 60079-11:2011 Certification
- Earth leakage protection
- Earth fault lockout protection
- Earth continuity protection
- Overcurrent /overload protection
- Short circuit protection
- Frozen/failed contactor protection
- Machine communications
- Automatic and manual HV insulation test
- Fail safe operation
- Settings stored on removable dongle
- Diode or remote termination unit operation (RTX)
- Standardised interface platform – PIP
- User friendly HMI through dedicated screen or over Ethernet communications
- 50 Event log
- 140 Event log descriptions to indicate what is required to energise the outlet.
- Local or remote operation
- Sequencing and remote communication via Ethernet
- 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



## Description

The IPE Integrated Protection Relay is approved for use in mining operations. For the protection of mining equipment in hazardous areas the relay is to be installed within a flameproof enclosure. Control and interfacing with the relay is performed through a locally mounted PIP, visual interface can be through a panel mounted screen (PIPS) or installed within a flameproof enclosure where needed. Alternatively interfacing with the PIP can be achieved remotely over Ethernet communications.



## Specifications

General	
Auxiliary Supply Voltage	24 VDC $\pm$ 20 %, 30 W*
Dimensions	See IPE User Manual
Ambient Temperature	0 °C to 60 °C
Relay Contact Ratings	1.6 A @ 250 VAC VA / 1.6 A @ 30 VDC maximum (MCR1, MCR2, CBR)
Certification	
IECEX Certification	IECEX ITA 12.0032X (refer to the IECEX website for the latest certificate)
I.S. Parameters	
Combined Phase & Pilot Port	RTX
C: 3.72 $\mu$ F	Ui: 28.0 V
L/R: 4.5 mH	Ci: 18.8 nF
L/R: 207 $\mu$ H/Ohm	Li: nil

**Touch Potential Protection Functions**

<b>Earth Leakage</b>	
Frequency Response	Narrowband, Designed for 50 Hz
Trip Times (mSec) + 0 %, -20 %	Instant, 50, 75, 100, 150, 200, 250, 300, 350, 400, 450, <b>500</b>
Trip Levels (mA) ± 10 %	100, 150, 200, 250, 300, 350, 400, 450, <b>500</b>
CT Failure (mSec)	500
<b>Earth Continuity</b>	
Trip Times (mSec)	100, 150, 200, 300, 400, <b>500</b>
Trip Levels – Series (Ω)	10, 15, 20, 25, 30, 35, 40, <b>45</b>
Trip Levels – Shunt (Ω)	<b>1500</b>
Latching Trip	<b>ON / OFF</b>
Remote Start at Machine	<b>ON / OFF</b>
Pilot Termination	<b>Diode (1N5404), RTX</b>
<b>Earth Fault Lockout</b>	
EFLO – Low Voltage Test	3PH Load Disconnected – Trip by 3 MΩ 3PH Load Connected – Trip by 1 MΩ
HV Insulation Test Voltage	900 VDC (1.1 kV System or 3.3 kV System) or 2700 VDC (3.3 kV System)
HV Insulation Test Level	OFF, 1 MΩ, 2.5 MΩ, 5 MΩ, <b>10 MΩ</b> , 20 MΩ, 50 MΩ
<b>Frozen Contactor/Loss of Vacuum</b>	
Back EMF Timer (Sec)	2, 5, 10, 15, <b>20</b>
Loss of Vacuum Level (VAC)	OFF, <b>25</b> , 50, 100, 150
Loss of Coil Voltage	< 100 ms
Loss of Vacuum	< 1 s
Frozen Contactor	< 100 ms
Contact Logic Trip	< 1 s
<b>Load Related Protection Functions</b>	
<b>Overload Protection</b>	
OL Model	<b>Very Inverse</b> , Extreme Inverse, Motor Overload
Very Inverse	IEC 60255-151 B Curve, or
Extremely Inverse	IEC 60255-151 C Curve
Thermal Model as per	IEC 60255-8
Time Multiplier (TMS) (x FLC)	0.05-30 (See user manual for more detail)
FLC (A)	5.125-640 [ <b>10</b> ] (See user manual for more detail)
Cooling Multiplier	1.0x, 1.5x, 2.0x, 2.5x, 3.0x, 4.0x, <b>5.0x</b>
Thermal Accumulator Start Block (%)	20, 30, 40, 50, 60, 70, 80, <b>90</b>
<b>Short Circuit Protection</b>	
SC Trip Current Multiplier (trip level) (xFLC)	1.5 to 12.5 in 0.25 increments in OC mode 3.0x to 25x when in MOL mode with additional slower trip element at 1.5x to 12.5x (Multiples of Full Load Current)
Time (mSec) ± 15 ms	<b>40</b> , 60, 80, 100, 120, 140, 160, 180, 200
SC Detect Level	6016A

**Touch Potential Protection Functions**

<b>Under Voltage Protection</b>	
Trip Level (%)	OFF, 40, 50, 60, 70, 75, 80, 85, 90, 95
Trip Time (mSec)	850
<b>Current Imbalance Protection</b>	
Trip Level (% FLC)	OFF, 5, 10, 20, 50
Trip Time (Sec)	2
<b>Under Current Protection</b>	
Trip Level (% FLC)	OFF, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95
Trip Time (Sec)	4
<b>(198557) IPE Protection Relay Kit (Require 1 per outlet)</b>	
Part Number	Description
197358	IPE Relay
180902	IPX Base 5m Tails
195677	OCS / IPE Plug Set
<b>Earth Leakage Toroid (Require 1 per outlet)</b>	
Part Number	Description
101649	EL Toroid EL500 60mm
101654	EL Toroid EL500 112mm
101658	EL Toroid EL500S 60mm
101656	EL Toroid EL500S 112mm
<b>Phase CT (Require 3 of same items per outlet)</b>	
Part Number	Description
101272	45mm CT 1000:1
101703	88mm CT 1000:1
<b>Outlet Dongle Part Numbers (Require 1 per PIP outlet)</b>	
Part Number	Description
199230	IPE Dongle Outlet 1 – PIP
199231	IPE Dongle Outlet 2 – PIP
199232	IPE Dongle Outlet 3 – PIP
199233	IPE Dongle Outlet 4 – PIP
199234	IPE Dongle Outlet 5 – PIP
199235	IPE Dongle Outlet 6 – PIP
199236	IPE Dongle Outlet 7 – PIP
199237	IPE Dongle Outlet 8 – PIP
199238	IPE Dongle Outlet 9 – PIP
199239	IPE Dongle Outlet 10 – PIP
199240	IPE Dongle Outlet 11 – PIP
199241	IPE Dongle Outlet 12 – PIP
199242	IPE Dongle Outlet 13 – PIP
199243	IPE Dongle Outlet 14 – PIP
199244	IPE Dongle Outlet 15 – PIP
199245	IPE Dongle Outlet 16 – PIP

(1000V, for 3300V add note to Purchase order)

Accessories	
Part Number	Description
196912	Kit RTX complete with dongle
195677	Kit OCS / IPE Plug Set
164268	Plug Bypass Circuit Breaker Relay OCS/IPE
115119	Module PTB Diode Pilot Termination
169732	RES 100R 5W 1%
117023	Diode 1N5404 3A
PIP System Components	
Part Number	Description
300104	KIT Protection Interface Platform (PIP) C/W Dongle & 12 VPS
198608	Protection Interface IO Block 2 (PI2)
198601	2FB - 2 Outlet Fixed IO Block*
198602	4FB - 4 Outlet Fixed IO Block*
198600	2WB - 2 outlet Withdrawable IO Block*
198598	4WB - 4 outlet Withdrawable IO Block*
302301	GFB – Group Feed IO Block
198599	PIPS - PIP Screen 10.1" (Optional)
300716	PIPS SS - PIP Screen 10.1" Stainless Steel Bezel (Optional)
199332	HDMI to DVI Cable 1.5m (to connect PIP to PIPS) (Optional)
176082	Temp Sensor (Optional)
198558	MOXA 5x Ethernet Port Switch (Un managed) (Optional)
157711	Power Supply 24V 10A
165165	Track Pad – Hazardous Area (Optional)
172912	Trackpad Interface – Hazardous Area (Optional)

\*For other PIP System items required see PIP user manual

Accessories		
Part Number	Description	Manufacturer Part Number
198609	Protection Interface Platform (PIP) V01	-
199859	PIP System Dongle	-
302477	Power Supply 12V 5A (For PIP)	
-	Mouse (wired) – Most USB type will work	Not available through Ampcontrol
-	Mouse (wireless) – Most USB type will work	
198558	MOXA 2x Ethernet Port + 3x Fibre Port Switch	EDS-405A
178843	MOXA 8x Ethernet Port Switch	EDS-408A

#### Find Out More

For more information on this product, contact Ampcontrol Customer Service on +61 1300 267 373 or [customerservice@ampcontrolgroup.com](mailto:customerservice@ampcontrolgroup.com) or visit the Ampcontrol website: [www.ampcontrolgroup.com](http://www.ampcontrolgroup.com)

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