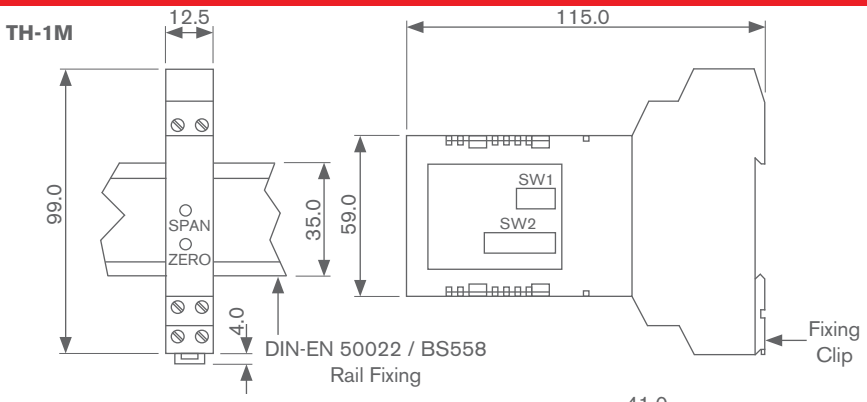
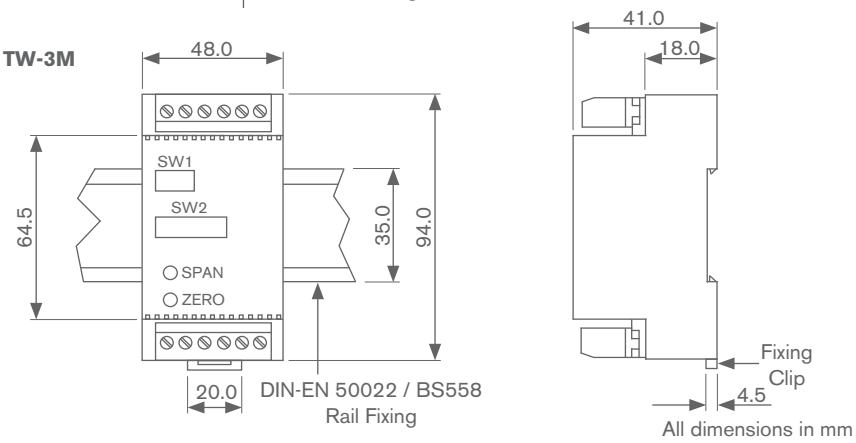
Dimensions

TH-1M



TW-3M



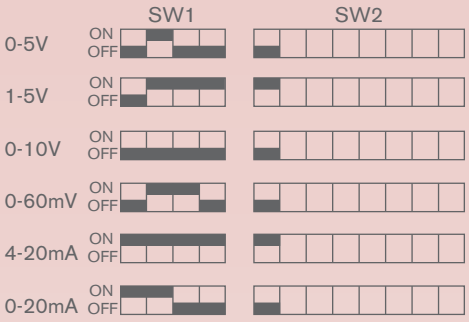
Ordering information

	Code	Description
	TH-1M	Slim Analogue Signal Conditioner - 24Vdc
	TW-3M	Analogue Signal Conditioner - 100-240Vac
Example	**TW-3M**	

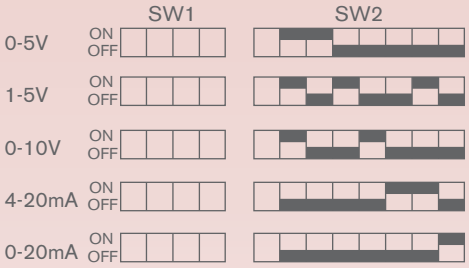
Note: Calibration can be factory set at a specific input and output if required (specify when ordering).

Range Settings

Input Range Setting



Output Range Setting



Resistance Values

Input	Input Resistance
0-5Vdc 1-5Vdc 0-10Vdc 0-60mV	More than 1Mohm
4-20mA 0-20mA	250 ohms

Output	Allowable Load Resistance
0-5Vdc 1-5Vdc	More than 2kohm
0-10Vdc	More than 4kohm
4-20mA 0-20mA	More than 550 ohms

Specification subject to change without notice.

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PETROLEUM RESOURCES

Product Catalogue

Electronic Protection Relays

Global Suppliers of Measurement and Protection Equipment for Industry

Abu Dhabi, UAE, Tel: +971 2 6796902, Fax: +971 2 6796903
Website: www.petroces.com, Email: info@petroces.com

General Specification

Reference Standards

Performance:	IEC 144 / BS 5420 / VDE/VDI 0435 / IEC 947 / EN60947

Environmental

Calibration Temperature:	23°C
Operating Temperature:	0°C to 60°C
Storage Temperature:	-10°C to 70°C
Temperature Coefficient:	±0.03%/ °C
Relative Humidity:	0 - 95% non-condensing

Relay Output

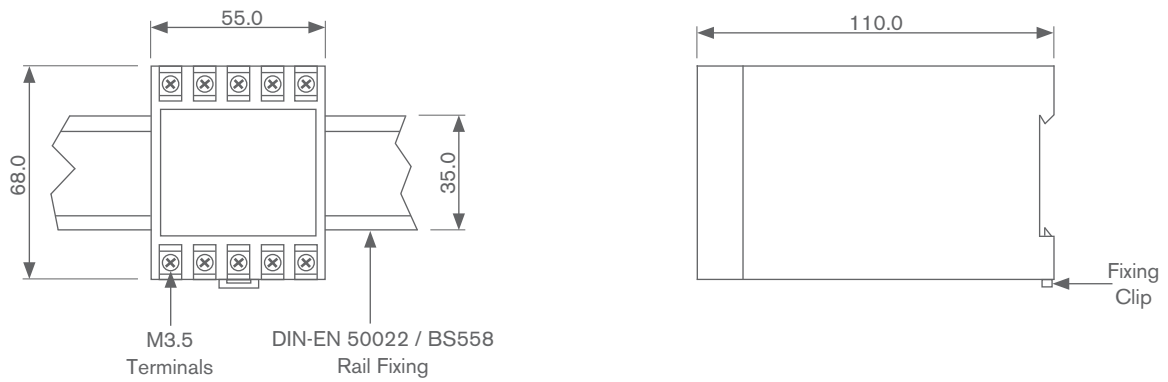
Relay Type:	Single pole change-over (Except CST-100 has single pole normally open or normally closed) (Double pole change-over available on some models as as option)
Contact Rating:	5A @ 250Vac (non-resistive), 1A @ 125Vdc (resistive)
Contact Life:	1,000,000 at 5A, 10,000,000 at 1A
Mechanical Life:	2,000,000 operations
Dielectric Strength:	4kV coil/contact, 1kV contact/contact
Optional Time Delay:	0.3-10 sec, 1-30 sec, 2-60 sec, 3-100 sec or 10-300 sec (delay on fault or reset) (Note if the voltage supply to the protection relay falls below 75% of the nominal the timer will fail to operate and the relay will trip instantaneously upon fault)

Enclosure

Enclosure:	Flame retardant black ABS plastic with screw type terminals
Enclosure Code:	Case IP50, terminals IP10 to IEC529 and BS5490
Insulation Test:	2kV rms 50Hz 1min (to IEC 414) between Input / Case / AC Auxiliary
Mounting:	35mm DIN rail (DIN-EN 50022)
Markings:	CE marked

Specification subject to change without notice.

Dimensions



All dimensions in mm

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Phase Protection (Phase Failure)

Models Available

B866/3W 3 Phase 3 Wire
B866/4W 3 Phase 4 Wire
A866PSI/3W 3 Phase 3 Wire with Phase Sequence Indication
A866PSI/4W 3 Phase 4 Wire with Phase Sequence Indication

Product Features

- Protects against:-
  Loss of phase
  Incorrect phase sequence (rotation)
  Phase reversal
  Symmetrical/asymmetrical under voltage
- LED indication
- Single or double pole output available
- Optional built-in time delay

For dimensions see page 87

Phase protection relays continuously monitor a three phase AC power supply, tripping upon fault condition. These relays protect against total loss of a phase (phase failure), incorrect phase sequence (rotation), symmetrical under voltage and asymmetrical under voltage. The A866PSI model also offers phase sequence and fault indication.

The internal relay remains energised and the LED illuminates only when the power supply is satisfactory for connection to the three phase equipment. The under voltage trip point on all three phases is fixed at 85% of the nominal voltage although an alternative trip point may be possible upon request. The relays are self powered, requiring no auxiliary power supply and are available with either a single or double pole changeover relay output and optional built-in time delay.

For protection against phase failure, incorrect sequence and under voltage

Specification

Nominal Voltage, *Un*:
- 110, 230VL-N
- 380, 400, 415VL-L
- 60-500V upon request

Frequency:
- 50/60Hz (400Hz upon request)

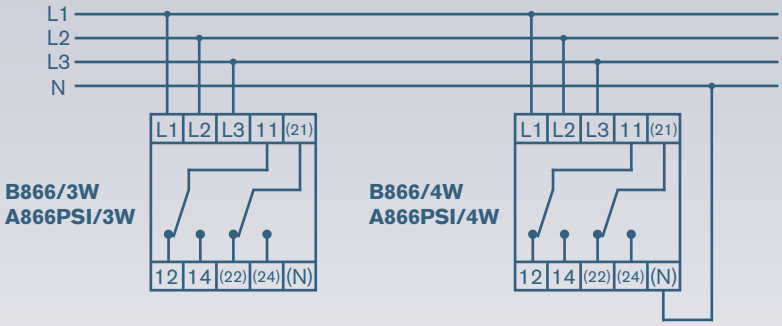
Overload:
- 1.5 x *Un* continuous
- 2 x *Un* for 5 seconds

Burden:
- B866/3W & B866/4W < 2VA
- A866PSI/3W & A866PSI/4W < 4VA

Operating Time:
- 100ms typically
- Built-in time delay (optional)

Weight:
- B866/3W & B866/4W 275g
- A866PSI/3W & A866PSI/4W 300g

Connections



Ordering information

Code	Relay Type	Nominal Voltage	Output
B866/3W	3 Phase 3 Wire	–	–
B866/4W	3 Phase 4 Wire	–	–
A866PSI/3W	3 Phase 3 Wire with Indication	–	–
A866PSI/4W	3 Phase 4 Wire with Indication	–	–
Specify	–	110, 230VL-N, 380, 400, 415VL-L	–
Specify	–	50 to 600V L-N/L-L	–
1C/O	–	1 Pole Changeover Relay Output	
2C/O	–	2 Pole Changeover Relay Output	
Time Delay (B866 only)	–	Time Delay on Reset - Specify Time Range	

(Note: order code begins TA866, not B866 when time delay is included)

Example	B866/3W	415VL-L	2C/O

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Phase balance protection relays continuously monitor a three phase AC power supply, tripping upon fault condition. These relays protect against asymmetrical under or over voltage.

The internal relay remains energised and the LED illuminates only when the voltage balance between all three phases is within the user adjustable limit and hence satisfactory for connection to the three phase equipment.

The unbalance trip point is adjustable from 5% to 15% of the nominal voltage through the front control knob. The relay is self powered, requiring no auxiliary power supply and is available with either a single or double pole changeover relay output and built-in 5 second time delay.

Models Available

B921 3 Phase 3 Wire

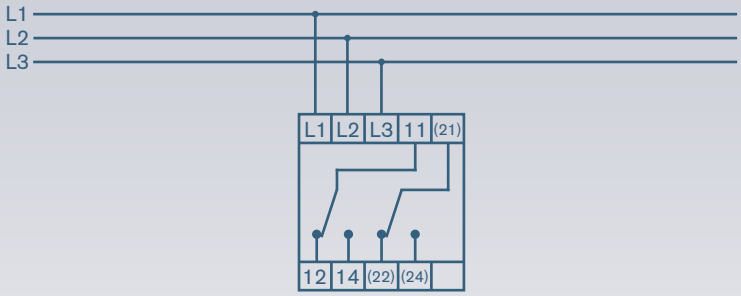
Product Features

- Protects against:-
  Asymmetrical under and over voltage
- LED indication
- Single or double pole output available
- 5 second fixed time delay

For dimensions see page 87

For protection against assymetrical under and over voltage

Connections



Ordering information

Code	Relay Type	Nominal Voltage	Output
B921	3 Phase 3 Wire	–	–
Specify	–	110, 380, 400, 415VL-L	–
Specify	–	50 to 600VL-L	–
1C/O	–		1 Pole Changeover Relay Output
2C/O	–		2 Pole Changeover Relay Output
Example	**B921**	**415VL-L**	**2C/O**

Specification

Nominal Voltage, *Un*:
- 380, 400, 415VL-L
- 60-500V upon request

Calibrated Scale:
- 5 to 15% (adjustable)

Frequency:
- 50/60Hz (400Hz upon request)

Overload:
- 1.5 x *Un* continuous
- 2 x *Un* for 5 seconds

Burden:
- < 2VA

Time Delay:
- 5 second fixed time delay

Weight:
- 275g

PETROLEUM RESOURCES

AC Voltage Protection

Models Available

B853/1 Single Phase Over & Under
B853/2 Single Phase Over
B853/3 3 Phase 3 Wire Over & Under
B853/4 3 Phase 4 Wire Over & Under
B853/5 3 Phase 3 Wire Over
B853/6 3 Phase 4 Wire Over
B853/7 3 Phase 4 Wire Under
B853/8 3 Phase 3 Wire Under
B853/9 Single Phase Under
B853/10 3 Phase 4 Wire Under 320-400V
B853/11 3 Phase 3 WIre Under 320-400V

Product Features

- Protects for under and/or over voltage
- LED indication
- Single or double pole output available
- Optional built-in time delay

For dimensions see page 87

AC voltage protection relays continuously monitor single phase or three phase AC voltages, tripping upon fault condition.

The output relay trips when the monitored voltage is outside of the user adjustable limit and the LED illuminates indicating a fault condition. The trip point on all models (except the B853/10 and B853/11) is adjustable from 5% to 20% of the nominal voltage through the front control knob.

The output relay is set to de-energise in the under voltage condition ensuring the protection relays are failsafe. The relays are self powered, requiring no auxiliary power supply and are available with either a single or double pole changeover relay output and optional built-in time delay.

For AC voltage monitoring and protection against under and/or over voltage

Specification

Nominal Voltage, *Un*:
- 110, 230VL-N
- 380, 400, 415VL-L
- 60-500V upon request

Calibrated Scale:
- 5% to 20% (B853/1 to B853/9)
- 320 to 400V (B853/10 & B853/11)

Setting Accuracy:
- 1%

Repeatability:
- Better than 0.5% of nominal

Differential (Hysteresis):
- Fixed 2%

Frequency:
- 50/60Hz (400Hz upon request)

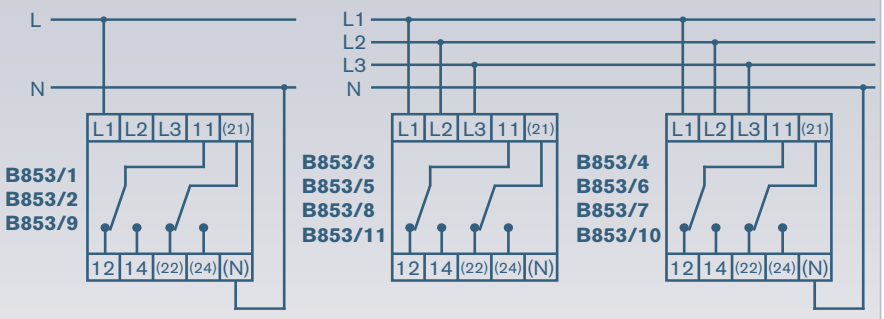
Overload:
- 1.5 x *Un* continuous
- 2 x *Un* for 5 seconds

Burden:
- < 2VA

Operating Time:
- 200ms typically
- Built-in time delay (optional)

Weight:
- 275g

Connections



Ordering information

Code	Relay Type	Nominal Voltage	Output
B853/1	Single Phase Over & Under	–	–
B853/2	Single Phase Over	–	–
B853/3	3 Phase 3 Wire Over & Under	–	–
B853/4	3 Phase 4 Wire Over & Under	–	–
B853/5	3 Phase 3 Wire Over	–	–
B853/6	3 Phase 4 Wire Over	–	–
B853/7	3 Phase 4 Wire Under	–	–
B853/8	3 Phase 3 Wire Under	–	–
B853/9	Single Phase Under	–	–
B853/10	3 Phase 4 Wire Under (320-400V)	–	–
B853/11	3 Phase 3 Wire Under (320-400V)	–	–
Specify	110, 230VL-N, 380, 400, 415VL-L or 50 to 600V L-N/L-L		
1C/O	–	1 Pole Changeover Relay Output	
2C/O	–	2 Pole Changeover Relay Output	
Time Delay	– Time Delay - Specify on Fault or Reset and Time Range		
(Note: order code begins TA853, not B853 when time delay is included)			
Example	**B853/8**	**380VL-L**	**2C/O**

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AC Current Protection

AC current protection relays continuously monitor single phase or three phase AC currents either directly or through current transformers, tripping upon fault condition. The output relay trips when the monitored current is outside of the user adjustable limit and the LED illuminates indicating a fault condition.

The trip point on all models is adjustable from 20% to 120% of the nominal current through the front control knob. The output relay is set to de-energise in the under current condition ensuring the protection relays are failsafe.

The relays are auxiliary powered and are available with either a single or double pole changeover relay output and optional built-in time delay.

Models Available

B867-1A Single Phase Over Current
B867-1B Single Phase Under Current
B867-3A 3 Phase Over Current
B867-3B 3 Phase Under Current

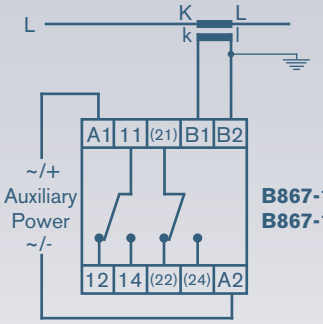
Product Features

- Protects for under or over current
- LED indication
- Single or double pole output available (Single phase model only)
- Optional built-in time delay

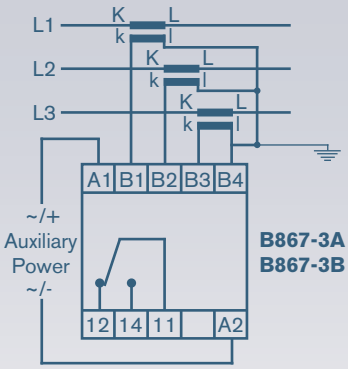
For dimensions see page 87

For AC current monitoring and protection against under or over current

Connections



B867-1A
B867-1B



B867-3A
B867-3B

Ordering information

Code	Relay Type	Nominal Current / Aux.	Output
B867-1A	Single Phase Over Current	–	–
B867-1B	Single Phase Under Current	–	–
B867-3A	Three Phase Over Current	–	–
B867-3B	Three Phase Under Current	–	–
Specify	–	1A or 5A from a CT	–
Specify	–	0.1A to 5A direct (B867-1 only)	–
Specify	–	110, 230, 380, 400 or 415Vac	–
Specify	–	24, 48Vac	–
Specify	–	10-60Vdc	–
1C/O	–	1 Pole Changeover Relay Output	
2C/O	–	2 Pole Changeover Relay Output	
Time Delay	– Time Delay - Specify on Fault or Reset and Time Range		
(Note: order code begins TA867, not B867 when time delay is included)			
Example	**B867-3A**	**5A, 230Vac**	**2C/O, 0.3-10 sec Delay on Fault**

Specification

Nominal Current, *In*:
- 1A or 5A from CT
- 0.1 to 5A direct (single phase model only)

Calibrated Scale:
- 20 to 120% (adjustable)

Frequency:
- 50/60Hz (400Hz upon request)

Overload:
- 2 x *In* continuous
- 10 x *In* for 3 seconds

Auxiliary Supply:
- 110, 230, 380, 400 or 415Vac (±15%)
- 24, 48Vac (±15%)
- 10-60Vdc (isolation 500V)

Burden:
- Current circuit < 0.5VA
- Auxiliary supply < 2VA

Operating Time:
- 100ms with a 200% over/under current
- 2.5 sec with a 2% over/under current
- Built-in time delay (optional)

Weight:
- 275g

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Frequency Protection

Models Available

B851 Over & Under Frequency
B851A Under Frequency
B851B Over Frequency
B851C Over Frequency 40-70Hz

Product Features

- Protects for under and/or over frequency
- LED indication
- Single or double pole output available
- Optional built-in time delay

For dimensions see page 87

Frequency protection relays continuously monitor the frequency of AC supplies, tripping upon fault condition.

The output relay trips when the monitored frequency is outside of the user adjustable limit and the LED illuminates indicating a fault condition. The trip point on all models (except the B851C) is adjustable from 1Hz to 5Hz through the front control knob.

The output relay is set to de-energise in the under frequency condition ensuring the protection relays are failsafe. The relays are self powered, requiring no auxiliary power supply and are available with either a single or double pole changeover relay output and optional built-in time delay.

For frequency monitoring and protection against under and/or over frequency

Specification

Nominal Frequency:
- 50, 60Hz (400Hz upon request)

Input Voltage, *Un*:
- 110, 230, 380, 400, 415VL-L (±15%)
- 60-500V upon request

Calibrated Scale:
- 1 to 5Hz (B851, B851A, B851B)
- 40 to 70Hz (B851C)

Setting Accuracy:
- 1%

Repeatability:
- Better than 0.5% of nominal

Differential (Hysteresis):
- Fixed 0.5Hz

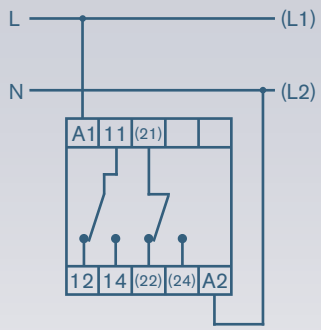
Overload:
- 1.5 x *Un* continuous
- 2 x *Un* for 5 seconds

Burden:
- < 2.5VA

Operating Time:
- 200ms typically
- Built-in time delay (optional)

Weight:
- 275g

Connections



Ordering information

Code	Relay Type	Nominal Freq. & Voltage	Output
B851	Over & Under Frequency	–	–
B851A	Under Frequency	–	–
B851B	Over Frequency	–	–
B851C	Over Frequency 40-70Hz	–	–
Specify	–	50, 60, 400Hz (N/A for B851C)	–
Specify	–	110, 230, 380, 400, 415Vac	–
Specify	–	50 to 600Vac	–
1C/O	–	1 Pole Changeover Relay Output	
2C/O	–	2 Pole Changeover Relay Output	
Time Delay	– Time Delay - Specify on Fault or Reset and Time Range		
(Note: order code begins TA851, not B851 when time delay is included)			
Example	**B851**	**50Hz, 230Vac**	**2C/O**

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3 Phase Current Balance Protection

A three phase current balance protection relay continuously monitors a three phase AC current through current transformers, tripping upon an unbalanced load condition. The output relay trips when the monitored current is outside of the user adjustable limit and the LED ceases to illuminate indicating a fault condition.

The trip point is adjustable from 3% to 20% of the nominal current through the front control knob. The relay also has a built-in time delay, adjustable from 0.1 to 10 seconds, used to avoid nuisance tripping.

The output relay is set to de-energise in the unbalanced condition ensuring the protection relay is failsafe. The relay is auxiliary powered and is available with either a normally open or normally closed relay output.

Models Available

CST-100 Three Phase Current Balance

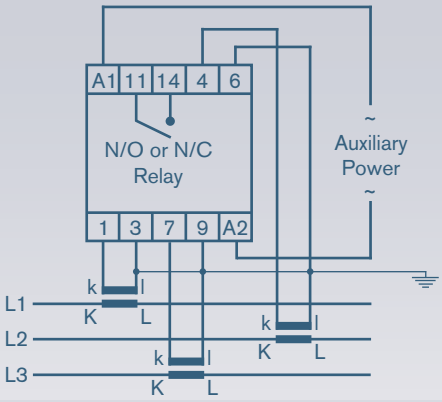
Product Features

- Protects against:-
  Unbalance in three phase loads
- LED indication
- Adjustable 0.1-10 second delay

For dimensions see page 87

For 3 phase current monitoring and protection against unbalanced loads

Connections



Ordering information

Code	Relay Type	Nominal Current / Aux.	Output
CST-100	Three Phase Current Balance	–	–
Specify	–	1A or 5A from a CT	–
Specify	–	110, 230, 380, 400 or 415Vac	–
Specify	–	24, 48Vac	–
N/O	–	Normally Open Relay Output	
N/C	–	Normally Closed Relay Output	
Example	**CST-100**	**5A, 230Vac**	**N/O**

Specification

Input Current, *In*:
- 1A or 5A from CT

Calibrated Scale:
- 3 to 20% (adjustable)

Time Delay:
- 0.1 to 10 seconds (adjustable)

Frequency:
- 50/60Hz (400Hz upon request)

Overload:
- 2 x *In* continuous
- 10 x *In* for 3 seconds

Auxiliary Supply:
- 110, 230, 380, 400 or 415Vac (±15%)
- 24, 48Vac (±15%)

Burden:
- Current circuit < 0.5VA
  Auxiliary supply < 2VA

Low Current Lockout:
- Non-operational below 0.2A

Weight:
- 300g

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DC Current or Voltage Protection

Models Available

B846-A DC Over Current
B846-B DC Under Current
F187/U DC Under Voltage
F187/O DC Over Voltage

Product Features

- Protects for:-
  Under or over DC Current or
  Under or over DC voltage
- LED indication
- Single or double pole output available (DC current relay only)
- Optional built-in time delay

For dimensions see page 87

DC current protection relays continuously monitor DC currents (either directly or through a current shunt) and DC voltage protection relays continuously monitor DC voltages, tripping upon fault conditions. The output relay trips when the monitored current or voltage is outside of the user adjustable limit and the LED illuminates indicating a fault condition.

The trip point on the current model is adjustable from 20% to 120% and the voltage model 70% to 130% of the nominal rating through the front control knob. The output relay is set to de-energise in the under condition ensuring the protection relays are failsafe. The voltage relay is self powered while the current relay requires an auxiliary power supply. The current protection relays are available with either a single or double pole changeover relay output and optional built-in time delay.

For monitoring and protection against under or over DC current or voltage

Specification

B846 Nominal Current, *In*:
- 50, 60 or 75mV from DC current shunt
- 0-20mA to 0-5A direct

F187 Nominal Voltage, *Un*:
- 12, 24, 48 or 110Vdc

Calibrated Scale:
- 20% to 120% (B846)
- 70% to 130% (F187)

Setting Accuracy:
- >5%

Repeatability:
- Better than 0.5% of nominal

Differential (Hysteresis):
- Fixed 5% (B846)
- Specify >0.1 *Un* (F187)

Overload:
- 2 x *In*, 1.5 x *Un* continuous
- 10 x *In*, 2 x *Un* for 5 seconds

B846 Auxiliary Supply:
- 110, 230, 380, 400 or 415Vac (±15%)
- 24, 48Vac (±15%)
- 10-60Vdc (isolation 500V)

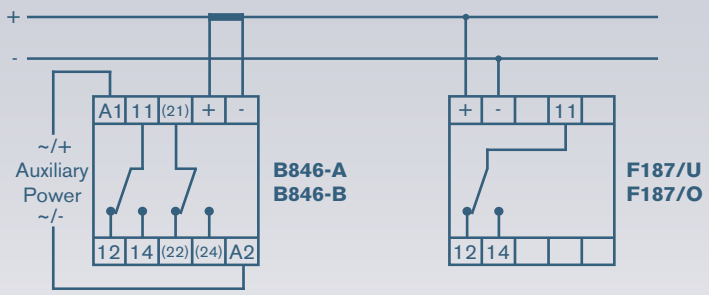
Burden:
- <0.5VA (B846), <0.6VA at *Un* (F187)

Impedance:
- 10kohm/volt (F187)

Operating Time:
- 200ms typically
- Built-in time delay (optional B846 only)

Weight:
- F187 175g, B846 275g

Connections



Ordering information

Code	Relay Type	Nominal Input / Aux.	Output
B846-A	DC Over Current	–	–
B846-B	DC Under Current	–	–
F187/U	DC Under Voltage	–	–
F187/O	DC Over Voltage	–	–
Specify (B846)	–	0-100mA to 0-5A direct	–
Specify (B846)	–	50, 60, 75mV from DC shunt	–
Specify (F187)	–	12, 24, 48Vdc (specify differential)	–
Specify (B846)	–	110, 230, 380, 400 or 415Vac	–
Specify (B846)	–	24, 48Vac	–
Specify (B846)	–	10-60Vdc	–
1C/O (B846)	–	1 Pole Changeover Relay Output	
2C/O (B846)	–	2 Pole Changeover Relay Output	
Time Delay (B846)	– Time Delay - Specify on Fault or Reset and Time Range		
(Note: order code begins TA846 not B846 when time delay is included)			
Examples	**B846-A**	**5Adc / 110Vac**	**2C/O**
	F187/U	**12Vdc**	**(1Vdc differential)**

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