

Motor Brake Relay

Type BI9028.38
ministop



Model BI9028.38

Description

A compact DIN rail mounted motor brake soft starter combination, designed to completely replace 3 phase star delta starters. BI9028.38 is suitable for motors rated from 7.5kW to 15 kW and has built in self monitoring, auto shutdown and indication features for phase failure, phase sequence, incorrect frequency and internal over temperature of the semiconductors.

Options for PTC thermistor motor protection and standstill monitoring of the motor are also available. Braking current (I_{br}) is adjustable via a potentiometer from 0.5A to 65A (15kW), with adjustable braking time delays (t_{br}) of 1 to 30 sec. Soft starting is adjustable via potentiometer (M_{on}) for start torque/voltage from 30 to 80%, with start time adjusted by (t_{on}) 1 to 30 sec. /600, output contacts 17– 18 close when full speed is reached and open when the stop cycle is initiated, on version /231 these contacts close when full speed is reached and open when the stop button is depressed to allow additional motor contactors to be controlled and inter-locked, contacts 17– 28 open to indicate the unit has detected a fault on the power supply or relay function.

Application Circuit Diagram

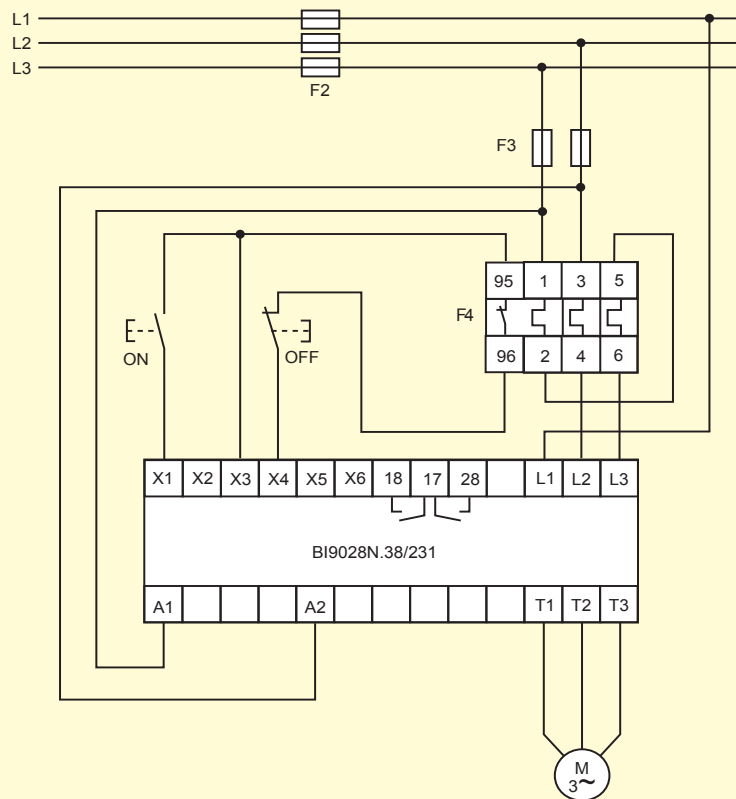
Start stop
pushbutton control
BI 9028.38/001 & /231
options

Fuses F2 to be
motor start rated (aM)

Fuses F3 to be
superfast or ultrafast
semi - conductor
fuses rated at 50A

400Vac auxiliary supply option
shown, connect to A1 - A2

Star delta motors must be
rewired permanently into delta
configuration



**NB: Overload
configuration for
heavy duty
starting**

Diag 1

Warning

Attention !! this device does not utilise a contactor to control the motor, it is still physically connected to the mains even when the motor is stationary. This unit **must be isolated** from the mains supply before any work is carried out on the motor. Adjustments and wiring should only be carried out by qualified persons.

Auxiliary Supply Options:

Option-1, 400V Auxiliary (Standard option).
AC 400V A1– A2 No Links

Option-2, Multi Voltage Auxiliary (Non 400V Motors).
AC 115V A1– A2 Link, A1–Y1, A2–Y2
AC 230V A1– A2 Link, Y1–Y2
DC 24V A3– A4 No Link

Special Note

When monitoring the injected DC current we recommend the use of a **Moving iron or true RMS current measuring instrument**, connected to terminal T2, to allow the amount of DC current flowing in the motor to be limited to no more than 2.8 times the motor rated current for Delta connected motors or (35A for 7.5kW units), (50A for 11kW units), (65A for 15kW units).

Fuses F2 to motor start rated (aM).

Fuses F3 to always be replaced with 50A rated superfast or ultrafast semiconductor fuses <1800 A².

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Basic Setting: Set pot (M_{on}) to min (anti clockwise), set ramp time delay (t_{on}) to 20-25sec ("10" on /001 versions) ("8" on /600, /231 30sec versions), set braking current (I_{br}) to min (fully anticlockwise), set brake time (t_{br}) to max (fully clockwise). Initiate a start cycle and turn up the pot (M_{on}) until the motor starts to turn without excessive humming for no more than 0.5 of a second normally set 0 - 5, then reduce the ramp time (t_{on}) to a suitable time span. Initiate a stop cycle and turn up current pot (I_{br}) slowly to a maximum of no more than 2.8 x the motor line current or 65A for 15kW units. Reduce brake time pot (t_{br}) to a suitable level. Restart the motor and fine tune the settings until the required start and stop times are achieved.

Please note as the BI 9028 is a two phase controlled unit, constant start and restarts during set up may cause the overload F4 to trip prematurely due to uneven heating. If this occurs allow the overload to cool, reset it and then proceed with set up.

Description

Wiring Information / _1 Versions.

Connect wiring for phases L2, L3 to fuses (F3) and then respectively to terminals L1(1) and L2 (3) on overload (F4), link T1(2) to L3(5). Phase L1 is connected directly to terminal L1 on BI 9028. Terminals T2 (4), T3 (6) on (F4) are connected to terminals L2, L3 on BI 9028, see diag 1.

The motor must be reconfigured in Delta and connected to terminals T1, T2, T3 on BI 9028. The N/C stop button is wired to terminals X3 - X4 and the N/O start button to terminals X4 - X1. For auxiliary supply connections to BI 9028 see previous page.

All control wiring to be 2.5 mm² min, Conduit or gland entry, 20 mm or 25 mm. All wiring to fuses F3, terminals on overload F4, L1, L2, L3, T1, T2, T3 and power terminals on BI 9028, L1, L2, L3 and T1, T2, T3 to be 6mm² stranded min.

Application Circuit Diagram

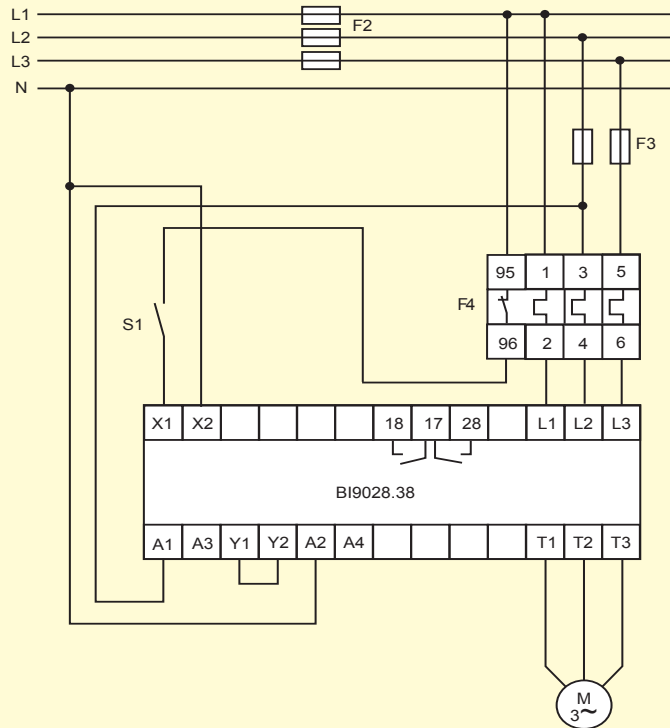
Contact control Via S1 BI 9028.38/600 option

Fuses F3 to be superfast or ultrafast semi-conductor fuses rated at 50A

NB: Contact controlled variant via S1, to special order only.

110V / 230Vac, 24Vdc auxiliary supply option shown set to 230V, these options are only required when the motor Voltage is not 400V.

For standard 400V option, A1-A2 is connected to terminals 3 & 5.



NB: Overload configuration for light duty starting only

Star delta motors must be rewired permanently into delta configuration

Diag 2

Notes

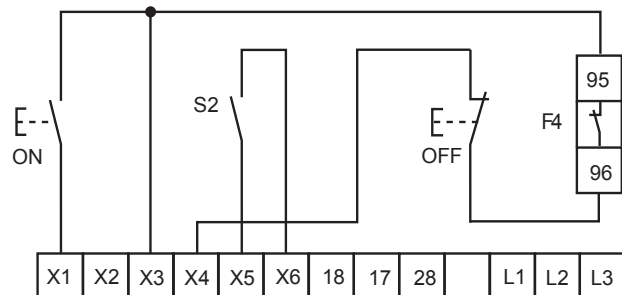
Key switch override of braking function, see product SX9033/401
An external key switch may be used to override the braking function of BI 9028.38/231 for machine set up purposes, ie machine jogging.

A key switch with a N/O contact (S2) should be connected as per the adjacent diagram 3. Closing the key switch will inhibit the braking function and only allow the machine to be operated while the start button is depressed, releasing the start button will cause the machine to coast to a stop. If the stop button is depressed while inputs X5-X6 are bridged a braking cycle will take place and the module function will be inhibited until the key switch contact is opened then closed again.

Safety Notes: limit jog functions to no more than 3 per min / 6 min off. **The key should always be removed** before the machine is used. If the keyswitch is closed before power is applied to L1, L2 the module will be inhibited. To reset, open the key switch and momentarily remove power from A1, A2.

When replacing older /131 versions with /231 version, wiring must be modified to the latest circuit diagram for switch S2.

Key Switch Connection, Brake Override Option (S2)



SX9033/401 Option
BI9028N.38/231 Keyswitch override of braking function (S2) 1N/O contact, open when key removed

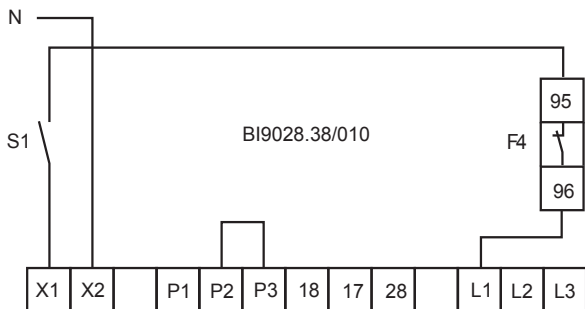
Diag 3

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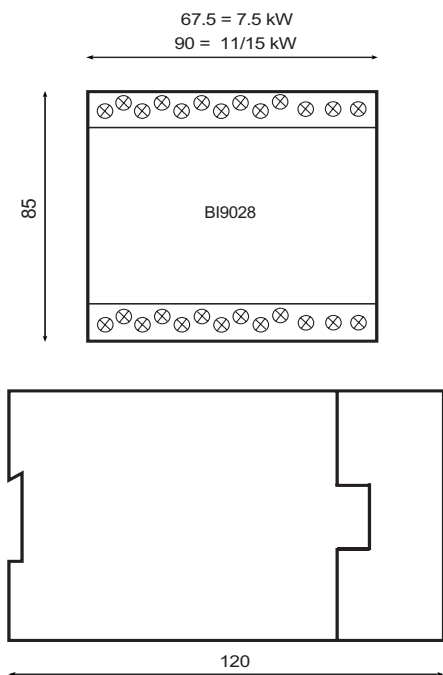


Temperature Monitoring Input Option /010



Fit Link to P2 - P3 if no monitoring device on motor
Connect N/C bimetallic contact to P2 - P3
Connect PTC to P1 - P2 (up to 6 in series)

Dimensions



kW / Current Overload Options

Motor kW Rating @ 400V	O/L Current Range
7.5 - 11kW	16 - 24A
11 - 15kW	24 - 40A

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Indication & Flashing LED Fault Codes

Green LED 1, (ON) when power connected
(Flashing) when Starting or Braking.

Monitoring Relay 1, Contact 17-18

/000 and /001 version of BI 9028, **Yellow LED 2**, (ON) when relay energised, 17-18 closed for duration of the start and stop cycle.

/231 & /600 version of BI 9028, **Yellow LED 2**, (ON) when relay energised, 17-18 closed when full speed is reached and is de energised when a stop button is activated (used to interlock feed and scorer motor starters). **Yellow LED 2** flashing when brake override mode is active.

Monitoring Relay 2, Contact 17-28

Yellow LED 3, (ON) when relay energised, 17-28 closed, relay healthy.

Yellow LED 3 (Flashing) = Fault, 17-18, 17-28 relays open.

LED 3 will pulse for the number of pulses shown below then pause and repeat the cycle until the fault is cleared.

- 1 - pulse Over temperature of semiconductors.
- 2 - pulses PTC over temperature on Motor, /01_ version.
- 3 - pulses Short on PTC sensor circuit, /01_ version.
- 4 - pulses Phase failure.
- 5 - pulses Incorrect phase sequence.
- 6 - pulses Incorrect frequency.
- 7 - pulses Brake override enabled at power up, /131, /231 version.

Faults can be reset after they are cleared, by removing the power to the auxiliary supply terminals A1 - A2 for 5 seconds.

Specifications

Nominal Voltage	200 to 480Vac
Voltage Tolerance	0.8 - 1.1Vn
Auxiliary Voltage	110Vac + 230Vac + 24Vdc or 400Vac
Frequency	50 to 60Hz
kW Rating @ 400V	7.5, 11, 15kW (to be specified)
Burden	3VA
Control Input Voltage	X1, X2, 24 to 230V ac/dc X3, X4, X5, 24V ac/dc
Soft start	X1-X2 > 15V
Braking	X1-X2 < 5V
Start Torque (Mon)	30 to 80%
Soft Start Time Delay (tbr)	1 to 30 sec, /600, /231 version
Braking Current (ibr)	0.5 - 65A
Braking Time Delay (tbr)	1 to 30 sec, /600, /231 version
Reaction Time	1 sec
Stops Per Hour @ 50A	25 / Hr @ 10 sec duration
Control Contact Ratings	400V (AC1) 3A
Control Contact Fuse Rating	4A gL
Max Semiconductor Fuse Rating	7.5kW <1800 A ² s 11/15kW <6600 A ² s
Temperature Range	-20 - +55°C
Protection Class	Case IP65, Terminals IP20
Enclosure Material	Thermoplastic Vo rating UL94
Terminations	2 x 2.5mm ² solid 2 x 1.5mm ² stranded ferruled 1 x 6mm ² stranded ferruled

Information Required With Order

• Model type • Auxiliary supply voltage • kW •

Example: Soft Start Brake Module, BI9028.38/231, 400V, 15kW