# Fuji Duo Series Manual Motor Starters

The manual motor starter is a protective device for motor use that provides optimal protection by integrating the functions of a molded case circuit breaker and thermal overload relay into a compact unit. Since Fuji's MMS is UL listed for Category E self-protected motor control, it can be used for motor branch circuit protection without the need for additional protection such as fuses or molded case circuit breakers. The MMS is available in a 32A version with a 45mm frame width, and a 63A version with a 55mm frame width. Both MMS versions have high breaking capacities, up to 100,000A in some ranges. A wide range of accessories is available, including shunt trips and undervoltage releases.

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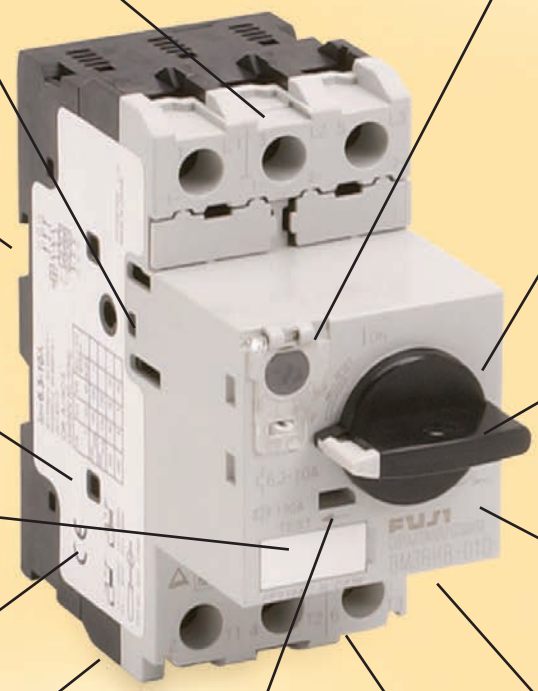


Auxiliary and alarm contact blocks

Shunt trips and undervoltage releases

MMS external handles

MMS Busbars

# Accessories

# Fuji Duo Series Manual Motor Starters

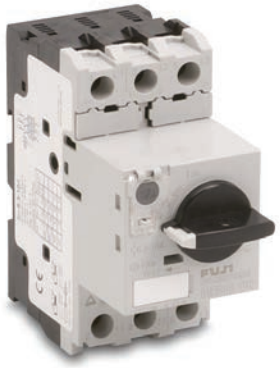
## General Information

***Features***

- Adjustable thermal-magnetic trip
- Available in two frame sizes, 45mm width and 55mm width
- A wide motor capacity range up to 40 hp, 3-phase (440/480 VAC, 63A); 60 hp @ 600V
- Rotary handle operators
- On/Off and trip state indicators for all frames
- Max. breaking capacity of 100 kA (240 VAC)
- Common accessories to reduce inventory
- A wide rated operational current range of up to 32A for the 45mm wide and 63A for the 55mm wide starters
- ON/OFF and trip indicators for instant status recognition
- Accessories such as auxiliary contact blocks, shunt trip devices, and undervoltage trip devices are compatible with the 45mm and 55mm wide frame sizes
- External operating handles are available as optional accessories
- Lockout/tagout feature

***Standards***

- UL listed, file E163944, Standard UL 508
- cUL listed, file E163944, CSA C22.2 No.14
- TÜV, CE
- cULus listed for group installation per NEC 430-53(c)



### BM3RHB-xxx Models (45mm wide)

Rated current: 0.16 to 32A

Rated insulation voltage: 690V

Operation handle: Rotary

Short circuit current rating:

- 100 kA at 240 VAC
- 50 kA at 480 VAC

NOTE: When using BM3RHB-xxx MMS in a UL Type E application, you must also use part numbers BZ0TKUAB (short-circuit contact block) and BZ0TCRE (line side terminal cover).

### BM3VHB-xxx Models (55mm wide)

Rated current: 10 to 63A

Rated insulation voltage: 1000V

Operation handle: Rotary

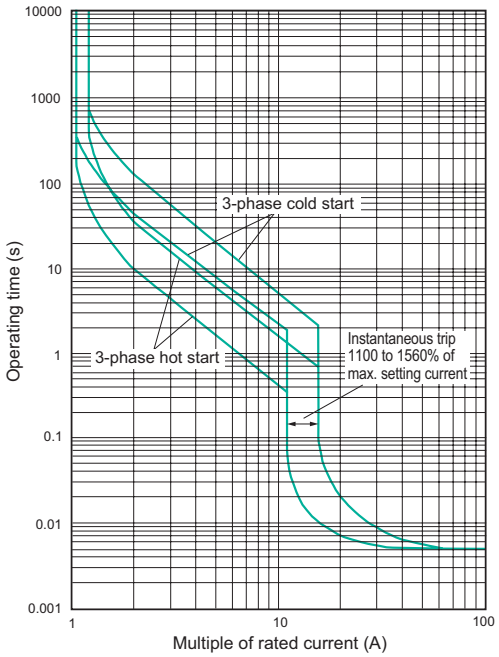
Short circuit current rating:

- 100 kA at 240 VAC
- 50 kA at 480 VAC

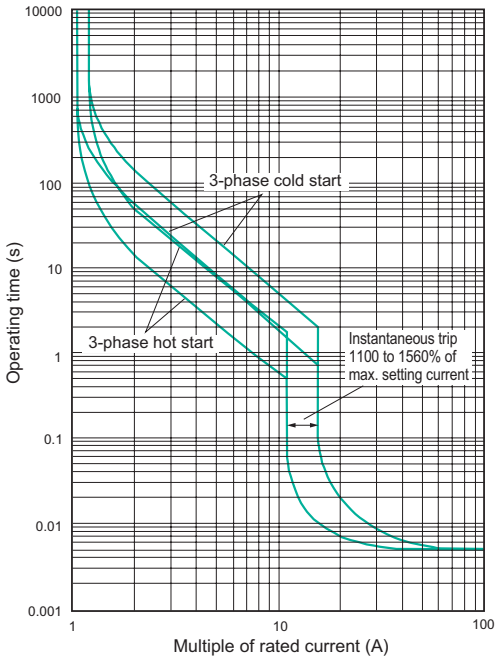
NOTE: When using BM3VHB-xxx MMS in a UL Type E application, you must also use part number BZ0TKUAB (short-circuit contact block).

## Characteristic curves

BM3RHB




BM3VHB



# Fuji Duo Series Manual Motor Starters

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## BM3RHB-xxx Specifications

### General Specifications: 45mm Frame Width - BM3RHB-xxx Series

| Part Number | Price | Adjustable Current Range Ie: Min.-Max. (A) | UL/CSA 3-Phase HP Rating[1] 200- 208 VAC | 220-240 VAC | 440-480 VAC | 550-600 VAC | Instant-aneous Trip Current (A) | UL/CSA Short Circuit Current Rating (kA)2 240 VAC | 480 VAC | 600 VAC | Max. Listed Branch Circuit Protection - Fuse or MCCB (A)[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BM3RHB-P16 | | 0.1-0.16 | Rated to motor full-load amperage | | In accordance with motor full-load current | | 2.1 | 100 | 50 | 10 | 500 |
| BM3RHB-P25 | | 0.16-0.25 | | | | | 3.3 | 100 | 50 | 10 | 500 |
| BM3RHB-P40 | | 0.25-0.4 | | | | | 5.2 | 100 | 50 | 10 | 500 |
| BM3RHB-P63 | | 0.4-0.63 | | | | | 8.2 | 100 | 50 | 10 | 500 |
| BM3RHB-001 | | 0.63-1 | | | | 1/2 | 13 | 100 | 50 | 10 | 500 |
| BM3RHB-1P6 | | 1-1.6 | | | 3/4 | 3/4 | 20.8 | 100 | 50 | 10 | 500 |
| BM3RHB-2P5 | | 1.6-2.5 | 1/2 | 1/2 | 1 | 1-1/2 | 32.5 | 100 | 50 | 10 | 500 |
| BM3RHB-004 | | 2.5-4 | 3/4 | 3/4 | 2 | 3 | 52 | 100 | 50 | 10 | 500 |
| BM3RHB-6P3 | | 4-6.3 | 1 | 1-1/2 | 3 | 5 | 81.9 | 100 | 50 | 10 | 500 |
| BM3RHB-010 | | 6.3-10 | 2 | 3 | 5 | 7-1/2 | 130 | 100 | 50 | 10 | 500 |
| BM3RHB-013 | | 9-13 | 3 | 3 | 7-1/2 | 10 | 169 | 100 | 50 | 10 | 500 |
| BM3RHB-020 | | 14-20 | 5 | 5 | 10 | 15 | 260 | 100 | 50 | 10 | 500 |
| BM3RHB-025 | | 19-25 | 7-1/2 | 7-1/2 | 15 | 20 | 325 | 100 | 50 | 10 | 500 |
| BM3RHB-032 | | 24-32 | 10 | 10 | 20 | 30 | 416 | 100 | 50 | 10 | 500 |

Note 1: BM3RHB-xxx are cUL listed as HP rated motor controllers. Note 2: BM3RHB-xxx are cUL listed for group installation per NEC430-53(C).

### General Specifications: 45mm Frame Width - BM3RHB-xxx Series - continued

| | | |
|---|---|---|
| Features | | Adjustable thermal-magnetic trip type |
| Number of Poles | | 3 |
| Handle Type | | Rotary |
| Rated Current $I_e$ (A) | | 0.16 to 32 |
| Rated Operational Voltage $U_e$ (V) | | 200 to 690 |
| Rated Frequency (Hz) | | 50/60 |
| Rated insulation Voltage $U_i$ (V) | | 690 |
| Rated Impulse Withstand Voltage Uimp (kV) | | 6 |
| Utilization Category | IEC 60947-2 Circuit Breaker | Cat. A |
| | IEC 60947-4-1 Motor Starter | AC-3 |
| Trip Class IEC 60947-4-1 | | 10 |
| Instantaneous Trip Characteristic | | 13 x $I_e$ max. |
| Power Loss (total of 3-pole) | | 7W: $I_n$=0.16 to 25A 8.5W: $I_n$=32A |
| Mechanical Durability (operations) | | 100,000: $I_n$=0.16 to 25A 70,000: $I_n$=32A |
| Electrical Durability (operations) | | 100,000: $I_n$=0.16 to 25A 70,000: $I_n$=32A |
| Max. Operations per Hour (motor start-up) | | 25 |
| Phase-loss Protection | | Provided |
| Trip Indicator | | Provided |
| Test Trip Function | | Provided |
| Dimensions (mm) WxHxD | | 45x90x79 |
| Weight (oz [g]) | | 13.05 [370] |
| Optional Accessories | Auxiliary Contact Block | Yes |
| | Alarm Contact Block | Yes |
| | Auxiliary and Alarm Contact Block | Yes |
| | Short-Circuit Alarm Contact Block | Yes |
| | Shunt Trip Device | Yes |
| | Undervoltage Trip Device | Yes |
| | External Operating Handle | Yes |
| Standards & Agency Approvals | | IEC 60947-1, 60947-2, 60947-4-1, UL 508 file E163944, CSA C22.2 No.14 file 20479 |

# Fuji Duo Series Manual Motor Starters

## BM3VHB-xxx Specifications

| General Specifications: 55mm Frame Width - BM3VHB-xxx Series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Part Number | Price | Adjustable Current Range | UL/CSA 3-Phase hp Rating[1] | | | | Instantaneous Trip Current (A) | UL/CSA Short Circuit Current Rating (kA)[2] | | | Max. Listed Branch Circuit Protection - Fuse or MCCB (A)[2] |
| | | Ie: Min.-Max. (A) | 200-208 VAC | 220-240 VAC | 440-480 VAC | 550-600 VAC | | 240 VAC | 480 VAC | 600 VAC | |
| BM3VHB-010 | | 6.3-10 | 2 | 3 | 5 | 7-1/2 | 130 | 100 | 50 | 10 | 600 |
| BM3VHB-013 | | 9-13 | 3 | 3 | 7-1/2 | 10 | 169 | 100 | 50 | 10 | 600 |
| BM3VHB-016 | | 11-16 | 3 | 5 | 10 | 10 | 208 | 100 | 50 | 10 | 600 |
| BM3VHB-020 | | 14-20 | 5 | 5 | 10 | 15 | 260 | 100 | 50 | 10 | 600 |
| BM3VHB-025 | | 19-25 | 7-1/2 | 7-1/2 | 15 | 20 | 325 | 100 | 50 | 10 | 600 |
| BM3VHB-032 | | 24-32 | 10 | 10 | 20 | 30 | 416 | 100 | 50 | 10 | 600 |
| BM3VHB-040 | | 28-40 | 10 | 10 | 30 | 30 | 520 | 100 | 50 | 10 | 600 |
| BM3VHB-050 | | 35-50 | 15 | 15 | 30 | 40 | 650 | 100 | 50 | 10 | 600 |
| BM3VHB-063 | | 45-63 | 20 | 20 | 40 | 60 | 819 | 100 | 50 | 10 | 600 |

Note 1: BM3VHB-xxx are cUL listed as HP rated motor controllers. Note 2: BM3VHB-xxx are cUL listed for group installation per NEC430-53(C).

| General Specifications: 55mm Frame Width - BM3VHB-xxx Series - continued | | |
|---|---|---|
| Features | | Adjustable thermal-magnetic trip type |
| Number of Poles | | 3 |
| Handle Type | | Rotary |
| Rated Current $I_e$ (A) | | 10 to 63 |
| Rated Operational Voltage $U_e$ (V) | | 200 to 690 |
| Rated Frequency (Hz) | | 50/60 |
| Rated Insulation Voltage $U_i$ (V) | | 1,000 |
| Rated Impulse Withstand Voltage Uimp (kV) | | 8 |
| Utilization Category | IEC 60947-2 Circuit Breaker | Cat. A |
| | IEC 60947-4-1 Motor Starter | AC-3 |
| Trip Class IEC 60947-4-1 | | 10 |
| Instantaneous Trip Characteristic | | 13 x $I_e$ max. |
| Power Loss (total of 3-pole) | | 11W: $I_n$ = 10 to 32A 15W: $I_n$ = 40 to 50A 17W: $I_n$ = 63A |
| Mechanical Durability (operations) | | 50,000 |
| Electrical Durability (operations) | | 25,000 |
| Max. Operations per Hour (motor start-up) | | 25 |
| Phase-Loss Protection | | Provided |
| Trip Indicator | | Provided |
| Test Trip Function | | Provided |
| Dimensions (mm) WxHxD | | 55x110x96 |
| Weight (oz [g]) | | 27.51 [780] |
| Optional Accessories | Auxiliary Contact Block | Yes |
| | Alarm Contact Block | Yes |
| | Auxiliary and Alarm Contact Block | Yes |
| | Short-Circuit Alarm Contact Block | Yes |
| | Shunt Trip Device | Yes |
| | Undervoltage Trip Device | Yes |
| | External Operating Handle | Yes |
| Standards & Agency Approvals | | IEC 60947-1, 60947-2, 60947-4-1, UL 508 file E163944, CSA C22.2 No.14 file 20479 |

# Fuji Duo Series Manual Motor Starters

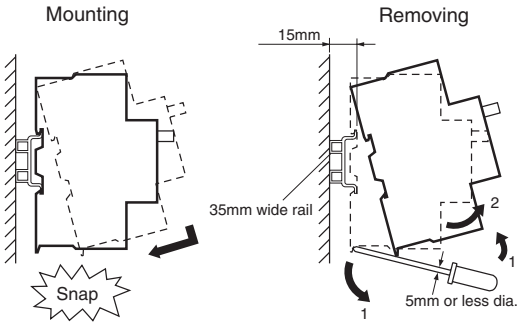
***DIN-rail mounting***
The MMS can be mounted to a 35mm DIN rail. Secure the rail with screws at mounting pitch of less than 400mm for the BM3R type and less than 300mm for the BM3V type.

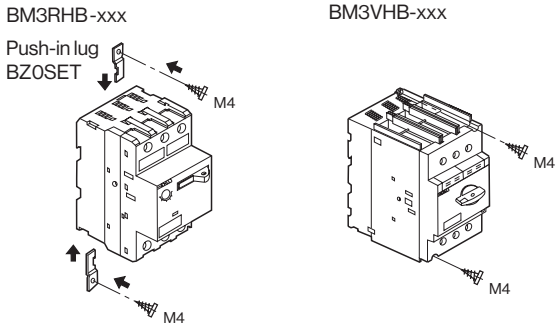
Applicable rail:

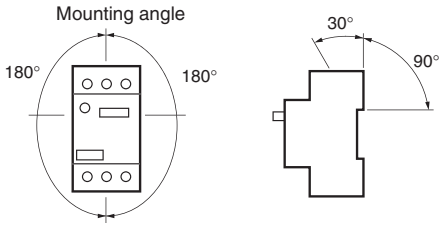
Use a 15mm-high DIN rail, such as our DN-R35HS1, which conforms to EN-50022 and IEC715.

The standard DIN rail mounting direction is horizontal. When using the MMS on vertically mounted DIN rail, use end clamps.

***Screw mounting***
The separately sold push-in lug (BZ0SET) is required for screw mounting the BM3R frame. The BM3V frame can be screw mounted directly to the panel.




***Wiring***
While pressing the wire with a screwdriver, tighten the screw to the specified tightening torque.

## Environmental Specifications

| | | |
|---|---|---|
| ***Ambient Temperature*** | Operating: -5 to +55 °C<br>Storage: -40 to +65 °C | No sudden temperature changes resulting in condensation or icing. |
| ***Humidity*** | 45 to 85%RH | |
| ***Altitude*** | 2000m or lower | |
| ***Atmosphere*** | No excessive dust, smoke, corrosive gases, flammable gases, steam or salt. | |
| ***Vibration*** | 10 to 55 Hz 15 m/s2 | No abnormal shock or vibration. |
| ***Shock*** | 50 m/s2 | |

***Wiring Specifications***

## Wire Size and Tightening Torque

| ***Type*** | | ***BM3RHB-xxx*** | ***BM3VHB-xxx*** | ***BZ0 Accessories*** |
|---|---|---|---|---|
| ***Solid Wire (mm)*** | | 1.6 to 2.6 dia. | 1.6 to 2.6 dia. | 1 to 1.6 dia. |
| ***Stranded Wire (mm2)*** | ***Single-wire***<br>***2-wire*** | 1 to 10<br>1 to 6 | 1 to 25<br>1 to 16 | 0.5 to 2.5<br>0.5 to 2.5 |
| ***AWG*** | ***Single-wire***<br>***2-wire*** | 18 to 8<br>18 to 10 | 18 to 4<br>18 to 4 | 18 to 14<br>18 to 14 |
| ***Sheath Stripping Length (mm)*** | | Approx.10 | Approx.13 | Approx.10 |
| ***Terminal Screw*** | | Pan head screw (PZ2) M4 | Pan head screw (PZ2) M6 | Pan head screw (PZ2) M3.5 |
| ***Tightening Torque (N·m)*** | | 2 | 4 | 0.8 |

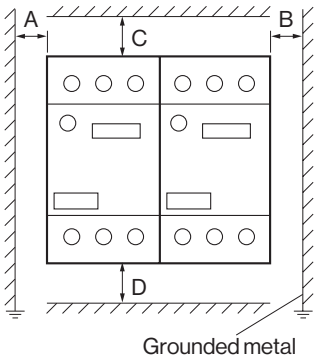
**Note: There is no need for a crimp terminal or any other terminal on the end of the connection wire.**

***Arc Space Requirements***

## Arc Space Requirements

| ***Part Number*** | ***Rated operational voltage $U_e$*** | ***Minimum distance to grounded metal (mm)*** | |
|---|---|---|---|
| | ***(V)*** | ***A,B*** | ***C,D*** |
| ***BM3RHB-xxx*** | Up to 500 | 15 | 30 |
| | Up to 690 | 40 | 50 |
| ***BM3VHB-xxx*** | Up to 500 | 15 | 40 |
| | Up to 690 | 40 | 50 |

***When frames are mounted side-by-side, operating conditions such as a high ambient temperature or using the maximum setting for continuous carrying current may cause slight changes in operating characteristics due to temperature rises. Under such conditions, it is recommended that the frames be separated by at least 5mm.***



# Fuji Duo Series Manual Motor Starters Accessories

## Optional accessories

- All accessories can be used with BM3R (45mm wide) and BM3V (55mm wide) frames
- Accessories are easily mounted
- Internally-mountable auxiliary contact blocks and alarm contact blocks can be front mounted
- Side-mountable auxiliary contact blocks can be mounted on the left side
- Shunt trip and undervoltage trip devices are available in a wide operating coil voltage range and mount on the right side
- Standard and emergency external handles are available
- IP20 terminal cover helps prevent accidental contact with electrically charged parts
- Optional front mounted contact and alarm blocks eliminate horizontal space needed with the DIN rail

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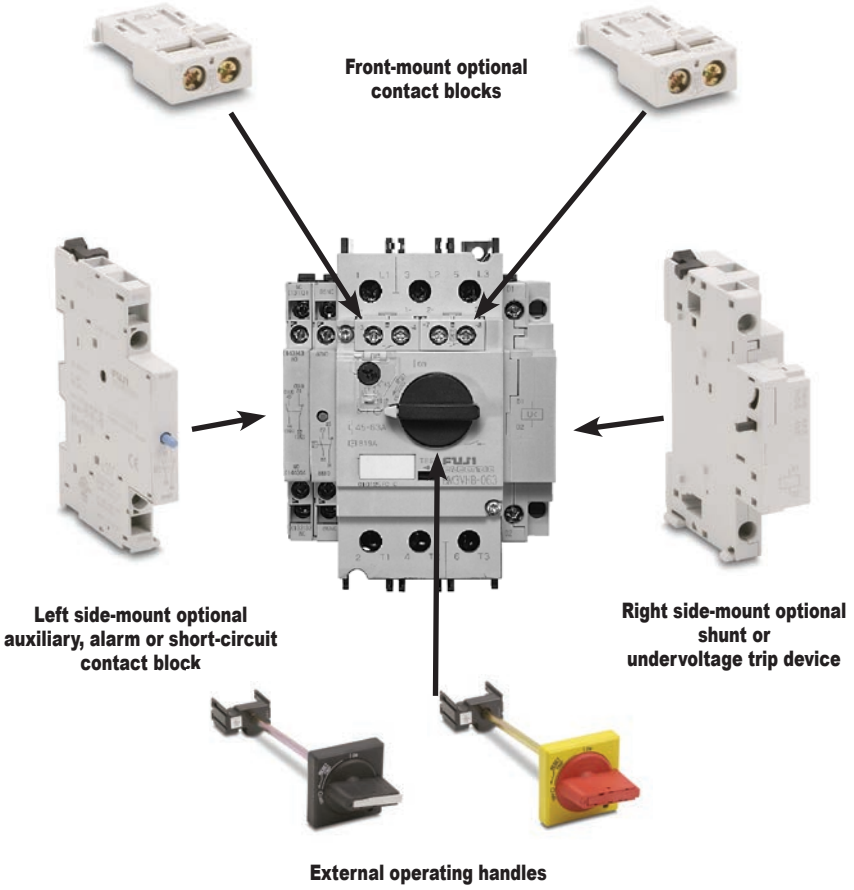
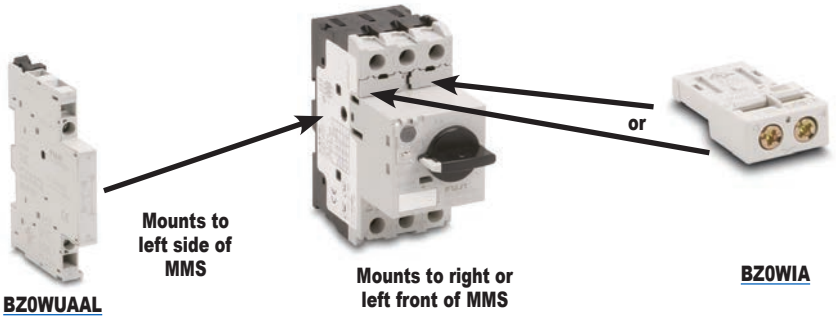
***Installation of optional contact blocks and trip devices***




***Auxiliary contact blocks***




| Auxiliary Contact Blocks | | | | | | |
|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Description* | *Starter Type* | *Mounting* | *Contact Arrangement* | *Weight (g [lb])* |
| BZ0WIA | | These contact blocks do not discriminate between OFF, overload, phase-loss, or short circuit. The blocks are linked to the ON/OFF operation of the MMS, and also operate in the event of an overload, phase-loss, or short circuit. Up to two contact blocks can be mounted to the right/left front, and up to two contact blocks can be mounted to the left sides. | BM3RHB-xxx BM3VHB-xxx | Front | 1 N.O. | 9 [0.02] |
| BZ0WIB | | | | | 1 N.C. | |
| BZ0WUAAL | | | | Left side | 2 N.O. | 45 [0.1] |
| BZ0WUABL | | | | | 1 N.O. + 1 N.C. | |
| BZ0WUBBL | | | | | 2 N.C. | |

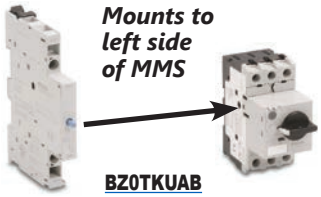
# Fuji Duo Series Manual Motor Starters Accessories

## Accessories (continued)

Fuji Electric

***Alarm contact blocks***

| Alarm Contact Blocks | | | | | | |
|---|---|---|---|---|---|---|
| ***Part Number*** | ***Price*** | ***Description*** | ***Starter Type*** | ***Mounting*** | ***Contact Arrangement*** | ***Weight (g [lb])*** |
| ***BZ0KIA*** | | This block operates when the MMS trips due to overload, phase-loss, or short-circuit. It is not linked to the ON/OFF operation of the MMS. Note: Operation can be checked with the test trip function. | BM3RHB-xxx BM3VHB-xxx | Front (Right side only) | 1 N.O. | 9 [0.02] |
| ***BZ0KIB*** | | | | | 1 N.C. | |




***Note 1: Required when using MMS in a UL Type E application.***
***Note 2: Do not configure this with an auxiliary contact block; the contact will only close when a short circuit occurs.***

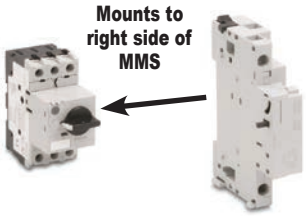
***Short-circuit alarm contact blocks***

| Short-Circuit Alarm Contact Block | | | | | | |
|---|---|---|---|---|---|---|
| ***Part Number*** | ***Price*** | ***Description*** | ***Starter Type*** | ***Mounting*** | ***Contact Arrangement*** | ***Weight (g [lb])*** |
| ***BZ0TKUAB*** | | • The contacts operate only when the MMS has tripped due to a short-circuit (cannot be checked with trip test function).<br>• When these contacts operate, the blue reset button extends out, and a trip indication is displayed.<br>• The power to the MMS can be turned ON after pressing the reset button.<br>• Note: Be sure to press the reset button before mounting to the MMS. | BM3RHB-xxx BM3VHB-xxx | Left | 1 N.O. + 1 N.C. | 45 [0.1] |

| Contact Status | | | | | |
|---|---|---|---|---|---|
| ***Contact Type*** | | ***Device Condition*** | | | |
| | | OFF | ON | ***Tripped*** | |
| | | | | ***Overload or Phase-loss*** | ***Short Circuit*** |
| ***AUX CONTACT, BZ0WIA, BZ0WIB, BZ0WUAAL, BZ0WUBBL, BZ0WUABL*** | ***N.O.*** | Open | Closed | Opens | |
| | ***N.C.*** | Closed | Open | Closes | |
| ***ALARM CONTACT BZ0KIA, BZ0KIB*** | ***N.O.*** | Open (no change) | Open (no change) | Closes | |
| | ***N.C.*** | Closed (no change) | Closed (no change) | Opens | |
| ***SHORT-CIRCUIT CONTACT BZ0TKUAB*** | ***N.O.*** | Open (no change) | Open (no change) | Open (no change) | Closes |
| | ***N.C.*** | Closed (no change) | Closed (no change) | Closed (no change) | Opens |

# Fuji Duo Series Manual Motor Starters Accessories

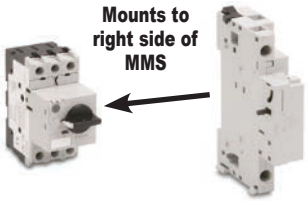
## Accessories (continued)




BZ0FAZU

### *Shunt trip devices*

| Shunt Trip Devices | | | | | | |
|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Description* | *Starter Type* | *Mounting* | *Contact Arrangement* | *Weight (g [lb])* |
| BZ0FAZU<br>BZ0FDZU | | This device is used to remotely trip the MMS.<br>*Notes:*<br>*• This device cannot be used together with an undervoltage trip device.*<br>*• When the MMS has been tripped with the shunt trip device, press the reset button before turning ON the power.* | BM3RHB-xxx<br>BM3VHB-xxx | Right | 110-127V 50 Hz/120V 60 Hz | 115 [0.25] |
| BZ0FKZUD | | | | | 24-60VDC<br>(time rating of coil is 5s) | |




BZ0RDZU

### *Undervoltage trip devices*

| Undervoltage Trip Devices | | | | | | |
|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Description* | *Starter Type* | *Mounting* | *Contact Arrangement* | *Weight (g [lb])* |
| BZ0RDZU | | This device automatically trips the MMS when the control circuit voltage drops below the specified value.<br>*Notes:*<br>*This device cannot be used together with a shunt trip device.*<br>*When the MMS has been tripped with the undervoltage trip device, press the reset button before turning ON the power.* | BM3RHB-xxx<br>BM3VHB-xxx | Right | 110-127V 50 Hz/120V 60 Hz | 115 [0.25] |
| BZ0R4ZU | | | | | 415-440V 50 Hz/460-480V 60 Hz | |

BZ0SET

### *Push-in lug*

| Push-in Lug | | | | |
|---|---|---|---|---|
| *Part Number* | *Price* | *Description* | *Starter type* | *Weight (g [lb])* |
| BZ0SET | | Push-in mounting lug. Required for screw mounting of MMS; qty: 10/pkg | BM3RHB-xxx | 2.0 [0.004] |

**Note: See page MRC-tMRC-72 for installation instructions**

BZ0TCRE

### *Terminal Cover*

| Terminal Cover | | | |
|---|---|---|---|
| *Part Number* | *Price* | *Description* | *Starter Type* |
| BZ0TCRE | | Line side terminal cover. | BM3RHB-xxx |

**Notes: BZ0TCRE required only when using BM3RHB-xxx MMS in a UL Type E application (along with short circuit alarm contact block BZ0TKUAB).**
**If using BZ0TCRE terminal cover with BM3R series MMS, the busbar system and front mounted contacts cannot be used.**

# Fuji Duo Series Manual Motor Starters Accessories

## Accessories (continued)

***External operating handles***

**BZ0VBBL**

Fuji Electric

| External Operating Handles | | | | | |
|---|---|---|---|---|---|
| ***Part Number*** | ***Price*** | ***Description*** | ***Starter Type*** | ***Handle Type*** | ***Weight (g [lb])*** |
| ***BZ0VBBL*** | | • Used to operate an MMS installed inside a panel, from the outside of the panel.<br>• Equipped with an interlock mechanism that prevents someone from mistakenly opening the panel door when the MMS is in the ON state.<br>• The shaft can be cut to match the distance between the MMS and the panel door.<br>• Door interlock function<br>• OFF lock function<br>• Can be locked OFF with up to three padlocks. Note: Padlocks are to be provided by the customer.<br>• Release screw allows the door to be opened with the handle in the ON position.<br>• IP54 enclosure | BM3RHB-xxx | Standard (black) | 160 [0.35] |
| ***BZ0VBBM*** | | | BM3VHB-xxx | Standard (black) | 160 [0.35] |
| ***BZ0VYRM*** | | | | Emergency (red/yellow) | 160 [0.35] |

***NOTE: Premade MMS enclosures are currently not available.***

## Accessory Specifications

| Trip Device Specifications | | | |
|---|---|---|---|
| ***Accessory Type and Part Number*** | | ***Shunt trip device*** | ***Undervoltage device*** |
| | | ***BZ0Fxxx*** | ***BZ0Rxxx*** |
| ***Standard*** | | IEC 60947-1, UL 508 | |
| ***Rated Insulation Voltage (VAC)*** | IEC 60947 | 690 | |
| | UL 508 | 600 | |
| ***No. of ON-OFF Operations*** | | 5000 | |
| ***Operating Time (ms)*** | | 20 | |
| ***Power Consumption*** | Inrush (VA/W) | 21/12 | |
| | Sealed (VA/W) | 8/1.2 | |
| ***Voltage Range*** | Tripping Voltage (V) | 0.7 to 1.1 Ue | 0.35 to 0.7 Ue |
| | Closing Voltage (V) | - | 0.85 to 1.1 Ue |
| ***Time Rating of Coil (s)*** | | AC: Continuous | AC: Continuous |
| | | DC: 5 | |

# Fuji Duo Series Manual Motor Starters Accessories

## Accessory specifications (continued)

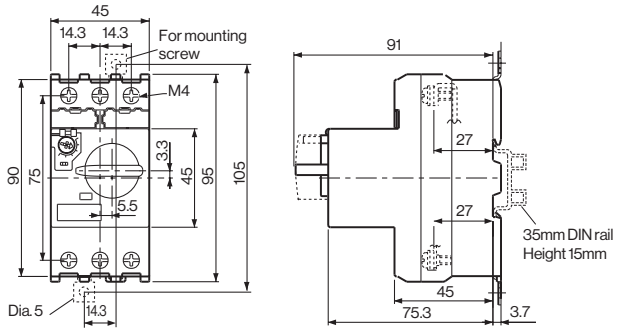
| Contact Block Specifications | | | | | |
|---|---|---|---|---|---|
| Accessory Type and Part Number | | Auxiliary contact block/front | Auxiliary contact block/side | Alarm contact block | Short-circuit alarm contact block |
| | | BZ0WIA, BZ0WIB (note 3) | BZ0WUAAL BZ0WUABL BZ0WUBBL | BZ0KIA, BZ0KIB (note 3) | BZ0TKUAB |
| Standard | | IEC 60947-5-1, UL 508 | | | |
| Rated Operational Current (A) | 48 VAC AC-15 (note 2) | 5 | 6 | 5 | 6 |
| | 125 VAC | 3 | 4 | 3 | 4 |
| | 230 VAC | 1.5 | 4 | 1.5 | 4 |
| | 400 VAC | (note 3) | 2.2 | (note 3) | 2.2 |
| | 500 VAC | | 1.5 | | 1.5 |
| | 690 VAC | | 0.6 | | 0.6 |
| | 48 VDC DC-13 (note 2) | 1.38 | 5 | 1.38 | 5 |
| | 110 VDC | 0.55 | 1.3 | 0.55 | 1.3 |
| | 220 VDC | 0.27 | 0.5 | 0.27 | 0.5 |
| Contact Rating Code UL 508 (note 1) | AC | B300 | A600 | B300 | A600 |
| | DC | Q300 | P300 | Q300 | P300 |
| Min. Voltage and Current | | 17V / 5 mA | | | |

Note 1: NEMA ICS 5-2000. For more information, refer to Control Circuit Contact Electrical Ratings, page MRC-tMRC-129.
Note 2: IEC utilization category. For more information, refer to page MRC-tMRC-130.
Note 3: The indicated contacts should not be used in control circuits higher than 300V.

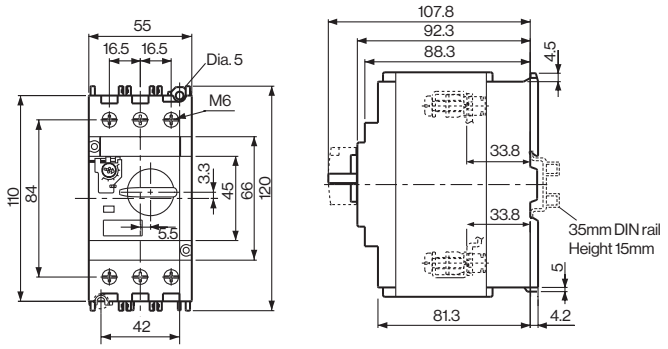
## Dimensions [mm]

***Manual motor starters***

Rotary handle types BM3RHB-xxx




Rotary handle types BM3VHB-xxx

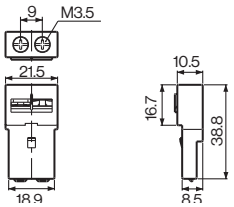


# Fuji Duo Series Manual Motor Starters Accessories

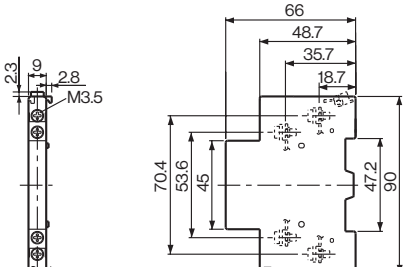
## Dimensions (continued) [mm]

***Accessories***

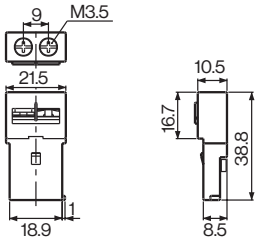
Auxiliary contact blocks, front mounting
BZ0WIA, BZ0WIB



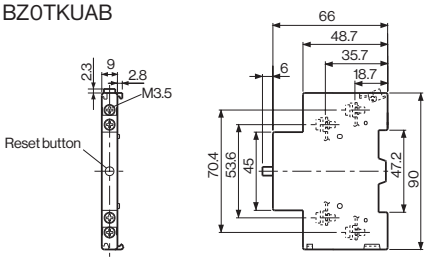

Auxiliary contact blocks, side mounting
BZ0WUAAL, BZ0WUABL, BZ0WUBBL



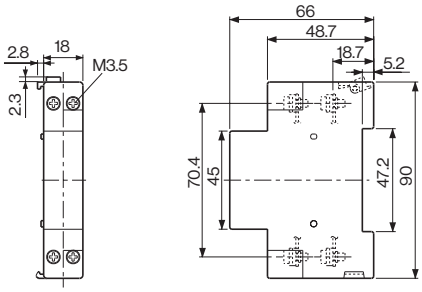

Alarm contact blocks, front mounting
BZ0KIA, BZ0KIB




Short-circuit alarm contact block
BZ0TKUAB

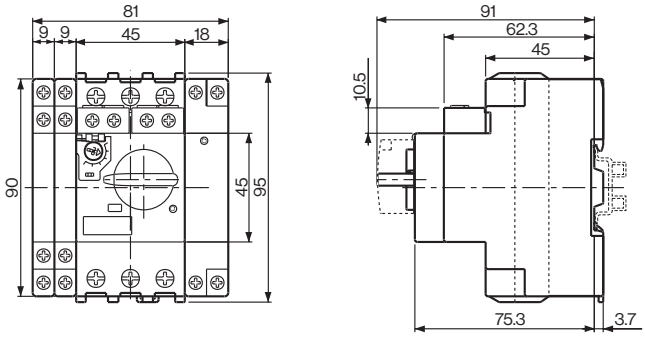



Shunt trip devices BZ0Fxxxx
Undervoltage trip devices BZ0Rxxxx

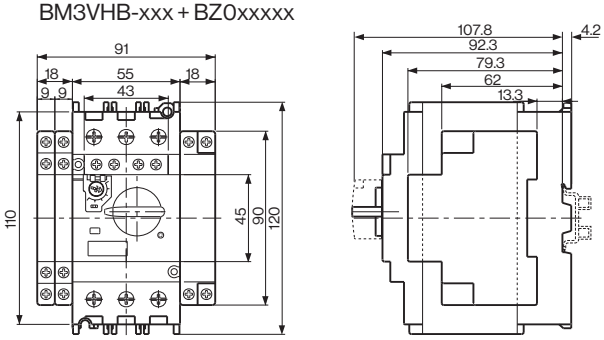



***MMS with accessories***

BM3RHB-xxx + BZ0xxxxx




BM3VHB-xxx + BZ0xxxxx



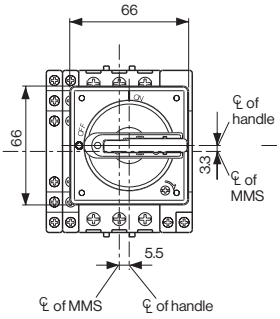
# Fuji Duo Series Manual Motor Starters Accessories

## Dimensions (continued)

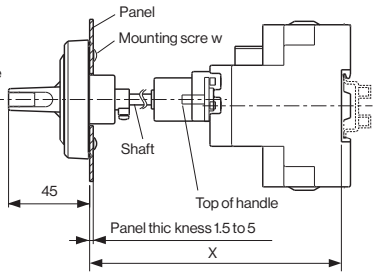
***[mm]***

***Accessories***

External operation handle

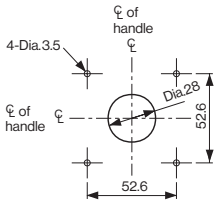


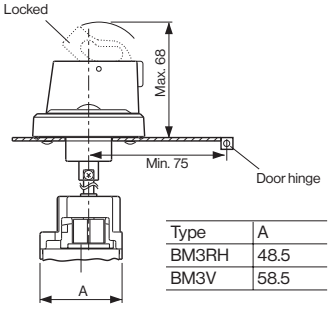

BZ0Vxxx




| Type | X min. | X max. |
|---|---|---|
| BZ0VBBL, BZ0VYRL | 139 ±2 | 289 ±2 |
| BZ0VBBM, BZ0VYRM | 156 ±2 | 306 ±2 |

Panel drilling

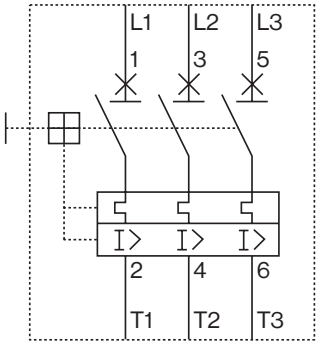



| Type | A |
|---|---|
| BM3RH | 48.5 |
| BM3V | 58.5 |

## Wiring Diagrams

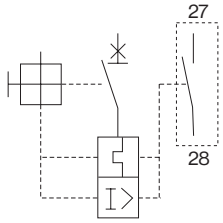
MMS



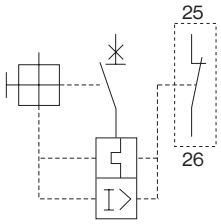

Alarm contact blocks

Front mounting

BZ0KIA




BZ0KIB



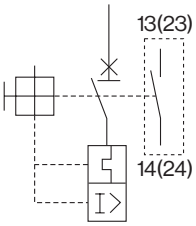

**For control circuit design, see design standards such as NEC 430 "Electrical Arrangement of control Circuits" or UL 508A Section 38 "Wiring methods, wire routing, and separation of circuits for internal wiring of a control circuit."**

# Fuji Duo Series Manual Motor Starters Accessories

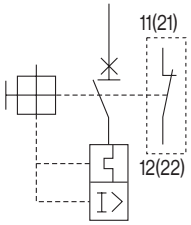
## Wiring Diagrams (continued)

Auxiliary contact blocks
Front mounting

BZ0WIA

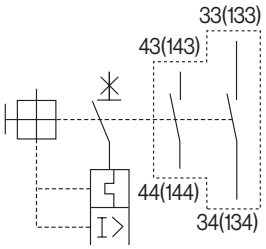



BZ0WIB

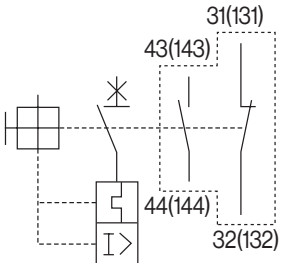



Side mounting

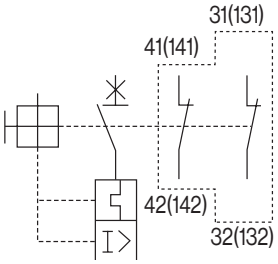
BZ0WUAAL




BZ0WUABL

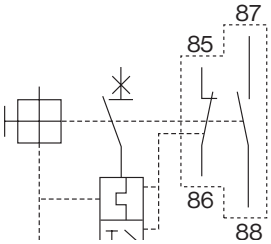



BZ0WUBBL



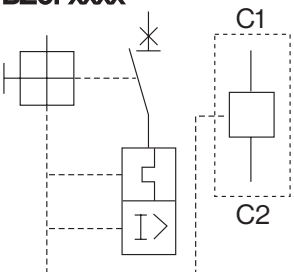

Short-circuit alarm contact blocks

**BZ0TKUAB**



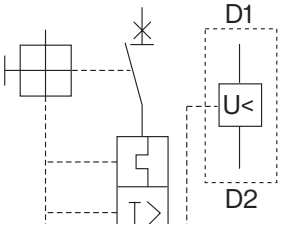

Shunt trip de vices

**BZ0Fxxxx**




Undervoltage trip devices

BZ0Rxxxx



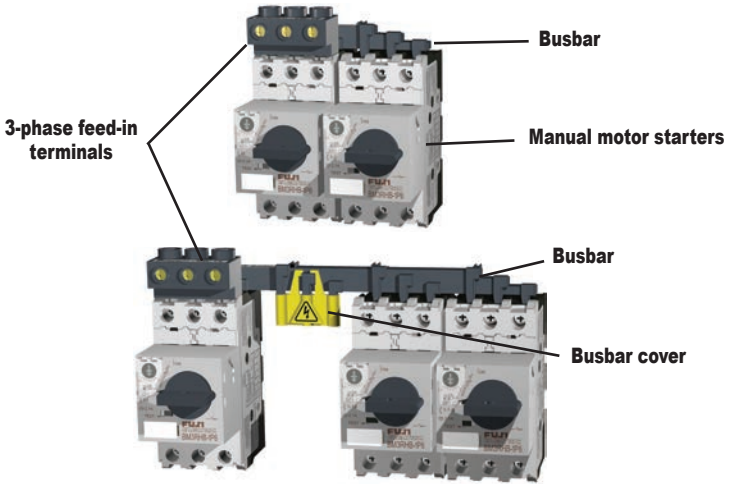

**For control circuit design, see design standards such as NEC 430 "Electrical Arrangement of control Circuits" or UL 508A section 38 "Wiring methods, wire routing, and separation of circuits for internal wiring of a control circuit."**

# Fuji Duo Series Manual Motor Starters Accessories

## Busbar system

***Features***

- The busbar system reduces wiring time and saves floor space.
- The busbar makes it easy to power from 2 to 5 manual motor starters, with no wiring needed.
- The 3-phase feed-in terminals are used to connect the wire for the power supply circuit.
- The busbar cover guards against accidental touching of non-connected busbar terminals (charged parts).
- If using BZ0TCRE terminal cover with BM3R series MMS, the busbar system can not be used.



BZ0BR02A

BZ0BR03A

BZ0BR04A

BZ0BR05A

BZ0BR12A

BZ0BR13A

BZ0BR14A

BZ0BR15A

BZ0BV02A

BZ0BV03A

*Note: Busbar photos continued on next page.*

BZ0BFRA

BZ0BFVA

BZ0BCRA

BZ0BCVA

### Busbar System Components and Ratings

| Part Number | Price | Description | Used with | Specifications | | Weight (g) |
|---|---|---|---|---|---|---|
| BZ0BR02A | | Busbar | BM3R | Continuous current: 64A max. pin connection | 2-BM3R, modular space: 45mm | 30 |
| BZ0BR03A | | | | | 3-BM3R, modular space: 45mm | 50 |
| BZ0BR04A | | | | | 4-BM3R, modular space: 45mm | 70 |
| BZ0BR05A | | | | | 5-BM3R, modular space: 45mm | 90 |
| BZ0BR12A | | | BM3R+ 1 external accessory, 9mm wide | | 2-BM3R, modular space: 54mm | 30 |
| BZ0BR13A | | | | | 3-BM3R, modular space: 54mm | 55 |
| BZ0BR14A | | | | | 4-BM3R, modular space: 54mm | 80 |
| BZ0BR15A | | | | | 5-BM3R, modular space: 54mm | 105 |
| BZ0BV02A | | | BM3V | Continuous current: 126A max. pin connection | 2-BM3V, modular space: 55mm | 140 |
| BZ0BV03A | | | | | 3-BM3V, modular space: 55mm | 240 |
| BZ0BV04A | | | | | 4-BM3V, modular space: 55mm | 340 |
| BZ0BV12A | | | BM3V + 1 external accessory, 9mm wide | | 2-BM3V, modular space: 64mm | 150 |
| BZ0BV13A | | | | | 3-BM3V, modular space: 64mm | 270 |
| BZ0BV14A | | | | | 4-BM3V, modular space: 64mm | 380 |
| BZ0BFRA | | 3-phase feed-in terminal | BM3R | Continuous current: 64A max. Applicable cable size: 25 $mm^2$ max. | | 40 |
| BZ0BFVA | | | BM3V | Continuous current: 126A max. Applicable cable size: 50 $mm^2$ max. | | 170 |
| BZ0BCRA | | Busbar cover | BZ0BR | For pin connection NOTE: Some fine tuning and fitting adjustments may be needed. | | 10 |
| BZ0BCVA | | | BZ0BV | | | 5 |

# Fuji Duo Series Manual Motor Starters Accessories

## Busbar system (continued)

## Dimensions

***(mm)***

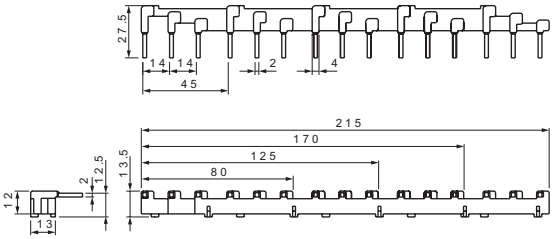
**BZ0BV04A**

**BZ0BV12A**

**BZ0BV13A**

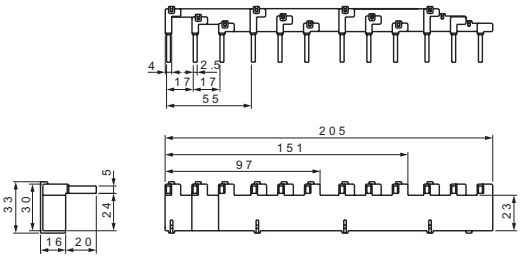
**BZ0BV14A**

For BM3RHB-xxx
BZ0BR0xx Without external accessory



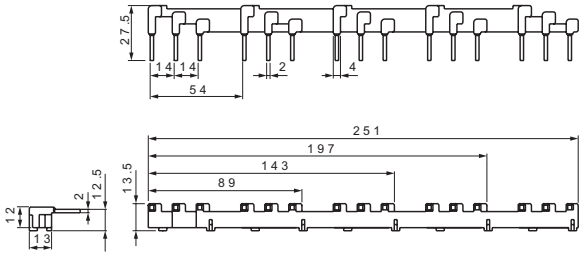

B Z 0 B R 0 2 A : 80 mm
B Z 0 B R 0 3 A : 125 mm
B Z 0 B R 0 4 A : 170 mm
B Z 0 B R 0 5 A : 215 mm

For BM3VHB-xxx
BZ0BV0xx Without external accessory



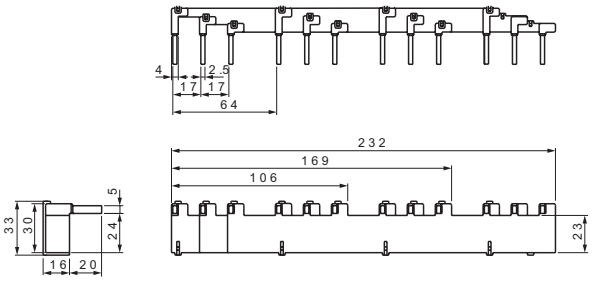

B Z 0 B V 0 2 A : 97 mm
B Z 0 B V 0 3 A : 151 mm
B Z 0 B V 0 4 A : 205 mm

BZ0BR1xx With 1 external accessory



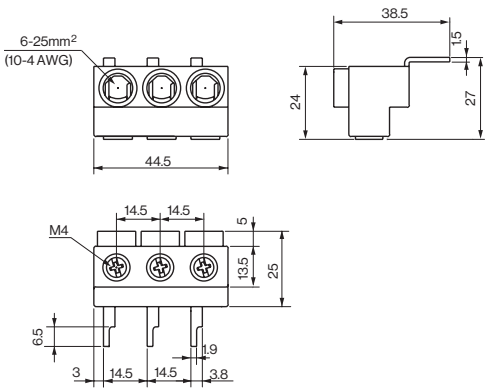

B Z 0 B R 1 2 A : 89 mm
B Z 0 B R 1 3 A : 143mm
B Z 0 B R 1 4 A : 197 mm
B Z 0 B R 1 5 A : 251 mm

BZ0BV1xx With 1 external accessory, 9mm wide

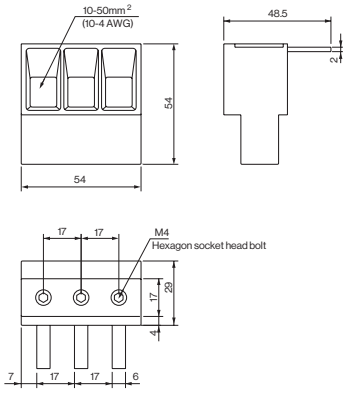



B Z 0 B V 1 2 A : 106 mm
B Z 0 B V 1 3 A : 169 mm
B Z 0 B V 1 4 A : 232 mm

BZ0BFRA 3-phase feed-in terminals




BZ0BFVA



# Fuji Duo Series Combination Starter Selection Table - 45mm

***Use this selection table to select 45mm frame width (A) Manual Motor Starter, (B) Contactor, (C) Link Module, and (D) Base Plate for a Combination Starter***

| Combination Starter Selection Table - 45mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Three Phase Motor* | | | | | *A* | *B* | *C* | *D* | |
| *220-240V* | | *440-480V* | | | | *Contactor* | | | |
| *Motor Horsepower (hp) See Note 1 below* | *Motor Full-Load Amperage (FLA) See Note 4 below* | *Motor Horsepower (hp) See Note 1 below* | *Motor Full-Load Amperage (FLA) See Note 4 below* | *Manual Motor Starter Adjustable Current Range (A)* | *Manual Motor Starter See Note 2 below for UL Type E applications.* | *The contactor part number needs the coil voltage suffix. See Note 3 below.* | *Link Module* | *Base Plate* | *SCCR at 480Y/277 VAC (kA) type F coordination* |
| - | - | - | - | 0.1 to 0.16 | BM3RHB-P16 | SC-E02-110VAC | BZ0LRE22AA | BZ0BPRE22A | 65 |
| | | | | | | SC-E02G-24VDC | BZ0LRE22GA | | |
| - | - | - | - | 0.16 to 0.25 | BM3RHB-P25 | SC-E02-110VAC | BZ0LRE22AA | | 65 |
| | | | | | | SC-E02G-24VDC | BZ0LRE22GA | | |
| - | - | - | - | 0.25 to 0.4 | BM3RHB-P40 | SC-E02-110VAC | BZ0LRE22AA | | 65 |
| | | | | | | SC-E02G-24VDC | BZ0LRE22GA | | |
| - | - | - | - | 0.4 to 0.63 | BM3RHB-P63 | SC-E02-110VAC | BZ0LRE22AA | | 65 |
| | | | | | | SC-E02G-24VDC | BZ0LRE22GA | | |
| - | - | - | - | 0.63 to 1.0 | BM3RHB-001 | SC-E02-110VAC | BZ0LRE22AA | | 65 |
| | | | | | | SC-E02G-24VDC | BZ0LRE22GA | | |
| - | - | 0.75 | 1.6 | 1.0 to 1.6 | BM3RHB-1P6 | SC-E02-110VAC | BZ0LRE22AA | | 65 |
| | | | | | | SC-E02G-24VDC | BZ0LRE22GA | | |
| 0.5 | 2.2 | 1 | 2.1 | 1.6 to 2.5 | BM3RHB-2P5 | SC-E02-110VAC | BZ0LRE22AA | | 65 |
| | | | | | | SC-E02G-24VDC | BZ0LRE22GA | | |
| 0.75 | 3.2 | 2 | 3.4 | 2.5 to 4.0 | BM3RHB-004 | SC-E02-110VAC | BZ0LRE22AA | | 65 |
| | | | | | | SC-E02G-24VDC | BZ0LRE22GA | | |
| 1.5 | 6 | 3 | 4.8 | 4.0 to 6.3 | BM3RHB-6P3 | SC-E02-110VAC | BZ0LRE22AA | | 65 |
| | | | | | | SC-E02G-24VDC | BZ0LRE22GA | | |
| - | - | 5 | 7.6 | 6.3 to 10 | BM3RHB-010 | SC-E02-110VAC | BZ0LRE22AA | | 65 |
| | | | | | | SC-E02G-24VDC | BZ0LRE22GA | | |
| 3 | 9.6 | 7.5 | 11 | 9 to 13 | BM3RHB-013 | SC-E03-110VAC | BZ0LRE22AA | | 65 |
| | | | | | | SC-E03G-24VDC | BZ0LRE22GA | | |
| 5 | 15.2 | 10 | 14 | 11 to 16 | BM3RHB-016 | SC-E04-110VAC | BZ0LRE22AA | | 65 |
| | | | | | | SC-E04G-24VDC | BZ0LRE22GA | | |
| 5 | 15.2 | 10 | 14 | 14 to 20 | BM3RHB-020 | SC-E04-110VAC | BZ0LRE22AA | | 65 |
| | | | | | | SC-E04G-24VDC | BZ0LRE22GA | | |
| 7.5 | 22 | 15 | 21 | 19 to 25 | BM3RHB-025 | SC-E05-110VAC | BZ0LRE22AA | | 50 |
| | | | | | | SC-E05G-24VDC | BZ0LRE22GA | | |
| 10 | 28 | 20 | 27 | 24 to 32 | BM3RHB-032 | SC-E1-110VAC | BZ0LRE32AA | BZ0BPRE32A | 50 |
| | | | | | | SC-E1G-24VDC | BZ0LRE32GA | | |

**Note 1:** When a horsepower rating is listed on two rows, the motor full-load amperage must be known so you can select the MMS with the best adjustable current range for your application. For example, if you have a 230V, 5 hp, 15.2A motor, you can select a MMS with either a 11-16A range or a 14-20A range. Consult the motor data plate or motor manufacturer.

**Note 2:** When using BM3RHB-xxx MMS in a UL Type E application, you must also use part numbers BZ0TKUAB (short-circuit contact block) and BZ0TCRE (line side terminal cover).

**Note 3:** For AC coil voltages other than 110 VAC, substitute the "110VAC" in the part number with "220VAC" for 220/240 VAC coils or "24VAC" for 24 VAC coils. For example, if the table lists a SC-E02-110VAC contactor for your application and you need a contactor with a 220 VAC coil, use contactor SC-E02-220VAC.

**Note 4:** Per NEC 2005 Table 430.250

**Note 5:** The table above also include the Fuji part numbers with (P). Example: SC-E02-110VAC = SC-E02P-110VAC.

# Fuji Duo Series Combination Starter Selection Table - 55mm

Fuji Electric

***Use this selection table to select 55mm frame width (A) Manual Motor Starter, (B) Contactor, (C) Link Module, and (D) Base Plate for a Combination Starter***

| Combination Starter Selection Table - 55mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Three Phase Motor* | | | | | *A* | *B* | *C* | *D* | |
| *220-240V* | | *440-480V* | | | | | | | |
| *Motor horsepower (hp) See Note 1 below* | *Motor Full-Load Amperage (FLA) See Note 4 below* | *Motor Horsepower (hp) See Note 1 below* | *Motor Full-Load Amperage (FLA) See Note 4 below* | *Manual Motor Starter Adjustable Current Range (A)* | *Manual Motor Starter See Note 2 below for UL Type E applications.* | *Contactor The contactor part number needs the coil voltage suffix. See Note 3 below.* | *Link Module* | *Base Plate* | *SCCR at 480Y/277 VAC (kA) type F coordination* |
| 3 | 9.6 | 5 | 7.6 | 6.3 to 10 | BM3VHB-010 | SC-E1-110VAC | BZ0LVE51AA | BZ0BPVE51A | 65 |
| | | | | | | SC-E1G-24VDC | BZ0LVE51GA | | |
| 3 | 9.6 | 7.5 | 11 | 9 to 13 | BM3VHB-013 | SC-E1-110VAC | BZ0LVE51AA | | 65 |
| | | | | | | SC-E1G-24VDC | BZ0LVE51GA | | |
| 5 | 15.2 | 10 | 14 | 11 to 16 | BM3VHB-016 | SC-E1-110VAC | BZ0LVE51AA | | 65 |
| | | | | | | SC-E1G-24VDC | BZ0LVE51GA | | |
| 5 | 15.2 | 10 | 14 | 14 to 20 | BM3VHB-020 | SC-E1-110VAC | BZ0LVE51AA | | 65 |
| | | | | | | SC-E1G-24VDC | BZ0LVE51GA | | |
| 7.5 | 22 | 15 | 21 | 19 to 25 | BM3VHB-025 | SC-E1-110VAC | BZ0LVE51AA | | 65 |
| | | | | | | SC-E1G-24VDC | BZ0LVE51GA | | |
| 10 | 28 | 20 | 27 | 24 to 32 | BM3VHB-032 | SC-E1-110VAC | BZ0LVE51AA | | 65 |
| | | | | | | SC-E1G-24VDC | BZ0LVE51GA | | |
| 10 | 28 | 30 | 40 | 28 to 40 | BM3VHB-040 | SC-E2-110VAC | BZ0LVE51AA | | 65 |
| | | | | | | SC-E2G-24VDC | BZ0LVE51GA | | |
| 15 | 42 | 30 | 40 | 35 to 50 | BM3VHB-050 | SC-E2S-110VAC | BZ0LVE51AA | | 65 |
| | | | | | | SC-E2SG-24VDC | BZ0LVE51GA | | |
| 20 | 54 | 40 | 52 | 45 to 63 | BM3VHB-063 | SC-E3-110VAC | BZ0LVE65AA | BZ0BPVE65A | 65 |
| | | | | | | SC-E3G-24VDC | BZ0LVE65GA | | |

**Note 1:** When a horsepower rating is listed on two rows, the motor full-load amperage must be known so you can select the MMS with the best adjustable current range for your application. For example, if you have a 230V, 10 hp, 28A motor, you can select a MMS with either a 24-32A range or a 28-40A range. Consult the motor data plate or motor manufacturer.

**Note 2:** When using BM3VHB-xxx MMS in a UL Type E application, you must also use part number BZ0TKUAB (short-circuit contact block).

**Note 3:** For AC coil voltages other than 110 VAC, substitute the "110VAC" in the part number with "220VAC" for 220/240 VAC coils or "24VAC" for 24 VAC coils. For example, if the table lists a SC-E1-110VAC contactor for your application and you need a contactor with a 220 VAC coil, use contactor SC-E1-220VAC.

**Note 4:** Per NEC 2005 Table 430.250