

Mitsubishi Breaker Line-up



MCB
DIN Series



MCCB
WS-V Series



MCCB
WS Series



ACB
AE-SW Series



CP
DIN Series

December 4th, 2015

Mitsubishi Electric Corp. Fukuyama Works

Agenda

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LVS Product Overview

2

Circuit Breakers

3

Applications

Mitsubishi Electric **Low Voltage Switchgear** delivers superior performance in every application with a comprehensive range of electrical protection, isolation and control products.

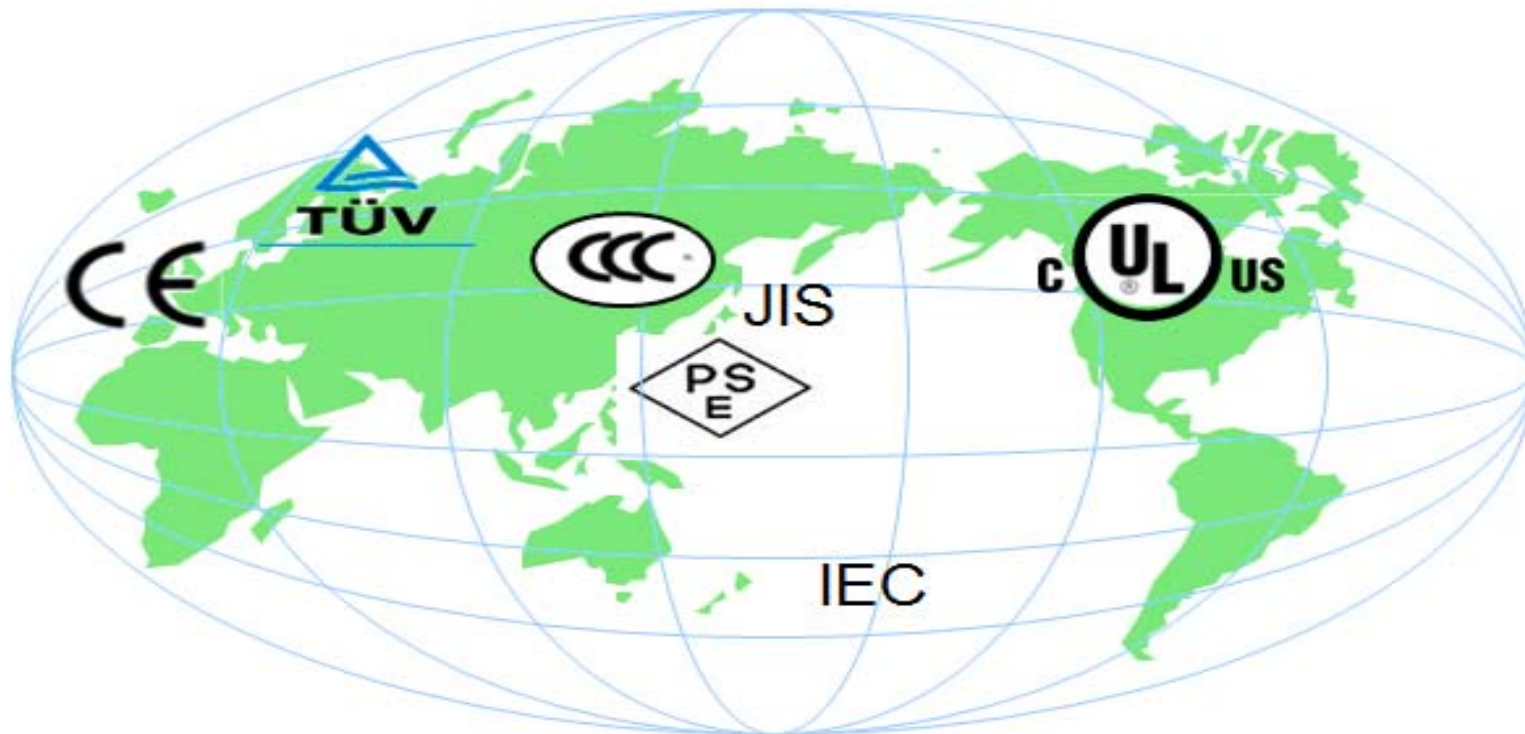
Circuit Breakers & Circuit Protection



Magnetic Contactors, Starters & Relays

LVS “Globalization of international electrical standards”

Compliance with international standards such as IEC, JIS, CE, UL and other country standards are planned to be acquired.
This will help our customers expand their business in foreign countries.





MDI
(China)

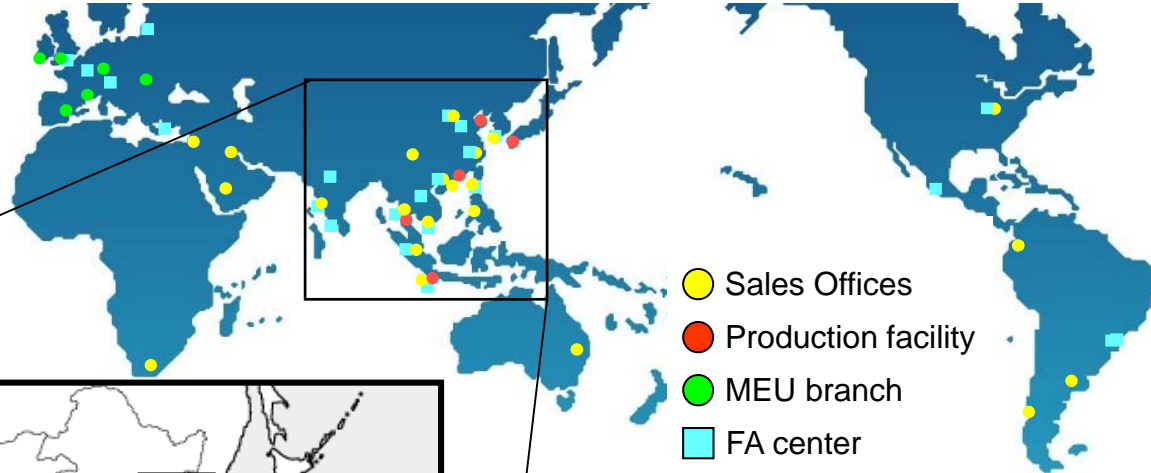
MELEX
(China)



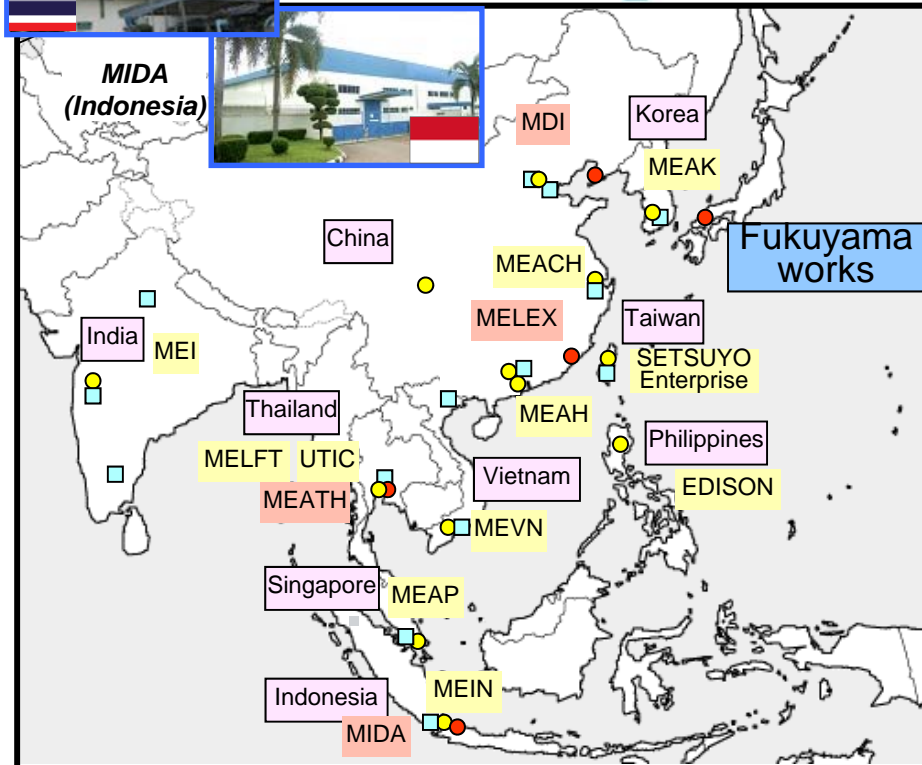
MEATH
(Thailand)



MIDA
(Indonesia)



- Sales Offices
- Production facility
- MEU branch
- FA center



【Production / Sales bases in Asia】

- Fukuyama works Production Facility
Japan / Mitsubishi Electric Corporation
Fukuyama Works
- China / Mitsubishi Electric Dalian Industrial Product Co., Ltd. (MDI)
- China / Mitsubishi Electric Low Voltage Equipment (Xiamen) Co., Ltd. (MELEX)
- Thailand / Mitsubishi Electric Automation (Thailand) Co., Ltd. (MEATH)
- Indonesia / P.T.MELCOINDA (MIDA)
- OEM (ODM) with Mitsubishi brand
China (MELEX) / NFC-MX series (MCCB)
India (MEI) / BHW-T series (MCB)
- Sales Offices
China, Thailand, Indonesia, Korea, Taiwan, Philippines, Vietnam, Singapore, etc.

What is a Circuit Breaker??

A Circuit Breaker is a device designed to protect an electrical circuit from damaged caused by a current overload or short-circuit condition. The basic function is to detect a fault condition and break the fault circuit.

Switch a circuit ON and OFF

Protection against:

- Overloads
- Short Circuits
- Earth Leakage

To ensure:

- End user safety
- Wire protection
- Equipment protection



Circuit Breakers are considered safety equipment!!

Air Circuit breakers can be used as the main circuit breakers of power distribution systems for commercial buildings, factories and freight ships which will provide a high-level of circuit monitoring and friendly networking.



IEC 60947-2 : 630 to
6300 amp frame size

Two Specification types:

- General Use
- Generator Protection

Fully “customized” to the
customers detailed specifications
and requirements

Two Application types:

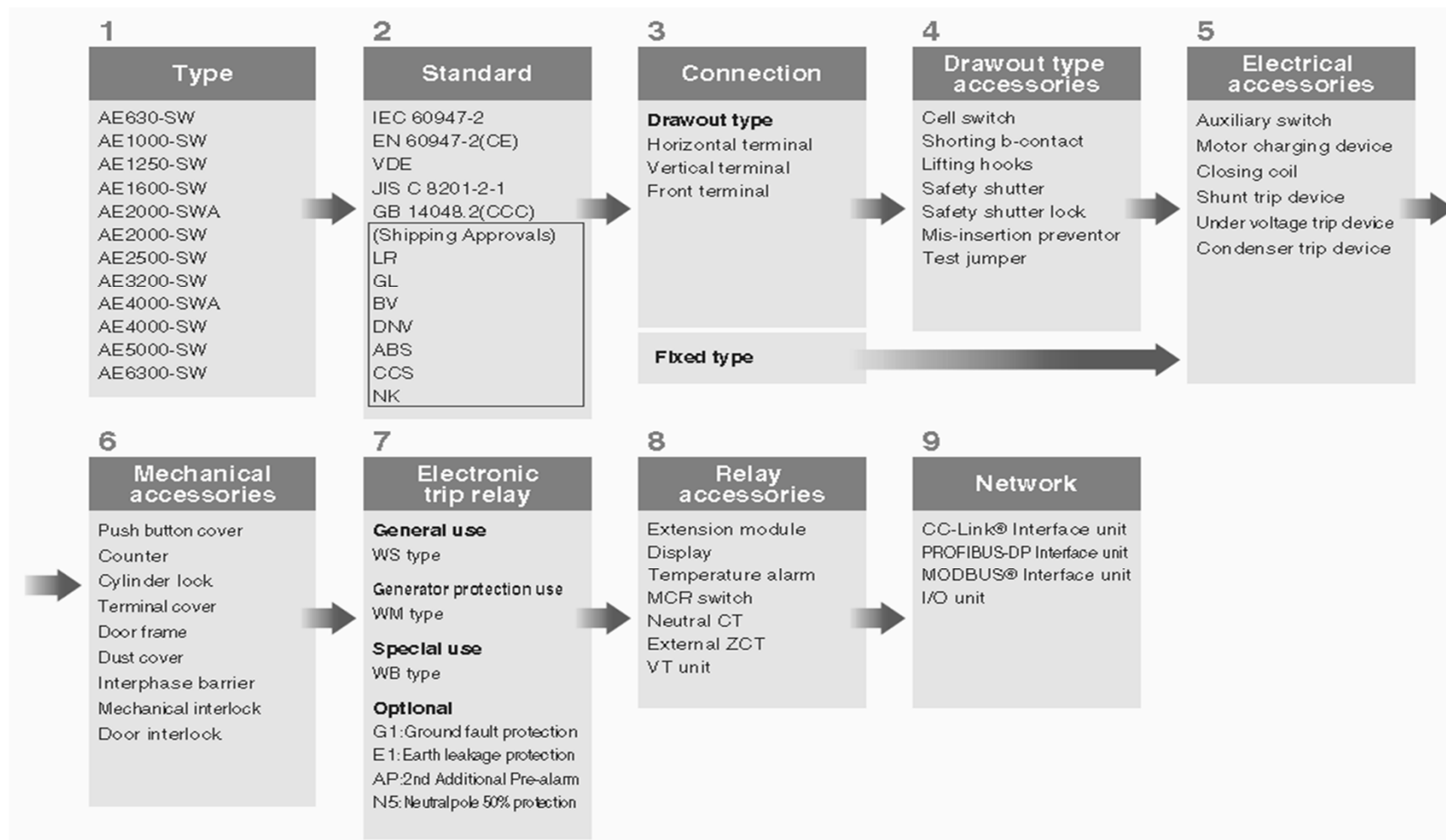
- Fixed
- Draw-out

Line and Load side are not defined
and reverse connection is possible

Special
ordering form

General Use Applications

Generator Protection



“Main” Circuit Breakers- ACB

Air Circuit breaker ordering is very complex. There is no such thing as “standard”

Customer(name)	Order No.	Number of units	units
Type P9-10 AE <u>1600</u> -SW AE -SWA			
Number of poles <input checked="" type="checkbox"/> 3P <input type="checkbox"/> 4P AE300-SW- AE4000-SWA AE4000-SW- AE300-SW <input type="checkbox"/> 3P <input type="checkbox"/> 4P HN Note15 <input type="checkbox"/> 4P FN Note15			
Current setting Ir <u>1600</u> A CT rating _____ A Note1 P9,P20			
Applicable standard <input checked="" type="checkbox"/> IEC 60947-2 <input type="checkbox"/> CCC			
Ambient temperature <input checked="" type="checkbox"/> 40°C(Standard) <input type="checkbox"/> Others _____ °C Note2			
Reset type <input checked="" type="checkbox"/> Automatic Reset (Standard) <input type="checkbox"/> Manual Reset (MRE)			
Connection <input type="checkbox"/> Fixed type Note3 <input checked="" type="checkbox"/> Drawout type Note3			
Main circuit terminal P.11 Horizontal terminal(FIX) (AE300-SW / AE2000-240V-SW) Vertical terminal(FIX-VT) (AE2000-SWA / AE4000-SWA) (AE4000-ES300-SW) <input checked="" type="checkbox"/> Horizontal terminals(DR)(standard) <input type="checkbox"/> Vertical terminals(DR-VT) AE2000-SWA / AE4000-SWA AE4000-ES300-SW <input type="checkbox"/> Front terminals(DR-FT) Note4			
Drawout type accessories P17-18 <input checked="" type="checkbox"/> Cell switch(CL- <u>4</u>): 1 or 2 or 3 or 4) Note5 <input type="checkbox"/> Shorting b-contact(SBC- <input type="checkbox"/> : 1 or 2 or 3 or 4 or 5) <input type="checkbox"/> Lifting hooks(HP) <input checked="" type="checkbox"/> Safety shutter(SST) <input checked="" type="checkbox"/> Shutter lock(SST-LOCK) <input type="checkbox"/> Mis-insertion preventor(MIP) <input type="checkbox"/> Test jumper(TJ)			
<input type="checkbox"/> Vertical terminal adapter(VTA) <input type="checkbox"/> Front terminal adapter(FTA)		Can be connected to the Horizontal terminals.	



Electronic trip relay(ETR)

With ETR
Type WS1 G1 - P1

<p>Main setting module</p> <p>WS1, WB1 AE630-1600-SW, AE2000-3200-SW, AE4000-SW WS2, WB2 AE2000-SWA, AE4000-SWA, AE5000-SW WS3, WB3 AE6300-SW</p> <p>WS: General use WB: INST/MCR only</p> <p><input type="checkbox"/> BARE(ETR not required)</p>	<p>Optional setting module</p> <p>G1: Ground fault protection Note5 N5: Neutral pole 50% protection Note5 E1: Earth leakage protection AP: 2nd Additional Prealarm NA: Without optional setting</p>	<p>Power supply</p> <p>P1: A: DC100-240V P2: DC24-60V P3: AC100-240V / DC100-125V with output contact P4: DC24-60V with output contact P5: DC100-240V with output contact (SSR)</p> <p><input type="checkbox"/> Neutral CT(NCT) Note6 <input type="checkbox"/> External ZCT Note9</p> <p>P28 ZCT <input type="checkbox"/> ZT <input type="checkbox"/> B ZTA <input type="checkbox"/></p>	<p>Additional function P22</p> <p><input checked="" type="checkbox"/> Extension module(EX1) Network P23 <input type="checkbox"/> Display(DP1) <input type="checkbox"/> BIF-CC <input type="checkbox"/> Display on panel board(DP2) <input type="checkbox"/> BIF-PR <input type="checkbox"/> BIF-CON <input checked="" type="checkbox"/> VT unit(VT) <input type="checkbox"/> BIF-MD <input type="checkbox"/> BIF-CL <input type="checkbox"/> Temperature alarm(TAL) <input type="checkbox"/> MCR switch(MCR-SW)</p> <p>Wire system (when EX1 is specified)</p> <p>EX1 <input checked="" type="checkbox"/> 3φ3W <input type="checkbox"/> 3φ4W <input checked="" type="checkbox"/> Normal connection : Note13 <input type="checkbox"/> Inverse connection : Note14</p>
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Electrical accessories P12-14

Auxiliary switch A and B contacts in the same quantity are used. Max. quantity: 5 each for A and B contacts.
 Standard(AX 6): 2 or 4 or 6 or 8 or 10)
 High capacity(HAX : 2 or 4 or 6 or 8 or 10)

Motor charging(MD) AC - DC100-125V AC - DC200-250V DC24V DC48V Note10


Closing coil(CC) AC - DC100-250V DC24-48V

Shunt trip device (SHT) AC - DC100-250V AC380-500V DC24-48V

Under voltage trip device(UVT)
 AC100-120V AC200-240V AC380-460V DC24V DC48V DC100-110V DC120-125V

Time delay
 Inst(INST)
 0.5s(05)
 3.0s(30)
Note11: In case of 380-460V AC, the external transformer is attached

ACB line-up

Frame	630AF	1000AF	1250AF	1600AF	2000AF	2500AF	3200AF	4000AF	5000AF	6300AF
AE-SW Series	AE630-SW	AE1000-SW	AE1250-SW	AE1600-SW	AE2000-SWA					
					AE2000-SW	AE2500-SW	AE3200-SW	AE4000-SWA		
								AE4000-SW	AE5000-SW	AE6300-SW



Circuit Breakers- MCCB

Standard Molded Case Circuit Breaker (MCCB) Mitsubishi "NF" series

IEC 60947-2 up to 1600 amp frame size

AC or DC rated applications

Line and Load side are not defined and reverse connection is possible with most Mitsubishi MCCB

Suitable for isolation

Thermal-Magnetic, Hydraulic-magnetic and Electronic tripping mechanisms



Mitsubishi Electric "Branch"

Circuit Breakers- ELCB

Earth Leakage Circuit Breaker (ELCB) Mitsubishi "NV" series



IEC 60947-2 up to 800 amp frame size

Rated current sensitivity ratings:

- 30mA
- 100/200/500mA selectable

Line and Load side are not defined and reverse connection is possible

Suitable for isolation

Thermal Magnetic, Hydraulic-magnetic and Electronic tripping mechanisms

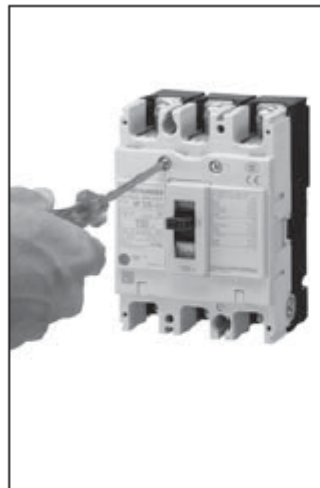
User friendly and easy to install internal accessories that allow Mitsubishi to provide the best solution for any application

Side Lead Terminal type internal accessories:

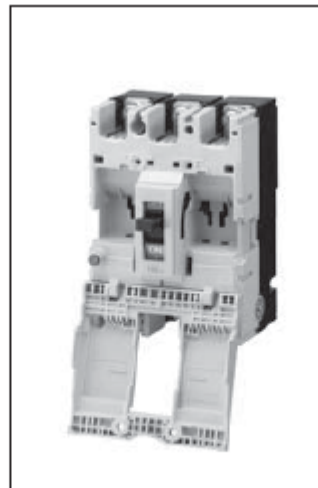
- Alarms Contacts
- Auxiliary Contacts
- Under Voltage trip device
- Shunt Trip device



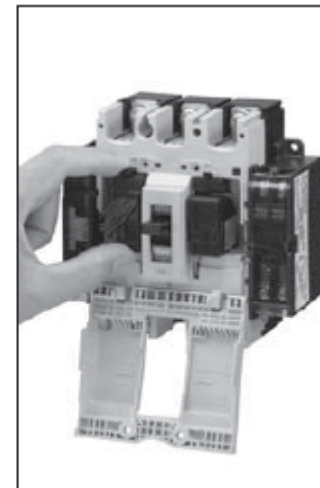
1. Press the trip button (PTT) to trip the circuit breaker.



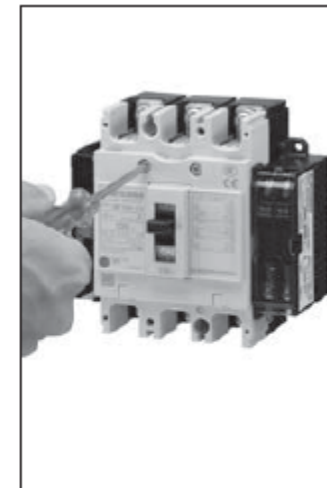
2. Loosen the cover screws.



3. Open the cover.



4. Install the cassette type accessory.



5. Close the cover, and tighten the screws.

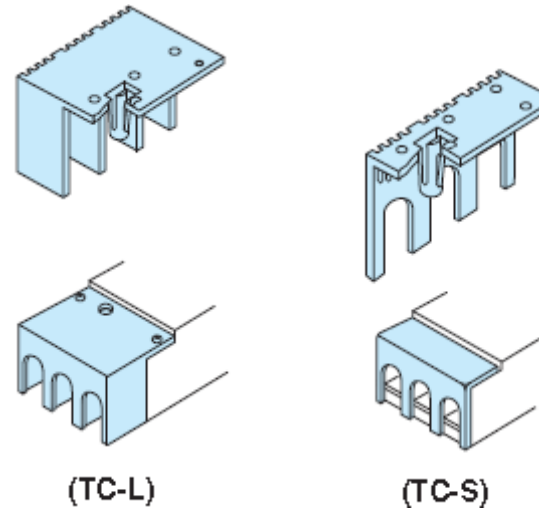
User friendly and easy to install external accessories that provide flexibility and functionality in any application

Three types of external disconnect handles:

- Fixed (F-Type)
- Door mounted (V-Type)
- Flange Disconnect

Two types of terminal covers:

- Large (TC-L)
- Small (TC-S)
- 2 terminal covers are needed to protect both line and load terminals



MCCB line-up

Full rated current for all types.

■ 32AF – 250AF [WS-V Series]

Class \ AF	32	63	125	160	250
NF-C (Economy class)		NF63-CV	NF125-CV		NF250-CV
NF-S (Standard class)	NF32-SV	NF63-SV	NF125-SV NF125-SGV NF125-SEV	NF160-SGV	NF250-SV NF250-SGV NF250-SEV
NF-L (High-performance class)			NF125-LGV	NF160-LGV	NF250-LGV
NF-H (High-performance class)		NF63-HV	NF125-HV NF125-HGV NF125-HEV	NF160-HGV	NF250-HV NF250-HGV NF250-HEV
NF-U (Ultra current-limiting class)			NF125-RGV NF125-UV		NF250-RGV NF250-UV

■ 400AF – 1600AF [WSS Series]

Class	400	630	800	1000	1250	1600
NF-C	NF400-CW	NF630-CW	NF800-CEW			
NF-S	NF400-SW/SEW	NF630-SW/SEW	NF800-SEW	NF1000-SEW	NF1250-SEW	NF1600-SEW
NF-H	NF400-HEW	NF630-HEW	NF800-HEW			
NF-R/U	NF400-REW/UEW	NF630-REW	NF800-REW/UEW			

MCCB Production Line

Produced by fully functional production system

Amazing fully robotized assembly line with individual unit production management system



Fully Robotized Assembly Line



Individual Unit Production Management System

“Supplemental” circuit breakers

Circuit Protector – CP series

The optimum circuit breaker for opening/closing power sources and preventing overloading and short-circuiting of control circuits of construction equipment, office machines and communications/measurement devices



Suitable for:

- AC rated applications up to 250V
- DC rated applications up to 120V

AC or DC rated applications

- UL1077: (1 Pole or 2 Pole only)
- IEC60947-2: (1P, 2P, 3P)

Line and Load side are not defined and reverse connection is possible

Equipped with retractable compact terminal cover.

Internal accessories such as Auxiliary Relay, Alarm Relay and Shunt-Trip units are available

- Larger terminal covers sold separately
- Flat recessed handle to avoid accidental operation

Product Line-up

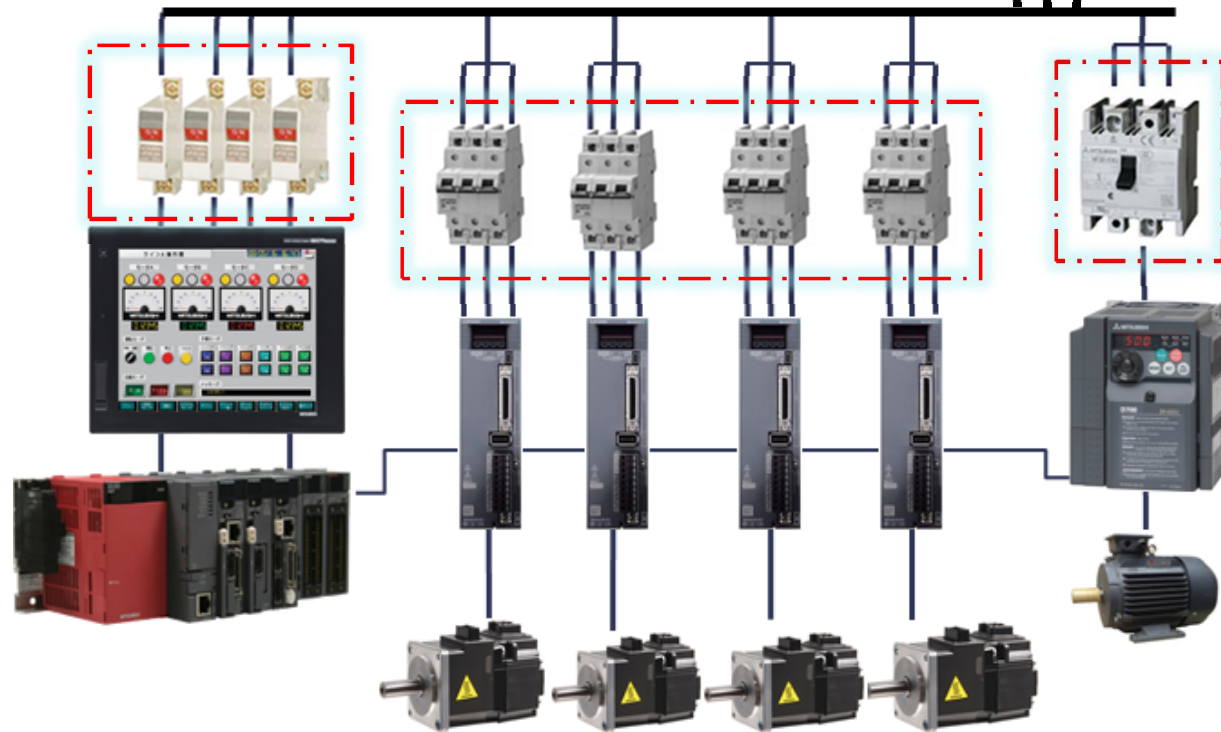


MCB - DIN Series

MCB line-up

Model type		Poles (P)	Rating (A)	Instantaneous tripping type	Voltage (V)	Breaking capacity (kA)	Compliance standard
MCB	BH-D6	1, 2, 3, 4(3+N)	0.5~63	B, C, D	230/400AC	6	IEC60898-1
		1+N	0.5~40	B, C	230AC		
	BH-D10	1, 2, 3, 4(3+N)	0.5~63	B, C, D	230/400AC	10	IEC60898-1
		(For DC)	1	0.5~63	B, C	125DC	10
	2		250DC				
BH-DN	1+N	6~20	C	230AC	4.5	IEC60898-1	
RCCB	BV-D	2(1+N), 4(3+N)	25, 40, 63	-	230/400AC	-	IEC61008
RCBO	BV-DN	1+N	6~40	C	230AC	4.5	IEC61009
Isolating Switch	KB-D	1, 2, 3, 4(3+N)	32, 63, 80	-	230/400AC	-	IEC60947-3

Circuit breakers should be utilized for protecting Mitsubishi Electric's core factory automation products such as graphic operating terminals, PLC, servo drives and VFD applications.

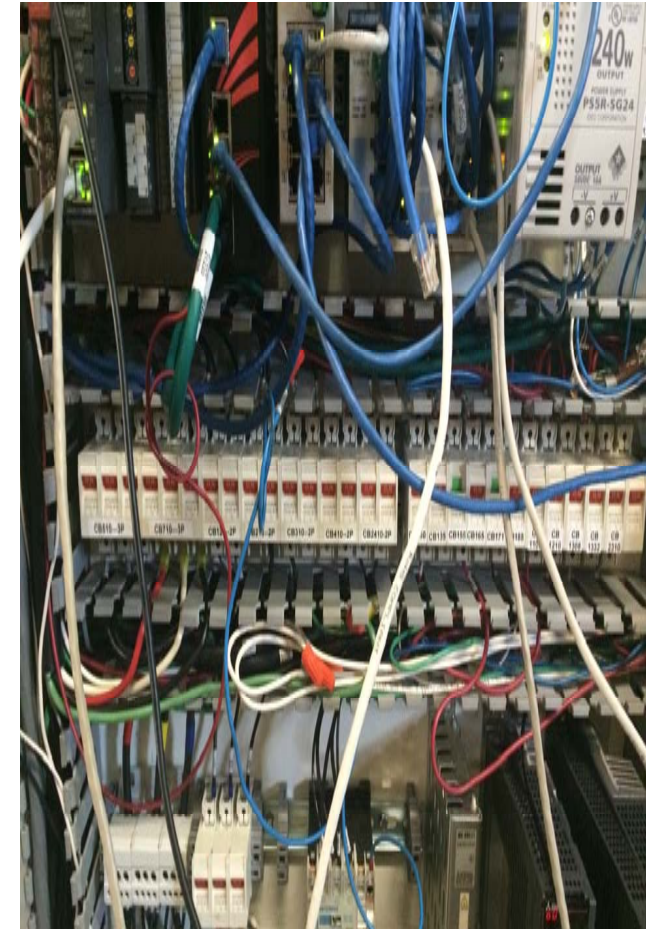
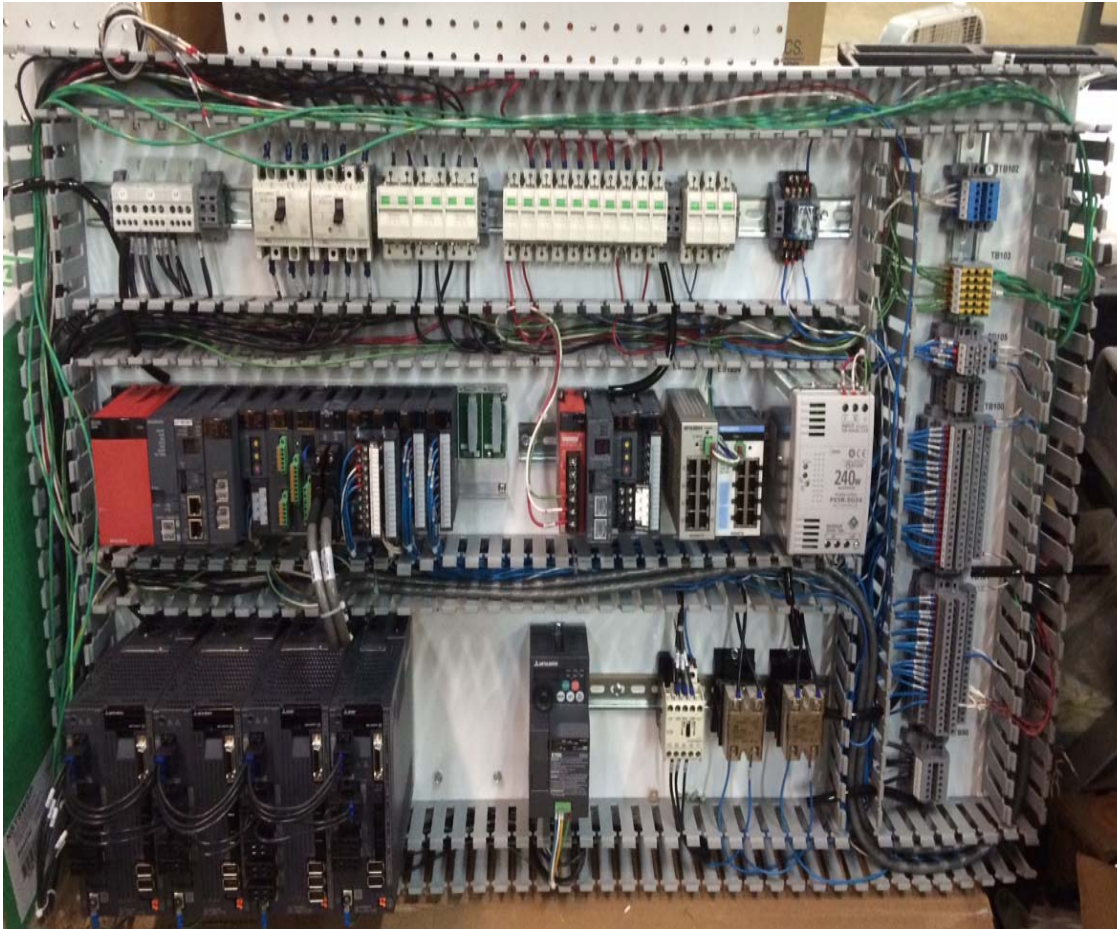


Mitsubishi Electric circuit breakers can be utilized for branch circuit protection in control panels, switchboards and motor control centers



Circuit Breaker Application

Mitsubishi Electric circuit breakers providing supplementary protection for Servo, VFD, PLC and GOT products.



With a wide range of circuit breakers that can be considered suitable for just about any application, there are some basic criteria that should be considered before selecting a circuit breaker:

What is the required electrical standard for the application:

- IEC
- UL
- CE

What do we need?

- Branch Protection
- Supplementary Protection

What are the voltage rating and trip amperage requirements??

Breaking Capacity requirements? kA

Number of poles?
(2P, 3P, 4P)



<http://www.mitsubishielectric.com/fa/index.html>



Catalog DL:

<http://www.mitsubishielectric.com/app/fa/download/search.do?kisyu=/lvcb&mode=catalog>



FACTORY AUTOMATION

Low Voltage Circuit Breakers (General Catalog)



FACTORY AUTOMATION

Low Voltage Air Circuit Breakers

*World
Super* **AE**
630AF~6300AF

World Super
WS
Series



Empowering
Industries

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<http://www.mitsubishielectric.com/fa/index.html>



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Low-voltage Power Distribution Products <ul style="list-style-type: none">▶ Low-voltage Circuit Breakers▶ Contactors and Motor Starters	Power Monitoring Products <ul style="list-style-type: none">▶ Power Management Meters▶ Energy Saving Supporting Devices	Medium-voltage Power Distribution Products <ul style="list-style-type: none">▶ Protection Relays	Processing Machines <ul style="list-style-type: none">▶ Laser Processing Machines▶ Electrical Discharge Machines▶ Electron Beam Machines

Thank you
for listening

We appreciate
your time

