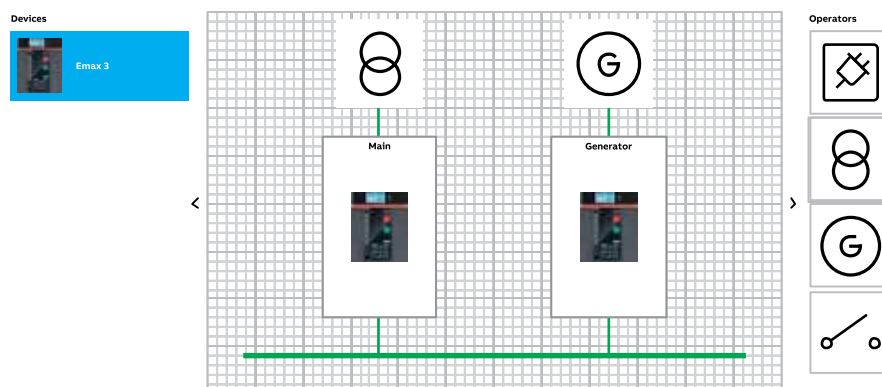


Projects page The Projects page allows you to manage all your Custom Logic projects and comprises two areas:

- **Commands menu:** the commands for creating your Custom Logics, the main commands (New Open, Save Project) and advanced ones (Print entire project, Consult materials table of all devices in project and Open pre-configured plant models) are available at the top.

 New Project
  Open Project
  Save Project
  Save Project As
  Print
  Bill Of Materials
  System Information
  Open Template

- **Graphic area:** allows you to add the ABB devices you want to program with Custom Logic (Emax 3 CB) and to complete the layout with the parts of the installation you want to connect to (electricity grid, transformers, generators, circuit-breakers) or with external drawings and photos.



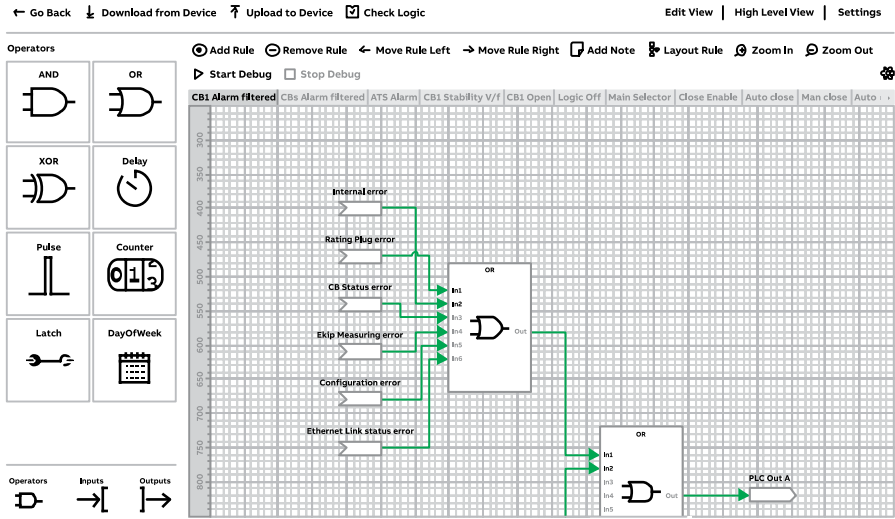
- When you have finished your layout, you can right click each element in order to customize certain elements (names, line thickness) and, in the case of ABB devices, access the Custom Logic programming page.



IMPORTANT: the project can include several ABB devices while, using a single PC (and Ekip Connect), you can connect to each and program them all; the ability to upload and download Custom Logics depends on the presence of the SW package in each device.

Programming page The Programming page has all the commands for creating and managing the Custom Logics of the device selected in the Projects page (indicated in the following text as Custom Device for the sake of convenience), divided into four macro areas:

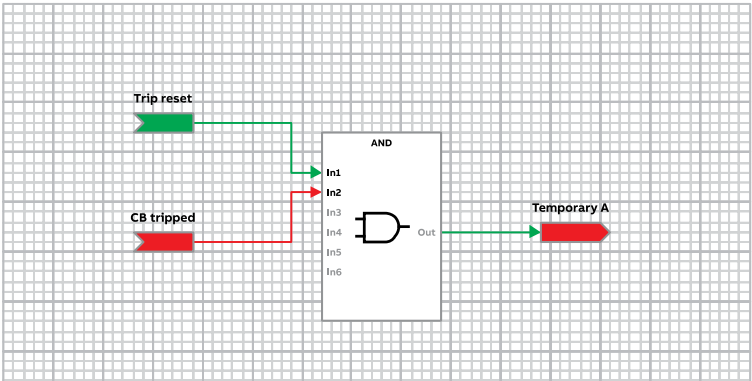
Area	Description
A	Main commands of the Custom Device
B	Rule bar, with commands for managing, accessing and debugging the Rules
C	Elements area, where you can select each element and logic you want to program
D	Graphics table, where all the elements are uploaded, the connections are made and Debugging is performed



A. Main controls

Command	Description
Go Back	Allows you to return to the Projects page
Download from Device	Allows you to download and access the Custom Logic configuration in the device to which it is connected. You can choose whether to download solely the Custom Logics (Download Logic) or even certain parameters, such as Programmable States and Outputs (Download Settings) i NOTE: the device must be the same as the type selected in the Projects page (e.g. Emax 3)
Upload from Device	Allows you to upload and access the Custom Logic configuration open in the device to which it is connected. You can choose whether to upload solely the Custom Logics (Upload Logic) or even certain parameters, such as Programmable States and Outputs (Upload Settings) i NOTES: - the device must be the same as the type selected in the Projects page (e.g. Emax 3) - the Upload command also performs a check to make sure programming is correct and notifies any inconsistencies if present
Check Logic	Command for checking that the programmed logics are programmed correctly; also checks that the logic complies with the memory limit available in the trip unit reserved to Custom Logic.
Edit View / High Level View	The two commands allow you to change screens: - Edit View: displays the Rule / graphic table in which you can manage your Custom Logics - High Level View: displays a high level overview with the interaction chart / connections between the different Rules relating to your Custom device

B. Rule bar

Command	Description
Add / Remove Rule	Enables you to add or remove a new Rule / graphic table
Move Rule Left / Right	Enables you to move the selected Rule to the left or right of the list
Add Note	Enables your to add a Sticky Note to your layout and change the colour (right click command)
Layout Rule	Command that automatically re-organizes / aligns the elements on the graphic table and generally streamlines the way in which the entire layout is presented
Zoom In / Zoom Out / Fit to Items	Graphic table zoom commands
Start / Stop Debug	Debug commands for supervising Custom Logic programming and checking that operation is aligned to your needs: • Select “Start” to simulate the states of the Inputs present in all the Rules of the Custom Device and view the states of the outputs • The Inputs are all at 0 (OFF / Red colour) by default and if you click on one of them its state changes to 1 (ON / Green colour); click again and the state returns to 0  • The “Stop” command releases the Debug mode (confirmed by the absence of Input and Output colours)
Custom Logic Options	The button enables you to configure certain support options for the Start / Stop Debug: state update Step time, Stop time commands and relevant state update interrupt Flag
List of all the open Rules	The list of all the Rules created for the Custom Device appears; change the name of the Rule with a double click

C. Elements area

Type	Description
Operators	They are the logic functions to which the Inputs for Output management must be connected: • AND: logic ports with AND function; a minimum of 2 and a maximum of 6 inputs are permitted • OR: logic ports with OR function; a minimum of 2 and a maximum of 6 inputs are permitted • XOR: logic ports with XOR function; a minimum of 2 and a maximum of 6 inputs are permitted • Delay: allows you to customize state changing of an input, delaying its activation (Delay On) or deactivating it (Delay Off) on the output for a time settable in ms ranging from minimum 0 ms to maximum 24 h i NOTE: the Delay operator also allows advanced configuration, described immediately after this table • Pulse: this function allows you to manage the transition from OFF to ON of an input, returning an ON pulse of programmable duration on the output • Latch: two inputs are available for this function: Set activates the output, Reset deactivates the output • DayOfWeek: this function allows you to set one or more days and a precise time, and return an ON output if date and time coincide with what has been programmed; the output will consider only the day if just the date is programmed • Counter: this function has two inputs (Set and Reset) and one output. Double-click on the lock to configure the Max Count parameter, which defines the maximum count value. The counter increments by one unit at each rising edge of the input signal (Set); when the count reaches the set value of Max Count, the output is brought to high level. The output remains activated until a rising edge is received on the Reset input, which resets the counter value to 0 and, therefore, the output back to low.
Input	The inputs are all states and alarms available from the Custom device and can be integrated with the Operators to create your own Custom Logic.
Output	The Outputs include the PLC Out1 and PLC Out2 states, connected to the outputs of the Operators for implementation of Custom Logic, besides the temporary Outputs provided by the Custom device, which can also be integrated with the Operators. The effective outputs of the Ekip Signalling 2k, Ekip Signalling 4k and Ekip Signalling 10k modules are also among the available Outputs. Outputs can also be used to connect logic distributed across multiple Rules, overall connection of which is represented in the High Level View, accessible from the main commands area



NOTE: Delay, Pulse, Latch, and Counter logic functions have a maximum 40 locks each. Error is generated if you attempt to set a higher number of locks

Continued on the next page

Delay (advanced configuration)

NOTE: the function described applies to both the Delay On function and Delay Off function. For convenience, the information provided in the following text refers to only one of the two functions.

Among the configuration options of the Delay, you can enable the “Register Delay Enable” parameter, which allows the runtime (outside the Ekip Connect environment) of the set Delay parameter to be changed:

- if OFF, the Delay used by the Custom Logics is the one uploaded to the Custom Device and can be adjusted by changing and then re-uploading the entire Custom Logic to one's own Trip unit
- if ON, the delay used by the Custom Logics is saved in a register called “Register Delay”, which can be accessed via modbus and runtime changed by the user. The user can choose and configure one of the fourteen Register Delays (from “Delay On A” to “Delay On O”) and, while the logics are operating, can change it from the “Custom Logic” PLC RealTime variable group Ekip Connect page or remotely (check System Interface for the registers)

D. Graphical table The graphic table is where the Custom Logics of each rule are built.

Display

When the Custom Logics are programmed in Ekip Aware (Upload to Device available in the Main commands area), the relevant icon appears on the display at the top right.



Package presence can be checked in the Info menu, on the display.

About

The “Custom Logic” page of Ekip Connect contains useful information about the Custom Logics in the device to which you are connected (Custom device of Project), divided into groups:

- **PLC Resources:** total count and count per type of the Custom Logic resources present
 - **PLC Status:** information about the state of execution (execution time, errors present, Runtime resource monitoring)
 - **PLC Outputs:** information about the logic states of the Logic Outputs (PLC Outputs 1 and 2)
 - **PLC RealTime variable:** Information about the Delay and Counters blocks (delays indicate the state of advancement of the time count of each Delay, counters indicate the actual count of the Counters)
 - **Delay On e Off Monitor:** Delay On parameters relating to the “Register Delay Enable” option of the Delay operator, described above in **Delay (advanced configuration)**
-

Advanced MDGF

1 - Advanced MDGF

Foreword If the Advanced MDGF digital upgrade is available the MDGF can be created by connecting several Ekip Aware together in a Link network, with the support of Ekip Supply Evo Modbus TCP.

The protection releases (at least two) share the respective earth fault currents I_g (phasors) in the Link network; based on the configuration of your system, you can program the parameters so that the general MDGF protection adds or subtracts the individual earth fault currents I_g and considers a sole "I GND ext" current.

The Advanced MDGF network configuration and the protection parameters are available from all remote connection systems; via display, you can activate the presence of the Advanced MDGF configuration (*Settings-Configuration-External Toroid* menu) and check whether the package is present (*Info-Feature Collect* menu).

For the sake of convenience, the next descriptions refer to paths and menus via Ekip Connect.

Parameters Certain parameters must be configured in order to activate the Advanced MDGF protection:

- External Toroid type = Advanced MDGF, in the "Unit Configuration" page of Ekip Connect; when this parameter is set, Advanced MDGF In Size will become available; the In Size value of the protection release is set automatically and cannot be edited.
- Link Bus enabled = ON, in the "Modules - Supply Pro-Settings" page of Ekip Connect; you can also define in this page whether you want Link on the 100M line (default configuration) or on the 100Base-Tx line (by enabling the "Extend Link Bus on ETH-Port" parameter)
- Configuration of the Trip units (actors) involved in the Advanced MDGF protection, in the "Modules - Supply Pro-Link configuration" page of Ekip Connect; each actor enables three parameters to be configured:

Parameter	Description	Default
IP Address	IP address of Trip unit (Link actor)	0.0.0.0
MDGF Actor	Enter True if used for the Advanced MDGF function	False
MDGF - Phasor Behaviour	Defines whether the current I_g supplied by this Trip unit must be added or subtracted in order to calculate the total used by the general MDGF protection	Sum

- The actor being programmed has a parameter allowing its current I_g to be excluded from the I GND ext current calculation used by its protection (Exclude Local Phasor from Vector Sum parameter = ON in the "Modules - Supply Pro-Link configuration" page of Ekip Connect)



IMPORTANT: the parameter exclusively concerns use of the local I_g current of the protection release in which it is set

Synchronism The protection needs the various protection releases connected to the Link network to be synchronized. Synchronism can be configured in two modes, both based on IEEE 1588 (parameters available in the "Modules - Supply Pro Settings" page of Ekip Connect, Synchronizations area):

- Synchronism with Local Master: to activate this mode, one of the actors must be configured as Master, the others as Slaves
- Synchronism with external Master (GPS antenna): to activate this mode, all the actors must be configured as Slaves



IMPORTANT: IEEE 1588 ("Enable IEEE 1588 = ON" parameter) must be enabled in both the modes

-
- Protection** The Advanced MDGF protection functions like the Local one of the same name and shares its parameters:
- if the I GND ext current exceeds threshold I41, the protection activates and, after a time established by the value read and by the protection parameter settings, transmits the TRIP command.
- Consult the chapter dedicated to the MDGF protection for all the details:
- Page 108 for the protection configuration
 - Page 121 for performance
 - Page 129 for the curve
 - Page 145 for default



NOTE: *in the chapter dedicated to protection configuration, do not considered the references to:*

- *External toroid (already explained in this chapter)*
- *MDGF In Size (already explained in this chapter)*

-
- Limitations** In order to function correctly, the protection requires the presence of Ekip Supply Evo Modbus TCP and, consequently, Vaux and Local Bus = On
-

Accessories

1 - Overview

Introduction Each circuit-breaker includes a series of electrical and mechanical accessories. The accessories adapt to the type of circuit-breaker. In addition, each circuit-breaker has a series of electronic accessories. The electronic accessories adapt to the type of Ekip release provided with the circuit-breaker.

Mechanical and electrical accessories The following table shows the possible combinations of the electrical and mechanical accessories for Emax E1.3:

Type of accessory	Accessory	Circuit-breakers	Switch-disconnectors
Electrical signalling	AUX 4Q	S	R
	AUX 15Q	R	R
	Ekip AUP ⁽¹⁾	R	R
	RTC	R	R
	S51	S	-
	S33 M 2 ⁽³⁾⁽⁴⁾	R	R
Electrical control	YO ⁽²⁾ - YC	R	R
	YO2 ⁽²⁾	R	R
	YU ⁽²⁾	R	R
	YR	R	-
	M	R	R
	YO Sense ⁽²⁾ - YC Sense	R	R
	YO2 Sense ⁽²⁾	R	R
	YU Sense ⁽²⁾	R	R
Security mechanical	KLC	R	R
	PLC	R	R
	KLP	R	R
	PLP ⁽¹⁾	R	R
	SL ⁽¹⁾	S	S
	DLC	R	R
	Anti-insertion lock	S	S
	MOC	R	R
Protection mechanical	PBC	R	R
	IP54	R	R
	HTC - LTC	R	R
	PB	R	R
Mechanical interlocks	A - B - C - D	R	R
Lifting plates	-	R	R

S: Standard. R: on request.

⁽¹⁾ For withdrawable version only.

⁽²⁾ A maximum of two YO and YU accessories (standard or Sense) are available.

⁽³⁾ Not available when M Sense Enabler is installed.

⁽⁴⁾ Always included in the gear motor for automatically charging the springs in the standard version.
The version for digital signals must be requested when the motor is ordered.

Continued on the next page

The following table shows the possible combinations of the electrical and mechanical accessories for Emax E2.3-E4.3-E6.3:

Type of accessory	Accessory	Circuit-breakers	Switch-disconnectors	Derived versions		
				CS	MV	MTP
Electrical signalling	AUX 4Q	S	R	-	-	-
	AUX 6Q	R	R	-	-	-
	AUX 15Q ⁽³⁾	R	R	-	-	-
	Ekip AUP ⁽¹⁾	R	R	R	R	R
	Ekip RTC	R	R	-	-	-
	S51	S	-	-	-	-
	S51/2 ⁽⁴⁾	R	-	-	-	-
	S33 M/2 ⁽⁵⁾⁽⁶⁾	R	R	-	-	-
Electrical control	YO ⁽²⁾ - YC	R	R	-	-	-
	YO2 ⁽²⁾ - YC2	R	R	-	-	-
	YU ⁽²⁾ - YU2 ⁽²⁾	R	R	-	-	-
	M	R	R	-	-	-
	YR	R	-	-	-	-
	YO Sense ⁽²⁾ - YC Sense	R	R	-	-	-
	YO2 Sense ⁽²⁾⁽⁴⁾ - YC2 Sense	R	R	-	-	-
	YU Sense ⁽²⁾ - YU2 Sense ⁽²⁾	R	R	-	-	-
Security mechanical	KLC	R	R	-	-	-
	PLC	R	R	-	-	-
	KLP	R	R	-	-	R
	PLP ⁽¹⁾	R	R	-	-	R
	SL ⁽¹⁾	S	S	-	-	S
	DLR ⁽¹⁾	R	R	-	-	R
	DLP ⁽¹⁾	R	R	-	-	R
	DLC ⁽³⁾	R	R	-	-	R
	Anti-insertion lock	S	S	-	-	S
	MOC	R	R	-	-	R
Protection mechanical	PBC	R	R	-	-	R
	IP54	R	R	-	-	R
Interlocks ⁽³⁾	A - B - C - D	R	R	-	-	R

S: Standard. R: on request.

⁽¹⁾ For withdrawable version only.

⁽²⁾ A maximum of two YO and YU accessories (standard or Sense) are available.

⁽³⁾ Not available for withdrawable circuit-breakers with lateral fastening.

⁽⁴⁾ Incompatible with YR.

⁽⁵⁾ Not available when M Sense Enabler is installed.

⁽⁶⁾ Always included in the gear motor for automatically charging the springs in the standard version.
The version for digital signals must be requested when the motor is ordered.

Electronic accessories The optional electronic accessories are listed in the table below:

Type of accessory	Accessory
Power supply	Ekip Busbar Supply
	Ekip Supply Lite
	Ekip Supply Evo Modbus TCP
Connectivity	Ekip Com Modbus RTU
	Ekip Com Modbus DP
	Ekip Com Profinet
	Ekip Com EtherNet/IP™
	Ekip Com IEC 61850
Signal	Ekip Signalling 2K
	Ekip RELT
	Ekip Temperature 4T
	Ekip Arc-Flash 6F
	Ekip Signalling 4K
	Ekip Signalling 10K Link
	M-Sense Enabler
	Ekip Signalling Modbus TCP
Measurement and Protection	Ekip Synchrocheck
	Rc Toroid
	S.G.R. Toroid
	Sensor MDGF
	T-Sense Ambient
	T-Sense Busbar



NOTE: Ekip Signalling 4K module available for Emax E2.3-E4.3-E6.3 circuit-breakers.

Operating conditions Ekip Synchrocheck, *Ekip Com* and *Ekip Signalling* function correctly:

- In the presence of auxiliary supply voltage
- With the circuit-breaker in the Racked-in position (if the CB version is withdrawable)

The limitations listed below apply in all the other cases:

Module\ Condition	Ekip Synchro-check	Ekip Com	Ekip Signalling 2K Ekip Temperature 4T Ekip Signalling 10K Link	Ekip Signalling 4K
Module power supply absent	Synchronism contact open	Communication: absent	Output contacts: open	Output contacts: open
CB in Test ⁽¹⁾⁽²⁾ position	Synchronism: not available ⁽⁴⁾	Communication: active	Inputs and output contacts: available	Inputs and output contacts: available
CB in DISCONNECTED ⁽¹⁾⁽³⁾ position	Synchronism: not available ⁽⁴⁾	Communication: partially active ⁽⁵⁾	Inputs and output contacts: partial available ⁽⁶⁾	Module power supply off (Output contacts: open)

⁽¹⁾ the description refers to the module when correctly on and with the CB in the indicated position

⁽²⁾ in the Test position, the Trip unit is connected to the modules and all information is available on the display or via external communication

⁽³⁾ in the Racked-out position, connection and communication between Trip unit and modules is interrupted. Information is not available/valid

⁽⁴⁾ due to voltage not connected to the internal sockets

⁽⁵⁾ see System Interface

⁽⁶⁾ the outputs only function correctly if configured as: input status (of module itself) or non-communication with Trip unit. For all other configurations, the module forces the Outputs as per Contact Type parameter (NO, NC).

System Interface Document 1SDH002545A1001.zip, describing how to use the Ekip Com communication modules correctly, is available in ABB library; the file contains:

Document	Description
1SDH002545A1001.pdf	Guidelines with details about how to put the communication modules into service, with reference to the protocols and supporting documents
1SDH002545A1001.xlsx	Table with the references of all the registers for parameters, controls, measurements, etc.

The .zip file contains the files for supplementing Ekip Aware in the available communication networks, with the specific Ekip Com module and an IMPORTANT file with notes on how to use the files:

File ⁽¹⁾	Protocol / Ekip Com module
ABBS0E7F.gsd + EkiDPB.bmp	File .gsd and module image for configuring <i>Ekip Com Profibus DP</i>
Ekip_COM_EtherNetIP_vx_xx.eds	File .eds for configuring <i>Ekip Com EtherNet/IP™</i>
ABBECxxx_Ed2.icd	File .icd for configuring <i>Ekip Com IEC 61850</i>
GSDML-Vx.xx.xml	File .xml for configuring <i>Ekip Com Profinet</i>

⁽¹⁾ Check the Firmware version of your module so as to choose the file with the correct configuration.

2 - Standard accessories

Accessories for fixed circuit-breakers

Fixed version SACE Emax 3 circuit-breakers and switch-disconnectors are always supplied with the following accessories as standard:

- IP30 protection for the switchgear door
- front terminals for Emax E1.3 circuit-breakers
- orientable rear terminals for Emax E2.3-E4.3-E6.3 circuit-breakers, mounted in HR – HR position
- Screws for fixing in the switchboard (only E1.3)

In addition, for automatic circuit-breakers only, the following accessories are always supplied:

- four standard open/closed auxiliary contacts - AUX 4Q
- four terminals for the auxiliary connections
- mechanical signalling of protection release tripped - TU Reset button
- Ekip protection trip unit tripping signalling contact S51

Accessories for withdrawable circuit-breakers

Withdrawable version SACE Emax 3 circuit-breakers and switch-disconnectors are always supplied with the following accessories as standard:

- anti-extraction locking mechanism with the circuit-breaker closed
- racking-in/racking-out lever
- anti-insertion lock

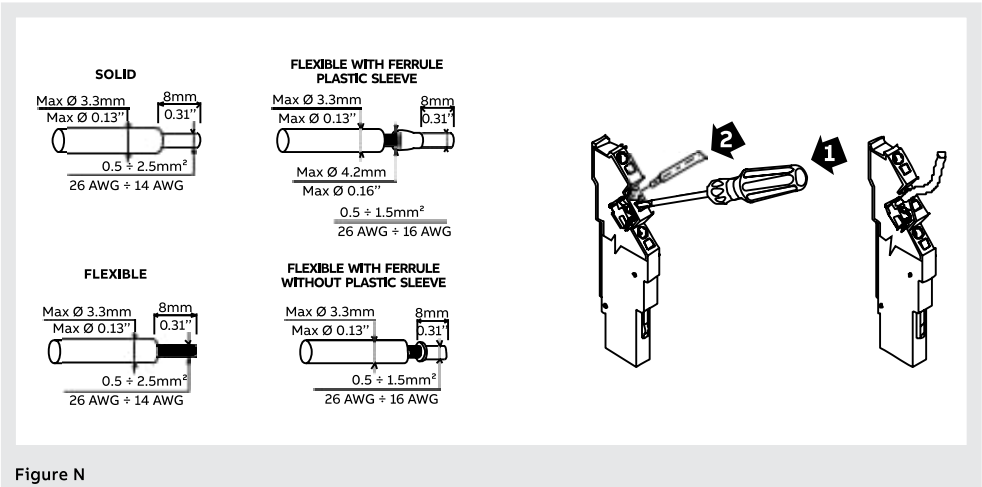
In addition, for automatic circuit-breakers only, the following accessories are always supplied:

- four standard open/closed auxiliary contacts - AUX 4Q
- four terminals for the auxiliary connections
- mechanical signalling of protection release tripped - TU Reset button

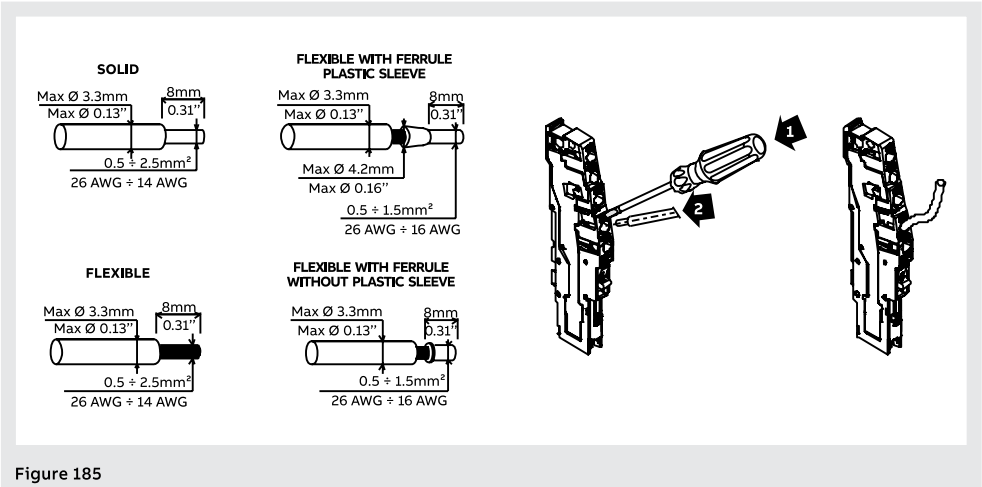
The fixed parts of the withdrawable versions are always supplied with:

- IP30 protection for the switchgear door
- anti-insertion lock
- standard shutter lock - SL
- screws for floor mounting
- orientable rear terminals

Terminal wiring Indication of cable size for wiring terminals:



5-way terminal cabling Indication of cable size for wiring terminals:



3 - Assembly and disassembly

Mounting The circuit-breaker is supplied with the ordered accessories already assembled. If ordered individually and separately from the job order of the circuit-breaker, the accessories are supplied with a Kit Sheet describing all the assembly operations.

Disassembly operations for Emax E1.3 circuit breakers

To dismantle the accessories, the following parts must be removed from the circuit-breaker:

- Front cover (A) and protection (F) by removing the screws (B and C).
- For 4-p circuit-breakers, the lateral protection (D) by fixing the screws (C and E).

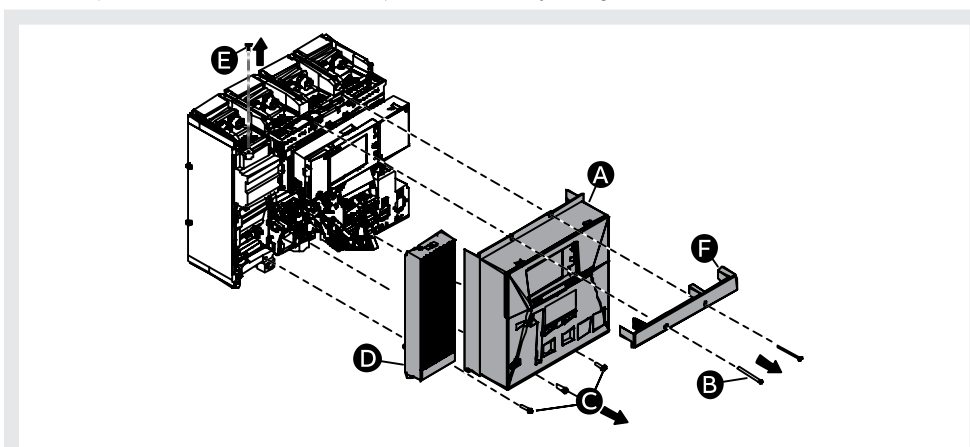


Figure 186 - Removing the front cover and protections

After reassembling the accessories, the parts previously dismantled must be reassembled as indicated:

- Front cover (A) and protection (F) by screwing the fixing screws (B and C) with tightening torque 0.8 Nm - 7 lb in (B) and 1.5 Nm - 13 lb in (C).
- For 4-p circuit-breakers, the lateral protection (D) by fixing the screws (C and E) with tightening torque 1.5 Nm - 13 lb in.

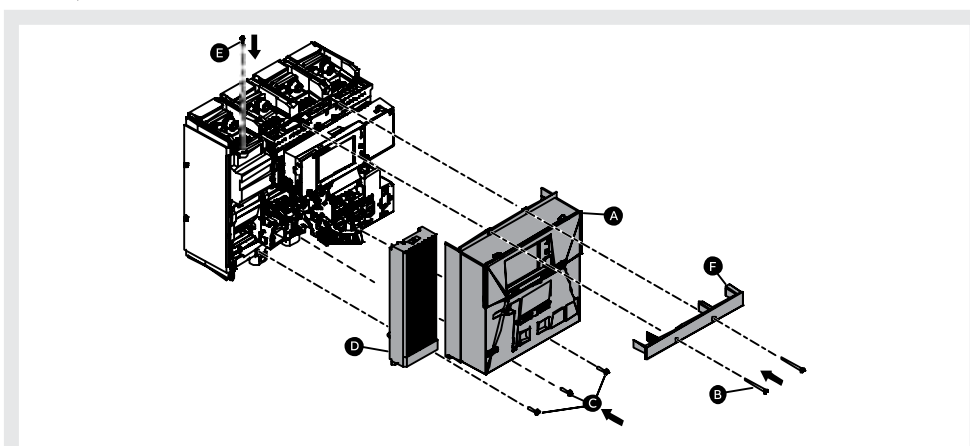


Figure 187 - Assembly of front cover and protections

Disassembly operations for Emax E2.3-E4.3-E6.3 circuit breakers

To dismantle the accessories, the following parts must be removed from the circuit-breaker:

- Transparent flange (A) of the trip unit, by turning the screws (B).
- Front cover of the circuit-breaker (C), by removing the mounting screws (D).

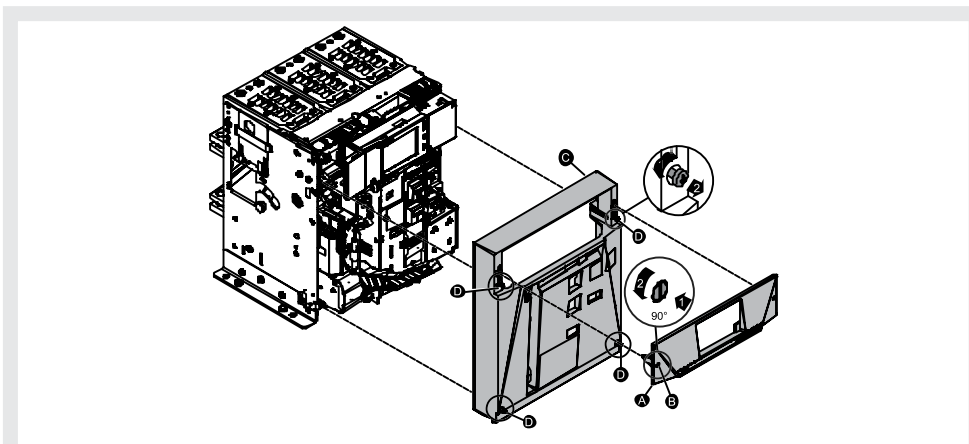


Figure 188 - Removing the flange and front cover

After reassembling the accessories, the parts previously dismantled must be reassembled as indicated:

- Escutcheon plate of circuit-breaker (C), by tightening the fastening screws (D). Tighten to 2.5 Nm - 22.1 lb in tightening torque.
- Transparent flange (A) of the trip unit, by turning the screws (B).

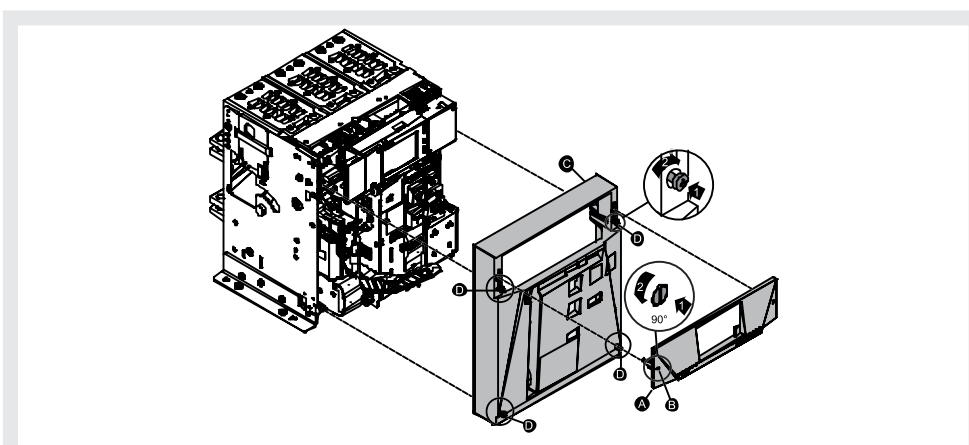


Figure 189 - Assembly of flange and front cover

4 - Wiring diagrams

General wiring diagrams

Document **1SDM000056A1001** available on <https://library.abb.com>

The wiring diagram of the circuit-breaker is illustrated below.

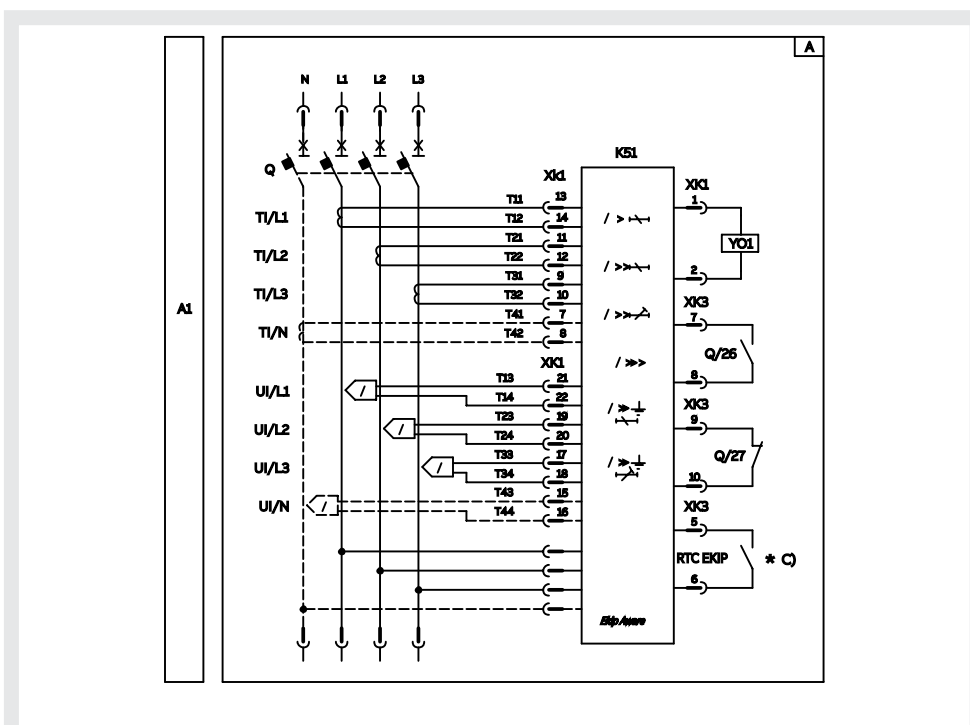


Diagram A - General diagram of the circuit-breaker



NOTE: The diagram is shown in the following conditions:

- Withdrawable circuit-breaker (also applicable to the fixed version), open and racked-in
- Circuits de-energized
- Releases not tripped
- Motor operator with discharged springs

The wiring diagram of the switch-disconnector is illustrated below.

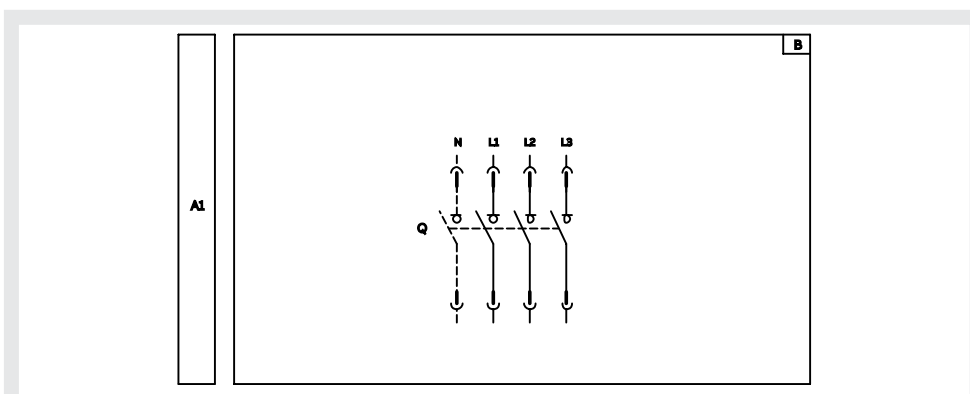
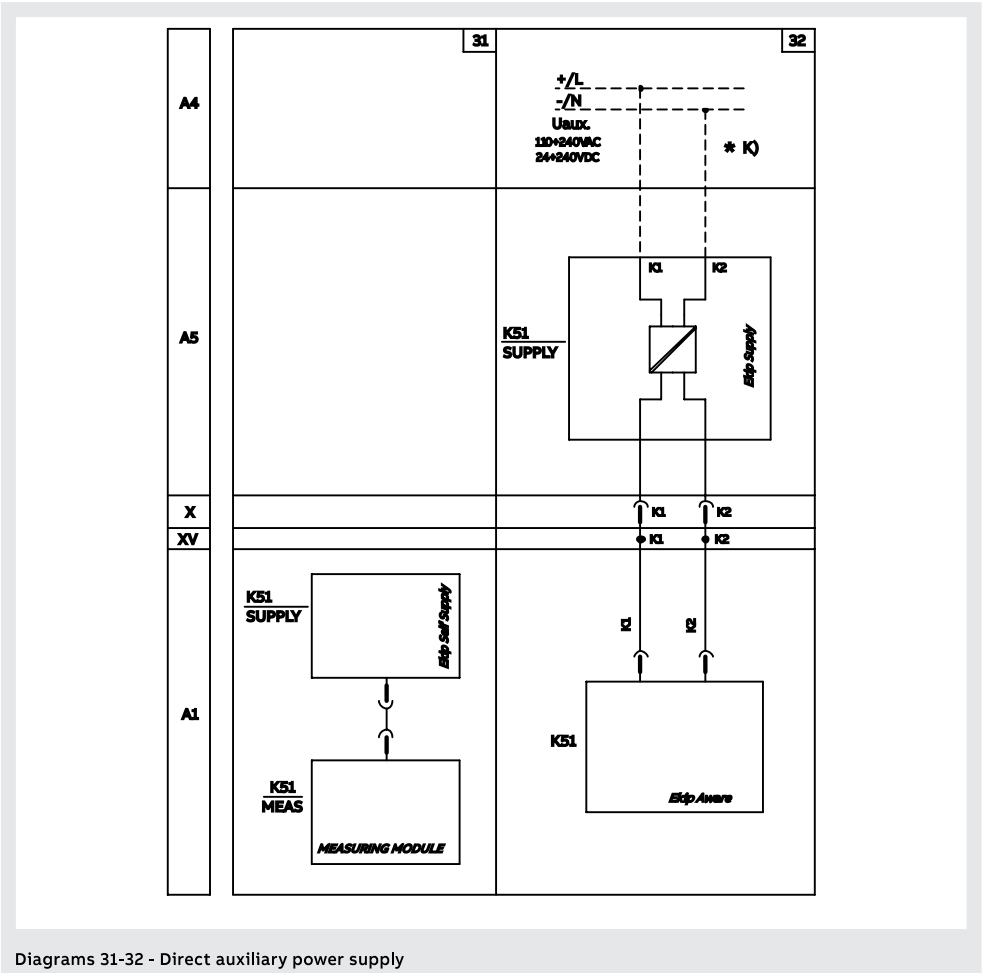


Diagram B - General diagram of the switch-disconnector

Continued on the next page

The auxiliary power supply of the protection release is not indicated in the circuit diagram. Information about the power supply of the protection release by one of the Ekip Supply modules is given on page 286 for Ekip Supply Lite and on page 287 for Ekip Supply Evo Modbus TCP.

If the circuit-breaker is not accessorized with the Ekip Supply module, consult the direct supply diagram shown here when connecting the auxiliary power supply to the trip unit.



Diagrams 31-32 - Direct auxiliary power supply

Circuit-breaker terminal box

The circuit-breaker is equipped with a terminal box for wiring the accessories, which differs depending on the type:

- Terminal box for fixed version circuit-breakers
- Terminal box for circuit-breakers in withdrawable version

The terminal box for E1.3 circuit-breakers in the fixed and withdrawable versions is illustrated here with the differences highlighted.

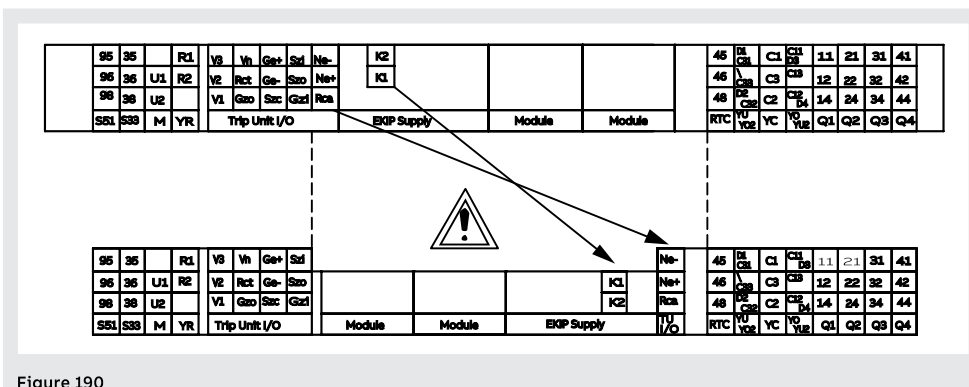


Figure 190

The terminal box for circuit-breakers E2.3-E4.3-E6.3 in the fixed and withdrawable versions is illustrated here with the differences highlighted.

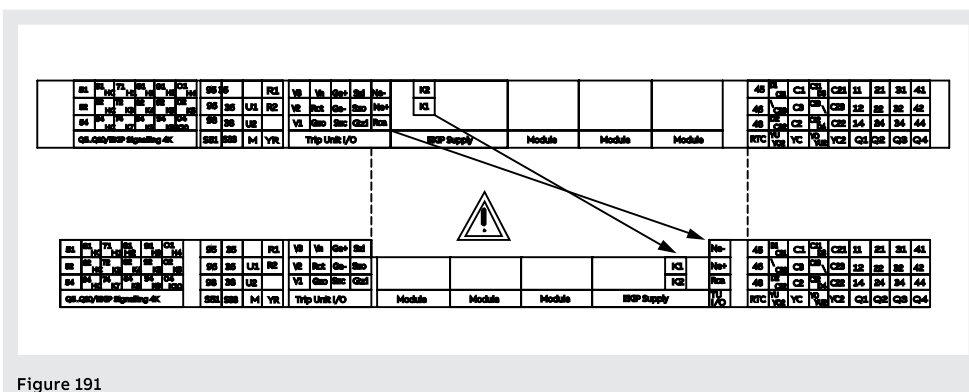


Figure 191



NOTE: Details about the circuit diagram of each accessory are available in the pages dedicated to the description of the accessory itself

The number of modules that can be mounted in the terminal block depends on the type of circuit-breaker and on the Supply module installed:

Circuit-breaker model	Supply module installed	Maximum number of additional modules
E1.3	Ekip Supply Lite	2
	Ekip Supply Evo Modbus TCP	1
E2.3-E4.3-E6.3	Ekip Supply Lite	3
	Ekip Supply Evo Modbus TCP	2

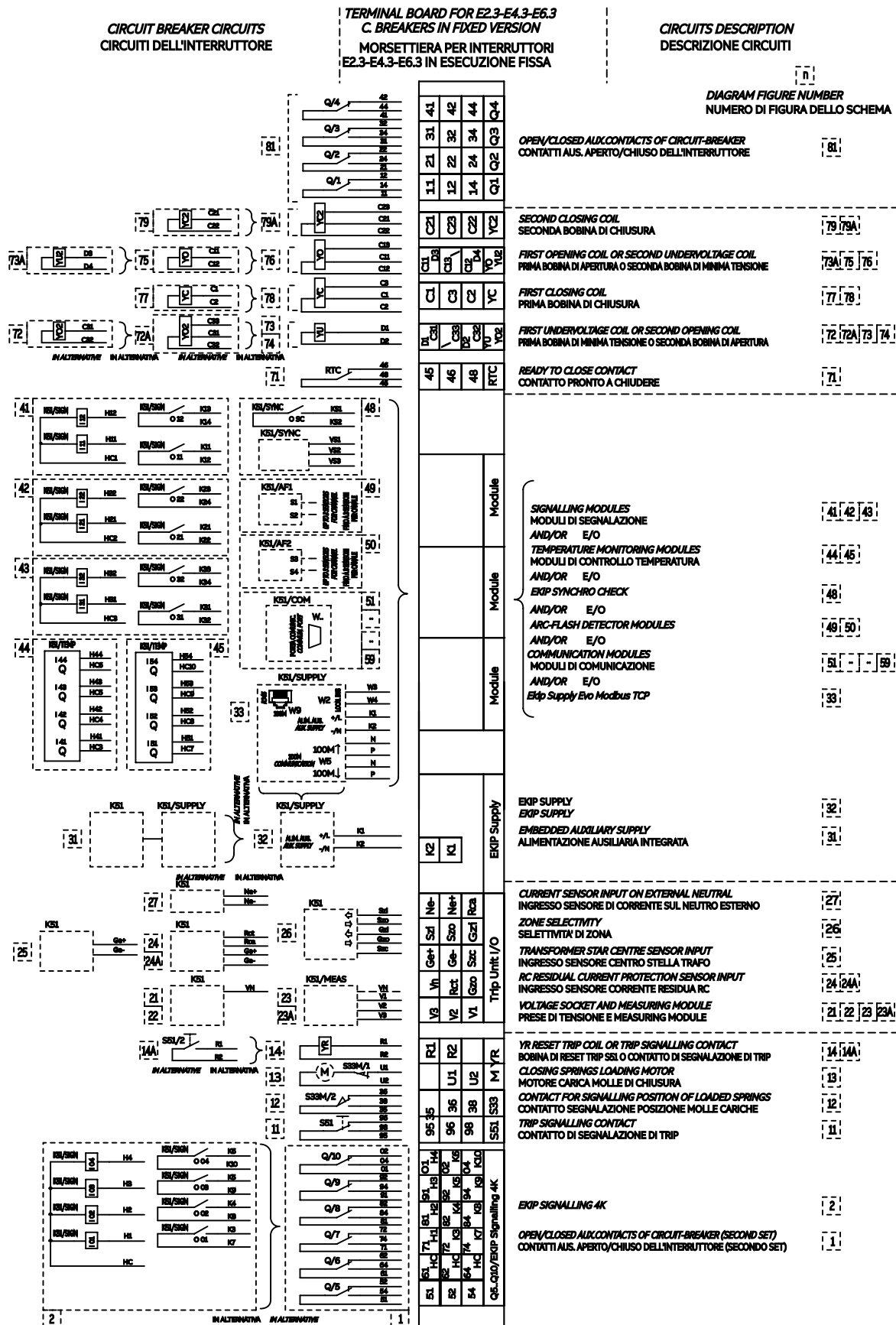


NOTE: The Emax E1.3 circuit-breaker does not have connections for contacts Q5..Q10 of the Ekip Signalling 4K module.

The version of circuit-breakers E2.3-E4.3-E6.3 is always indicated in the next chapters.

Continued on the next page

A the representation of the terminal box for a circuit-breaker in fixed version is provided below.



Continued on the next page

The key to the symbols used in the circuit diagrams is given below.

Symbol	Description
*	See the note indicated by the letter
A1	Applications located on the movable parts of the circuit-breaker
A3	Applications located on the fixed part of the circuit-breaker
A4	Indicative device and connections for control and signalling, outside the circuit-breaker
A5	Module applications
A6	Applications of the Ekip Cartridge holder
A13	Ekip Signalling 10K Link type signalling unit, on the outside of the circuit-breaker
A19	Ekip Cartridge
AF1÷3	Inputs for ARC-FLASH protection system
BUS1	Serial interface with external bus
D	Electronic time delay device of the undervoltage release, outside the circuit-breaker
GZi(DBi)	Zone Selectivity input for G protection or input in the “reverse” direction for D protection
GZo(DBo)	Zone Selectivity output for G protection or output in the “reverse” direction for D protection
I O1...32	Programmable digital inputs
K51	Ekip Aware type electronic protection release for overcurrent protection
K51/COM	Communication module
K51/MEAS	Measurement module
K51/SIGN	Signalling module
K51/SUPPLY	Optional auxiliary supply module (110 to 240VAC and 24 to 240VDC)
K51/SYNC	Synchronization module
K51/TEMP	Temperature monitoring module
M	Motor for loading closing springs
O 01...32	Programmable signalling contacts
O SC	Synchronism monitoring contact
Q	Circuit-breaker
Q/1...Q/25	auxiliary contacts open/closed of the circuit-breaker
Q/26-27	Open/closed auxiliary contacts of the circuit-breaker used inside protection release
RC	RC protection sensor (residual current)
RTC	Auxiliary contact for ready-to-close signalling
RTC Ekip	Ready-to-close auxiliary contacts of the circuit-breaker used inside protection release
S33 M/1-2	Limit contacts of spring loading motor
S43	Switch for remote/local command pre-setting
S51-S51/2	Contact for electrical signalling of trip
S75E/1÷4	Contacts for electrical signalling of circuit-breaker in racked-out position (only with withdrawable circuit-breakers)
S75I/1÷6	Contacts for electrical signalling of circuit-breaker in racked-in position (only with withdrawable circuit-breakers)
S75T/1÷4	Contacts for electrical signalling of circuit-breaker in test position (only with withdrawable circuit-breakers)
	(*) = The maximum number of S75 contacts is 10 for circuit-breakers E2.3-E4.3-E6.3, the maximum number of contacts for E1.3 circuit-breakers is 6.

Continued on the next page

Symbol	Description
SC	Pushbutton or contact for closing the circuit-breaker
SO	Pushbutton or contact for immediate opening of the circuit-breaker
SO1	Pushbutton or contact for opening the circuit-breaker with time-delayed trip
SR	Pushbutton or contact for electrical reset of the trip contact S51
SZi(DFi)	Input for zone selectivity for protection S or input in "direct" direction for D protection
SZo(DFo)	Output for zone selectivity for S protection or output in "direct" direction for D protection
TI/L1-L2-L3	Current transformers located on phases L1-L2-L3
TI/N	Current transformer located on neutral
TU1...TU2	Insulation voltage transformer (outside circuit-breaker)
Uaux	Auxiliary supply voltage
UI/L1-L2-L3	Current sensors (Rogowski coils) located on phases L1-L2-L3
UI/N	Current sensor (Rogowski coil) located on neutral
UI/O	Single-pole current sensor (Rogowski coil)
W2	Serial interface with internal bus (local bus)
W5	Serial interface 100M
W9	RJ45 connector for external bus (BUS 1 or LINK Bus)
W10...W14	RJ45 connector for communication modules
X	Delivery connector for auxiliary circuits for withdrawable version of circuit-breaker
XB1...XB7	Connectors for circuit-breaker applications
XCT1	Terminal box of Ekip Cartridge
XF	Delivery terminal board for position contacts of withdrawable version of circuit-breaker
XK1...XK3	Connectors for circuits of Ekip Aware release
XK7	Connectors for auxiliary circuits of modules
XV	Delivery terminal board for auxiliary circuits of fixed version circuit-breaker
YC	First closing coil
YC2	Second closing coil
YO	First opening coil
YO1	Opening coil for overcurrent protection
YO2	Second opening coil
YR	Coil for electrical reset of the trip contact S51
YU	First undervoltage coil
YU2	Second undervoltage coil

The key to the numbering used in the circuit diagrams is given below.

Symbol	Description
[81]	Open/close auxiliary contacts of circuit-breaker
[79][79A]	Second closing coil
[73A][75][76]	First opening coil or second undervoltage coil
[77][78]	First closing coil
[72][72A][73][74]	Second undervoltage coil or second opening coil
[71]	Contact ready to close
[41][42][43]	Signalling modules
[44][45]	Temperature monitoring modules
[48]	Ekip Synchrocheck
[49][50]	Ekip Artc-Flash 6F module
[51][...][...][59]	Communication modules

Continued on the next page

Symbol	Description
[33]	Ekip Supply Evo Modbus TCP
[32]	Ekip Supply Lite
[31]	Integrated auxiliary power supply
[27]	Input of current sensor on the external neutral
[26]	Zone selectivity
[25]	Input of the TRAFO star centre sensor
[24]	RC residual current sensor input
[21][22][23][23A]	Measuring module and voltage sockets
[14][14A]	Trip S51 reset coil or Trip signalling contact
[13]	Closing springs loading motor
[12]	Springs charged position signalling contact
[11]	Trip signalling contact
[2]	Ekip Signalling 4K
[1]	Open/close auxiliary contacts of circuit-breaker (second set)

The key of the notes used in the circuit diagrams is given below.

Note	Description
A)	The presence of auxiliary supply is required for the local bus and zone selectivity functions (see Fig. 32-33).
B)	Always supplied with the motor for loading the closing springs in Fig. 13.
C)	A voltage transformer is mandatory in the case of external sockets. External sockets are mandatory for systems with 100V rated voltage or lower or 690V rated voltage or higher.
D)	Connections between residual protection sensor RC and the poles of connector X (or XV) of the circuit-breaker must be made using four-pole shielded cable with paired braided wires (such as BELDEN 9696 paired or equivalent), not more than 15m in length.
E)	Earth fault protection (Gext) is available with the Ekip Aware electronic protection release, by means of the current sensor on the star point of the MV/LV transformer. Connection between terminals 1 and 2 of current transformer UI/O and poles Ge+ and Ge- of connector X (or XV) of the circuit-breaker must be made using two-pole shielded and stranded cable (type BELDEN 9841 or equivalent), not more than 15m in length.
F)	Make the connection using the cable provided. There must be no break in the cable. Use of other cables or extensions using intermediate terminal boxes is not allowed. Poles Ne+ and Ne- of connector X (or XV) of the circuit-breaker must be short-circuited if the external neutral is not present.
G)	Mandatory if Ekip DIN Rail Cartridge is present.
H)	Circuit-breakers E2.3, E4.3 and E6.3, equipped with Ekip Supply Lite, can use up to three of the applications between Figures 41 and 59, in the quantity of one for each application. These same circuit-breakers, equipped with Ekip Supply Evo Modbus TCP, can use up to two of the applications between Figures 41 and 59, in the quantity of one for each application. Circuit-breakers E1.3, equipped with Ekip Supply Lite, can use up to two of the applications between Figures 41 and 59, in the quantity of one for each application. Equipped with Ekip Supply Evo Modbus TCP, these same circuit-breakers can use one of the applications between Figures 41 and 59.
I)	Ekip Cartridge can be fitted with up to three applications among Figs. 41 to 59 purchased once.

Continued on the next page

Note	Description
J)	When there are several Ekip Com modules with withdrawable circuit-breaker, contact S75I/5 must be connected once only to one single module.
K)	Auxiliary voltage Uaux allows all the functions of the Ekip Aware electronic protection release to be activated. "Galvanically separated converters" conforming to standards IEC 60950 (UL 1950) or equivalent must be used since an earthed Uaux is required.
L)	Use a twisted pair cable supplied with Ekip Cartridge. If a longer cable is required, use BELDEN 3105A shielded cable or equivalent, not more than 15 m in length. The shield must be earthed from both sides.
M)	Suggested RJ45 cable: CAT6 STP
N)	Consult "Technical Application Paper - vol. 9: Communication with ABB circuit-breakers via BUS" when connecting the EIA RS485 serial link. Use BELDEN 3105A cable or equivalent
O)	Use BELDEN 3079A cable or equivalent. Consult White Paper 1SDC007412G0201 "Communication with SACE Emax circuit-breakers" for further details.
P)	The Ekip Signalling 10K Link module in Fig. 103 can be connected to the Ekip Supply Evo Modbus TCP of Fig. 33 via the W13 LINK Bus interface or via 2-wire Ethernet connection.
Q)	Use two-pole shielded cable type BELDEN 8762/8772 or equivalent. The shield must be earthed on the selectivity input side (for zone selectivity) or on both sides (for other applications).
R)	Use PENTRONIC TEXTSITW type insulated cables for PT100/PT1000, no more than 10 m in length.
S)	The terminals (HS02 to HS22) of the digital inputs of the Ekip Signalling 10K Link module in Fig. 103 are short-circuited internally.
T)	Use a suitable 2-wire cable for the Ethernet connection, e.g. a T1 SPE cable with double shielding type HARTING T1 SPE SF/TP 1x2xAWG26/7, up to 15 m in length.
U)	Use 3-wire shielded cables type BELDEN 8772 or 9533 or equivalent. The total length of the connections must not exceed 100 m. The shield must be earthed from both sides.

Mechanical accessories

1 - Mechanical Protection accessories

PBC: opening and closing pushbutton protection

The pushbutton protection inhibits the use of the opening and closing pushbuttons.

It is available in two types:

- Protection that inhibits the use of both push-buttons at the same time (PBC) or just one (PCB2). Use of the push-buttons is only allowed with the aid of a purpose-made key.
- Padlockable protection that inhibits the use of one or both of the push-buttons with the aid of a padlock (diameter 4, 6, 7 or 8 mm).

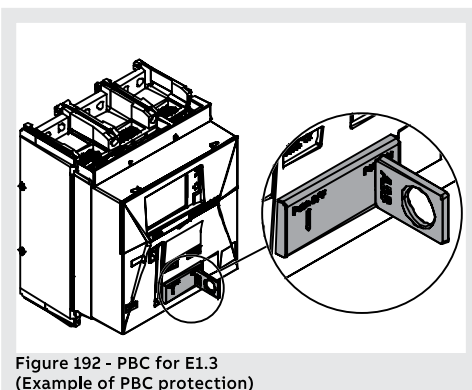


Figure 192 - PBC for E1.3
(Example of PBC protection)

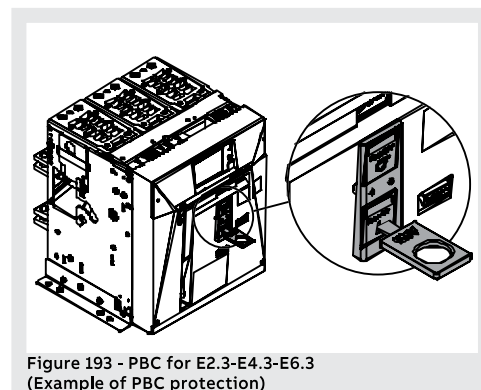


Figure 193 - PBC for E2.3-E4.3-E6.3
(Example of PBC protection)

Information on the assembly is available on the website <https://library.abb.com>

- protection with key for E1.3 in the kit instructions [1SDH002309A1715](#) and for E2.3-E4.3-E6.3 in the kit sheet [1SDH002310A1715](#)
- protection with padlock for E1.3 in the kit instructions [1SDH002309A1730](#) and for E2.3-E4.3-E6.3 in the kit sheet [1SDH002310A1730](#)

IP54 protection

IP54 protection completely protects the front of the circuit-breaker, to achieve protection class IP54.

It is always equipped with two locks for closing, available in two types:

- lock with different key code numbers (for an individual circuit-breaker);
- lock with the same key code number (for more than one circuit-breaker).

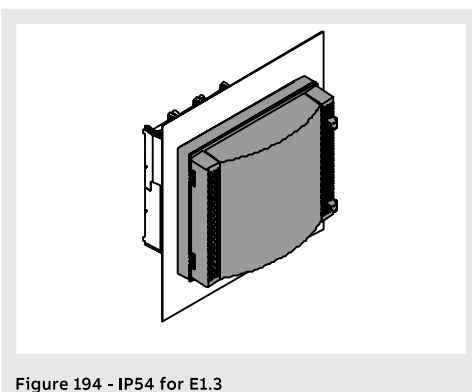


Figure 194 - IP54 for E1.3

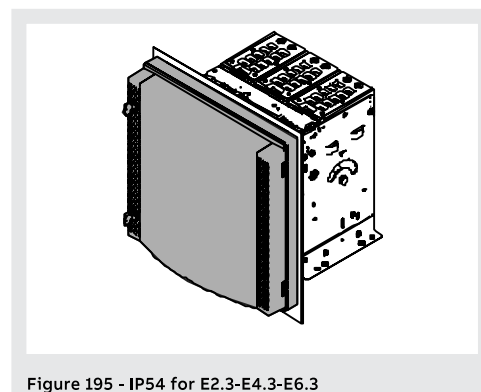


Figure 195 - IP54 for E2.3-E4.3-E6.3

Details about assembly are available at <https://library.abb.com>, especially for E1.3 in the kit instruction sheet [1SDH002309A1714](#) and for E2.3-E4.3-E6.3 in document [1SDH002310A1714](#).

HTC / LTC: Terminal-covers**E1.3**

Terminal-covers are applied in order to reduce the risk of direct contact with live parts. They are available in two types:

- HTC - High terminal-covers
- LTC - Low terminal-covers

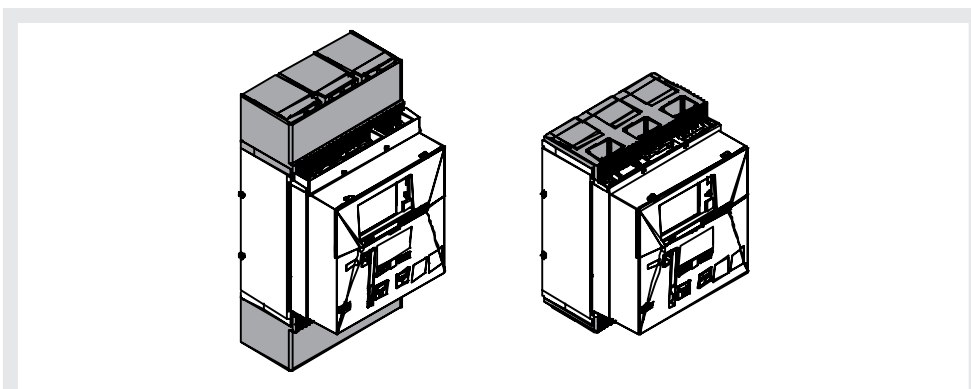


Figure 196

Information on assembly is available on the website <https://library.abb.com> in particular with the kit sheets:

- [1SDH002309A1612](#) for the high terminal-covers
- [1SDH002309A1613](#) for the low terminal-covers

PB: Phase separators E1.3

The phase separators are applied in order to increase the insulation clearance between two adjacent phases.

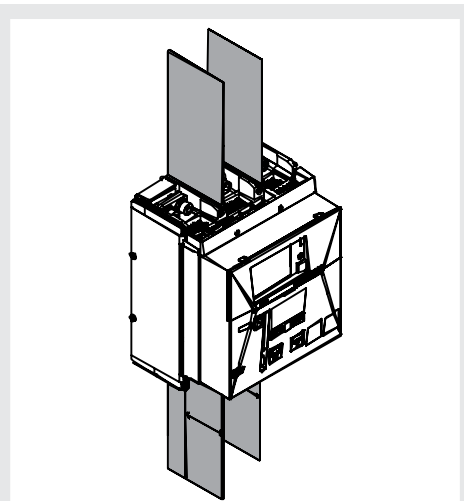


Figure 197

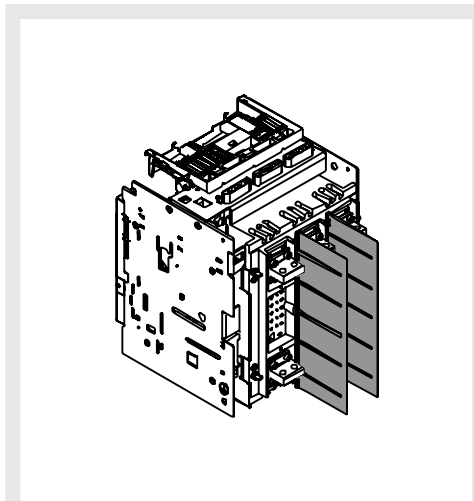


Figure 198

Information on the assembly is available on the website <https://library.abb.com> in particular in the kit sheet [1SDH002309A1608](#).

2 - Mechanical safety accessories

- KLC: open position key lock

The KLC locks the circuit-breaker in the open position.

It can also be used during maintenance work on the circuit-breaker after removal of the circuit-breaker escutcheon plate.

The KLC lock is available with three types of locking mechanism:

 - KLC-D lock (Giussani or Ronis) with different key numeration (for one single circuit-breaker);
 - KLC-S lock (Giussani or Ronis) with the same key numeration (for several circuit-breakers). The maximum number of numerations available is five.
 - KLC-A

A purpose-made expedient enables KLC-A to function with three types of locking mechanism

 - STI
 - Kirk
 - Castell



NOTE: provision of Ronis - STI - Kirk - Castell locks is at the customer's charge.



NOTE: the KLP lock can also be provided in the presence of PLC block.

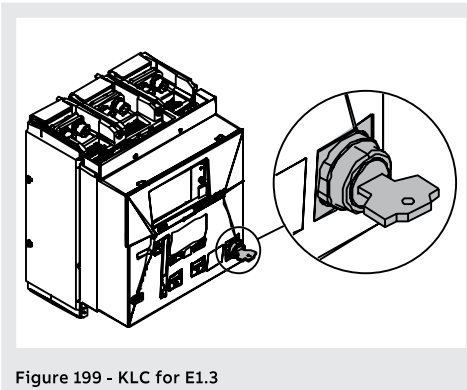


Figure 199 - KLC for E1.3

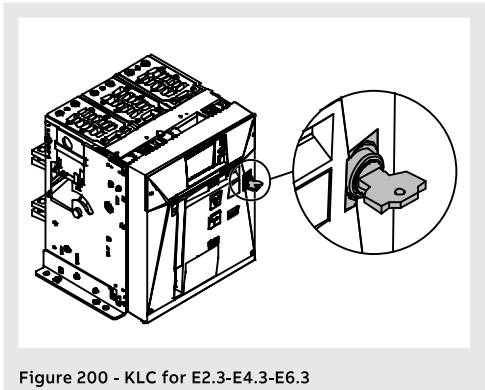


Figure 200 - KLC for E2.3-E4.3-E6.3

Details about assembly are available at <https://library.abb.com>, especially for E1.3 in the kit instruction sheet:

- [1SDH002309A1702](#) and [1SDH002309A1752](#) for key locks with Giussani locking mechanism supplied by ABB;
- [1SDH002309A1733](#) for key locks with Ronis locking mechanism supplied by ABB;
- [1SDH002309A1703](#) for key locks pre-engineered for STI - Kirk locking mechanisms;
- [1SDH002309A1718](#) for key locks pre-engineered for Castell locking mechanisms;

and for E2.3-E4.3-E6.3 in the kit sheets:

- [1SDH002310A1702](#) and [1SDH002310A1752](#) for key locks with Giussani locking mechanism supplied by ABB;
- [1SDH002310A1733](#) and [1SDH002310A1783](#) for key locks with Ronis locking mechanism supplied by ABB;
- [1SDH002310A1703](#) and [1SDH002310A1753](#) for key locks pre-engineered for STI - Kirk locking mechanisms;
- [1SDH002310A1718](#) for key locks pre-engineered for Castell locking mechanisms;

	1st PLC (Left)	2nd KLC-D Giussani (Left)	2nd KLC-D Ronis (Left)	2nd KLC-A Kirk/STI (Left)
1st KLC-D 1st KLC-S Giussani (Right)	X	X		
1st KLC-D Ronis (Right)	X		X	
1st KLC-A Kirk/STI (Right)	X			X
1st KLC-A Castell (Right)	X			

PLC: padlock The PLC locks the circuit-breaker in the open position.

It is available in two types:

- lock usable with a maximum number of three padlocks with a diameter of 4 mm - 5/32"
- lock usable with an 8 mm - 5/16" diameter padlock
- lock usable with a 7 mm - 1/4"-17/64" padlock



NOTE: The padlocks are at customer's expenses.



WARNING! Dangerous voltage For secure operation, it is mandatory to comply with the indicated padlock diameter. Smaller diameters than those indicated could lead to insecure and undesired performance with risk of serious injury to persons and damage to equipment. This accessory is designed for use with normal padlocks and specific shank diameters. Use of multiple clasp devices is not allowed. Please contact ABB for further information if different dimensional requirements are involved.

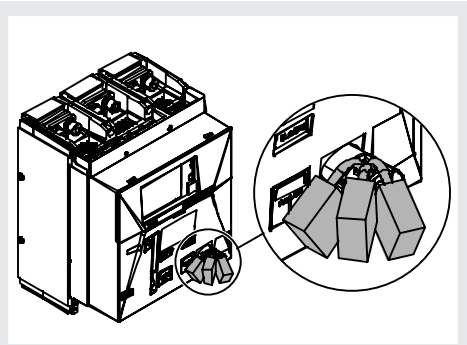


Figure 201 - PLC for E1.3

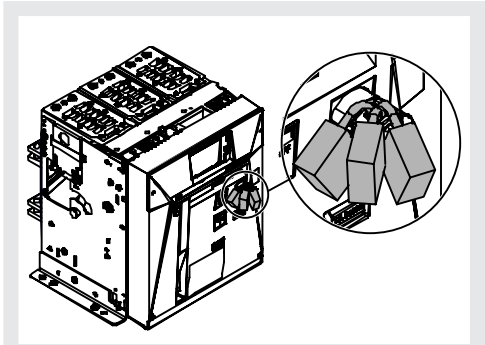


Figure 202 - PLC for E2.3-E4.3-E6.3

Details about assembly are available at <https://library.abb.com>, especially for E1.3 in the kit instruction sheet [1SDH002309A1736](#) and [1SDH002309A1786](#) and for E2.3-E4.3-E6.3 in the kit sheets [1SDH002310A1736](#) and [1SDH002310A1786](#).

	1st PLC (Left)	2nd KLC-D	2nd KLC-D	2nd KLC-A
		Giussani (Left)	Ronis (Left)	Kirk/STI (Left)
2nd PLC (Right)	X			

Anti-racking-in locks

The anti-racking-in locks enable the movable part of the circuit-breaker to be only racked into the corresponding fixed part.

They are provided for all withdrawable circuit-breakers and are divided into two types:

- according to configuration, factory installed on both the fixed and movable parts (A)
- according to rating, factory installed on the movable part and supplied in the packaging for the fixed part (B)



WARNING! Incorrect assembly. Risk of serious injury to persons and damage to equipment. It is forbidden to change the position of the configuration blocks

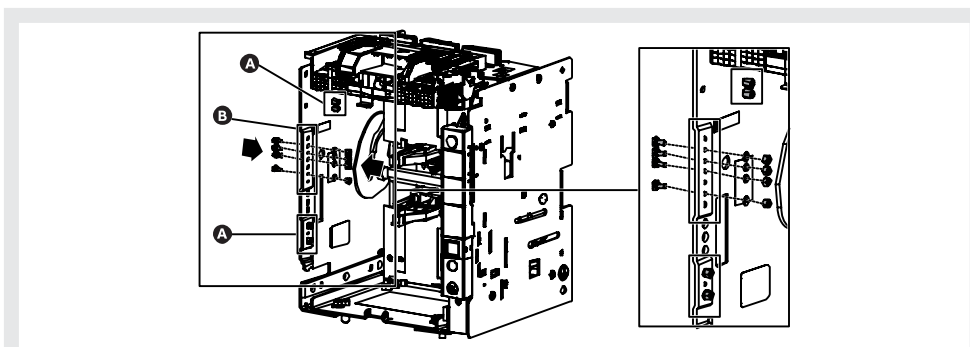
E1.3

Figure 203

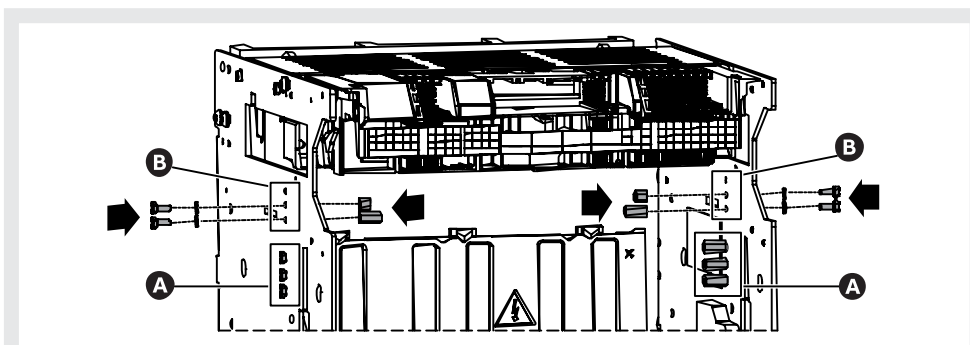
E2.3-E4.3-E6.3

Figure 204

Details about assembly are available at <https://library.abb.com>, especially for E1.3 in the kit instruction sheet [1SDH002309A1701](#) and for E2.3-E4.3-E6.3 in the kit sheet [1SDH002310A1701](#).

MOC: Operation counter

The mechanical operation counter displays the number of mechanical operations performed by the circuit-breaker.

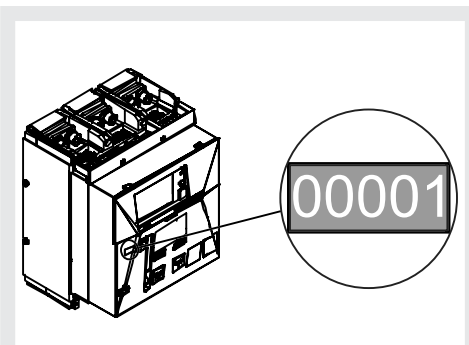


Figure 205 - MOC for E1.3

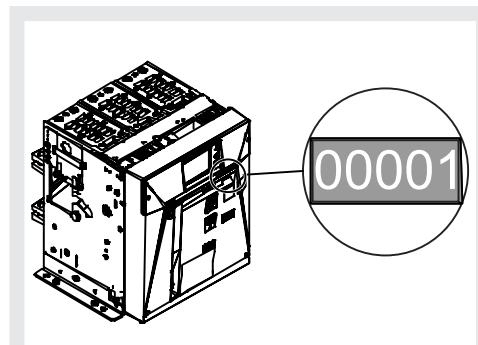


Figure 206 - MOC for E2.3-E4.3-E6.3

Details about assembly are available at <https://library.abb.com>, especially for E1.3 in the kit instruction sheet [1SDH002309A1710](#) and for E2.3-E4.3-E6.3 in the kit sheet [1SDH002310A1710](#).

**PLP: padlock in connected/
test/disconnected positions**

The PLP lock locks the movable part of a withdrawable circuit-breaker in the fixed part, in the racked-in, test or racked-out positions.

One single type is available, which allows up to three 8-mm diameter padlocks to be mounted or up to two padlocks in the case of E2.3-E4.3-E6.3 circuit-breakers with Castell lock already mounted.



NOTE: the PLP lock can also be supplied in the presence of a KLP lock.

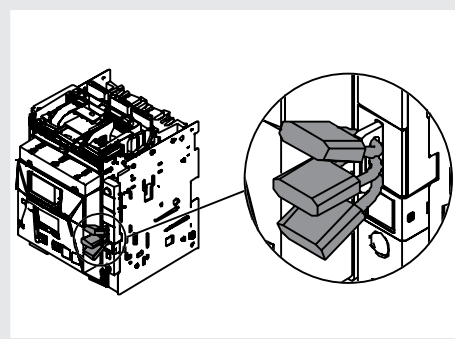


Figure 207 - PLP for E1.3

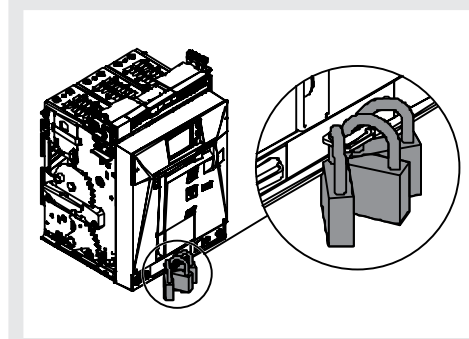


Figure 208 - PLP for E2.3-E4.3-E6.3

Details about assembly are available at <https://library.abb.com>, especially for E1.3 in the kit instruction sheet [1SDH002309A1707](#) and for E2.3-E4.3-E6.3 in the kit sheet [1SDH002310A1707](#).

**KLP: key lock for connected/
test/disconnected positions**

The KLP lock locks the movable part of a withdrawable circuit-breaker in racked-in, test or racked-out positions.



NOTE: it is possible to lock the moving part in the disconnected position only by using the additional accessory KLP lock.

The KLP lock is available with three types of locking mechanism:

- KLC-D lock (Giussani or Ronis) with different key numeration (for one single circuit-breaker);
- KLC-S lock (Giussani) with the same key numeration (for several circuit-breakers). The maximum number of numerations available is five.
- KLP-A

Through an appropriate setup, the KLP lock for connected/test/disconnected positions can work with other types of lock:

- Ronis
- Kirk
- Castell

The maximum number of locks that can be installed per circuit-breaker is the two, for all types of lock.

**NOTES:**

- provision of Ronis locks is at the charge of ABB.
- provision of STI - Kirk - Castell locks is at the customer's charge.
- the KLP lock can also be supplied in the presence of a PLP lock.

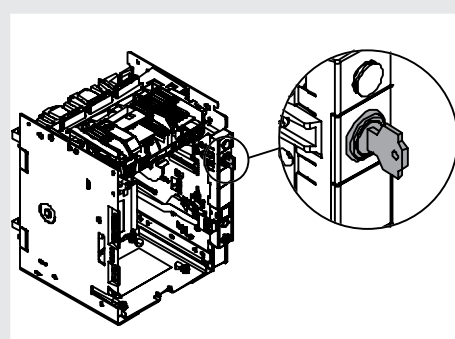


Figure 209 - KLP for E1.3

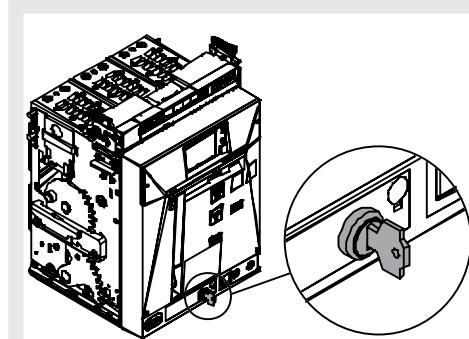


Figure 210 - KLP for E2.3-E4.3-E6.3

Continued on the next page

Details about assembly are available at <https://library.abb.com>, especially for E1.3 in the kit instruction sheet:

- [1SDH002309A1704](#) for key locks with Giussani locking mechanism supplied by ABB
- [1SDH002309A1735](#) for key locks with Ronis locking mechanism supplied by ABB
- [1SDH002309A1705](#) for key locks pre-engineered for STI - Kirk locking mechanisms
- [1SDH002309A1719](#) for the key locks with pre-engineering for Castell locks

and for E2.3-E4.3-E6.3 in the kit sheets:

- [1SDH002310A1704](#) and [1SDH002310A1726](#) for key locks with Giussani locking mechanism supplied by ABB
- [1SDH002310A1735](#) and [1SDH002310A1785](#) for key locks with Ronis locking mechanism supplied by ABB
- [1SDH002310A1705](#) and [1SDH002310A1755](#) for key locks pre-engineered for STI - Kirk locking mechanisms
- [1SDH002310A1719](#) and [1SDH002310A1769](#) for the key locks with pre-engineering for Castell locks

KLP lock additional accessory This additional accessory limits the blocking function to the disconnected position only.

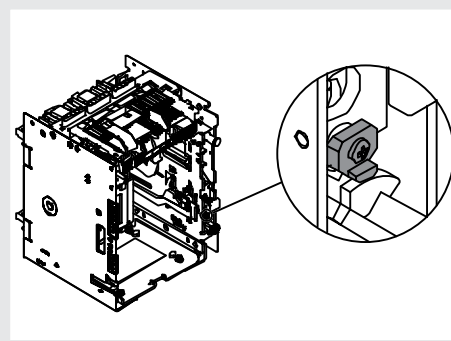


Figure 211 - for E1.3

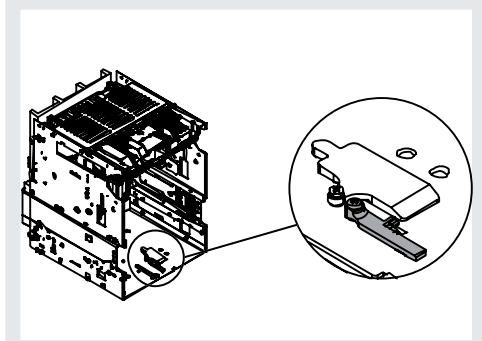


Figure 212 - for E2.3-E4.3-E6.3

Details about assembly are available at <https://library.abb.com>, especially for E1.3 in the kit instruction sheet [1SDH002309A1727](#) and for E2.3-E4.3-E6.3 in the kit sheet [1SDH002310A1727](#).

SL: shutter lock The SL shutter locks the shutters of the fixed part.

It is possible to lock the upper and lower shutters independently.

This is an accessory available on all the fixed parts and can work with the aid of padlocks with diameters of 4 mm - 5/32", 6 mm - 1/4", 8 mm - 5/16", with a maximum of four padlocks per fixed part (two for the upper shutters and two for the lower shutters).



NOTE: The padlocks are at customer's expenses.

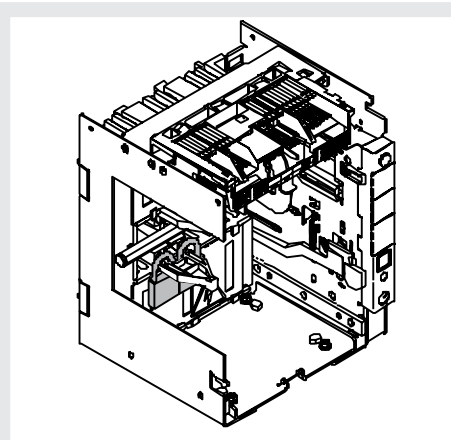


Figure 213 - SL for E1.3

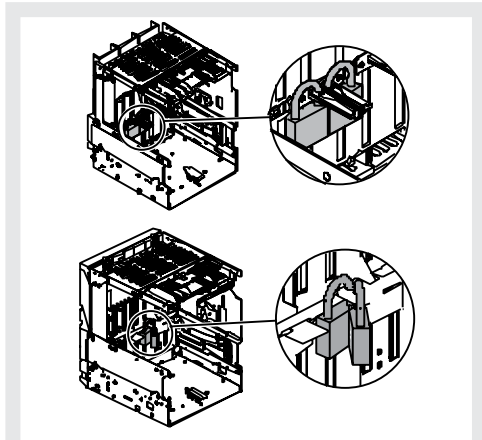


Figure 214 - SL for E2.3-E4.3-E6.3

DLC: Door opening lock with the circuit-breaker in closed position

The DLC prevents the following operations from being carried out:

- opening the switchgear door with the circuit-breaker closed if the circuit-breaker is in fixed version
- opening the switchgear door with the circuit-breaker closed and in connected position if the circuit-breaker is in fixed version
- closing of the circuit-breaker when the switchgear door is open

Details about assembly are available at <https://library.abb.com>, especially for E1.3 in the kit instruction sheet [1SDH002309R0712](#) and for E2.3-E4.3-E6.3 in the kit sheet [1SDH002310R0712](#).

DLP: door opening lock with the circuit-breaker in connected/test position

The DLP lock prevents the switchgear door from being opened when the moving part of the circuit-breaker is in the connected or test position.

It can be installed alternatively on the right side or the left side of the fixed part.



IMPORTANT: The DLP lock is used as an alternative to the mechanical interlock.

DLP not available for E1.3

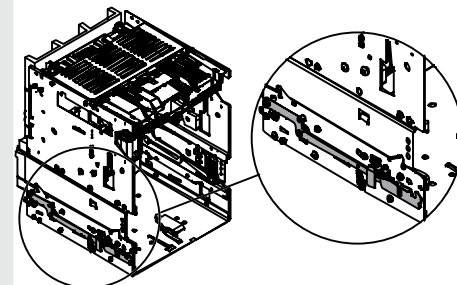


Figure 215 - DLP for E2.3-E4.3-E6.3

Information on the assembly is available on the website <https://library.abb.com> in particular in the kit sheet [1SDH002310A1709](#).

DLR: lock on racking-in/ racking-out of the moving part with the door open

The DLR lock prevents the moving part from being racked in/out from the fixed part when the switchgear door is open.

It is available on request on all fixed parts.

DLR not available for per E1.3

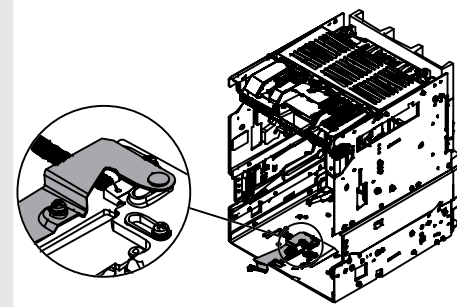


Figure 216 - DLR for E2.3-E4.3-E6.3

Information on the assembly is available on the website <https://library.abb.com> in particular in the kit sheet [1SDH002310A1725](#).

3 - Mechanical Interlocks

Mechanical interlocks determine the opening/closing logic between two or three circuit-breakers. Four types of interlocks are available, usable in both fixed and withdrawable versions.

Mechanical interlock of type A - Two Circuit-breakers

The Type A interlock is applicable to two circuit-breakers (normal power supply + emergency power supply).

It allows you never to have two circuit-breakers in the closed position at the same time.

Information on assembly is available on the website <https://library.abb.com> in particular with the kit sheets:

1	2
O	O
I	O
O	I

- [1SDH002309A1720](#) for interlock between E1.3 circuit-breakers
- [1SDH002310A1720](#) for interlock between E2.3-E4.3-E6.3 circuit-breakers
- [1SDH002309A1721](#) for interlocking between an E1.3 circuit-breaker and an E2.3-E4.3-E6.3 circuit-breaker

Mechanical interlock of type B - Three Circuit-breakers

The Type B interlock is applicable to three circuit-breakers (two normal power supplies + emergency power supply).

It only allows the closing of the two circuit-breakers of the normal power supply if the circuit-breaker of the emergency power supply is open. The circuit-breaker of the emergency power supply can be closed only if the others two are open.

Information on the assembly is available on the website <https://library.abb.com> in particular in the kit sheet [1SDH002310A1721](#).

1	2	3
O	O	O
I	O	O
O	O	I
I	O	I
O	I	O

Mechanical interlock of type C - Three Circuit-breakers

The Type C interlock is applicable to three circuit-breakers (two normal power supplies + a bus tie).

It allows the simultaneous closing of one or two circuit-breakers, resulting in two possible types of power supply of the half busbars:

- power supply from a single transformer (bus tie closed)
- power supply from both transformers (bus tie open)

Information on the assembly is available on the website <https://library.abb.com> in particular in the kit sheet [1SDH002310A1722](#).

1	2	3
O	O	O
I	O	O
O	I	O
O	O	I
O	I	I
I	I	O
I	O	I

Mechanical interlock of type D - Three Circuit-breakers

The Type C interlock is applicable to three circuit-breakers (three power supplies on the same bar that must not operate in parallel)

It allows only one of the three circuit-breakers to be closed.

Information on the assembly is available on the website <https://library.abb.com> in particular in the kit sheet [1SDH002310A1723](#).

1	2	3
O	O	O
I	O	O
O	I	O
O	O	I

Operating coil trip time setting on interlocked circuit-breakers

Before the trip command of a YC release on the circuit-breaker (B) which activates an interlock, make sure that at least 60ms have passed since the energizing of release YU or from the de-energizing of release YO - YO2 on the circuit-breaker to be interlocked (A).

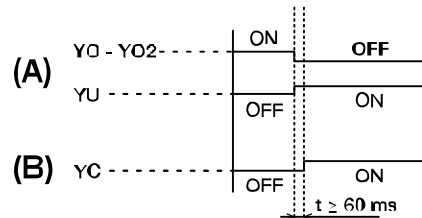


Figure 217

4 - Lifting plates

Lifting plates are applied to the movable part of withdrawable circuit-breaker E1.3 so that it can be handled when unpacked and for the racking-in/racking-out operations.



IMPORTANT: the lifting plates are built into E2.3-E4.3-E6.3 circuit-breakers

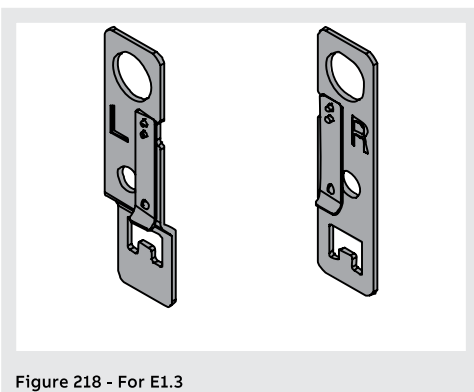


Figure 218 - For E1.3

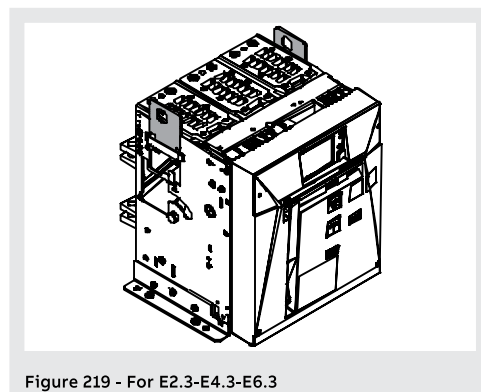


Figure 219 - For E2.3-E4.3-E6.3

Information on the assembly is available on the website <https://library.abb.com> in particular in the kit sheet [1SDH002309A1912](#).

Electrical accessories

1 - Electrical control accessories

YO-YC-YO2-YC2: Opening and closing coil

Opening coils, YO and YO2, and closing coils, YC and YC2⁽¹⁾, enable the circuit-breaker to be monitored remotely by actuating signals available via terminal box.

The opening of the circuit-breaker is always possible with the circuit-breaker closed, while closing is possible with the circuit-breaker open and the closing springs charged.

The opening and closing coils can operate in two different modes:

- instantaneous service (the minimum duration of the command impulse must be 100 ms).
- service with permanent power supply.

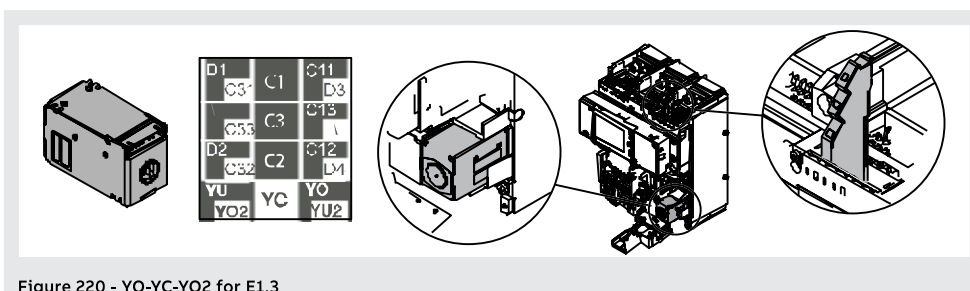


Figure 220 - YO-YC-YO2 for E1.3

⁽¹⁾ YC2 not available for per E1.3

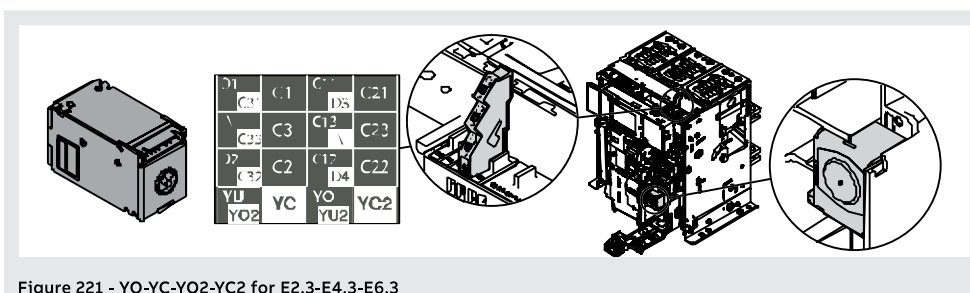


Figure 221 - YO-YC-YO2-YC2 for E2.3-E4.3-E6.3



IMPORTANT:

- if the closing coil is permanently energized and the opening coil trips, after opening, the closing coil must be momentarily de-energized so that it can be reused for the next closing operation.
- if an opening coil trips, wait at least 100 ms after having deactivated the opening coil before operating a closing coil.



NOTE: YO2 as an alternative to under-voltage coil YU

Available voltages and characteristics

The tables listing the available voltages and the electrical characteristics are provided below:

Available voltages (Un)	General characteristics	YO-YO2	YC-YC2
24 V AC/DC	Operating limits	70...110 %Un	85...110 %Un
30 V AC/DC	Inrush power (Ps)	300 VA/W	
48 V AC/DC	Continuous power (Pc)	3.5 VA/W	
60 V AC/DC	Maximum opening time	35 ms	-
110...120 V AC/DC	Maximum closing time	-	70 ms
220...240 V AC/DC			
240...250 V AC/DC			
380...400 V AC			
415...440 V AC			
480...500 V AC			

Continued on the next page

YO-YC-YO2-YC2: Connections

More details are available in the website <https://library.abb.com> which also includes the entire circuit diagram [1SDM000056A1001](#).

Details about assembly are available at <https://library.abb.com>, especially for E1.3 in the kit instruction sheets:

- [1SDH002309A1502](#) for YO and YO2 coils
- [1SDH002309A1503](#) for coils YC

and for E2.3-E4.3-E6.3 in the kit sheets:

- [1SDH002310A1502](#) for YO and YO2 coils
- [1SDH002310A1503](#) for YC and YC2 coils