

ABB Ekip UP

Switchgear digital unit for monitoring, protecting and controlling plant

Manual on use, installation, configuration and maintenance
for the installing technician and user



Safety prescriptions

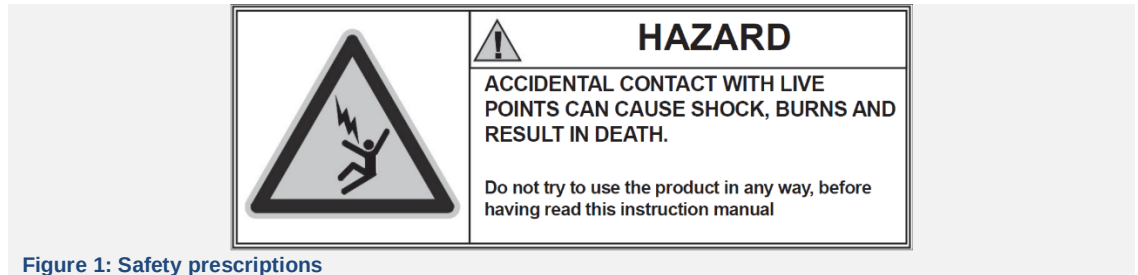


Figure 1: Safety prescriptions



HAZARD! ELECTRIC SHOCK RISK! In the case of persons who are not authorized to work on plants carrying live voltage in accordance with local legislation, in order to avoid any potential electrical risk during assembly, installation, maintenance or removal of the Ekip UP from service, disconnect or lock out all electrical supplies.



WARNING!

- Detailed descriptions of the standard installation, use and maintenance procedures and principles for operating in safety are not included: it is important to note that this document contains safety and caution indications against certain methods (of installation, use and maintenance) that could harm persons, damage devices or make them less safe.
- These warnings and alarms do not encompass all conceivable installation, use and maintenance methods recommended or not recommended by ABB that could be applied and possible consequences and complications of each conceivable method. Neither will ABB investigate all these methods.
- Anybody who uses maintenance procedures or devices, recommended by ABB or not has to check thoroughly that neither personal safety or safety devices are placed in danger by the installation method, use, maintenance or by the instruments used; for further information, explanations or specific problems contact the nearest ABB.
- This manual has been written only for qualified persons and is not to be intended as a substitute for a suitable course or experience with the safety procedures for this device.
- For products provided with communication, the purchaser, the installer or the final customer are responsible for applying all the IT security measures to prevent risks arising from the connection to communications networks; these risks comprise amongst other things the use of the product by unauthorized persons, the alterations of its normal operation, access to and modification of information.
- The purchaser, the installer or the final customer and person responsible for ensuring that safety warnings and notices are displayed and also that all the access points and operating devices are safely locked when the switchgear is left unattended even momentarily.
- All the information contained in this document is based on the latest information available at the moment of publication. We reserve the right to modify the document at any moment without prior notice.

Warnings



WARNING! READ THE FOLLOWING MANUAL CAREFULLY BEFORE INSTALLING OR WORKING ON EKIP UP

- Keep this manual carefully with all the other available documents, including: Getting Started for first installation, electrical diagrams, drawings and any descriptive notes.
- Keep these documents available during the Ekip UP installation, operating and maintenance step to facilitate the following operations.
- Install the unit in compliance with the environmental, electrical and mechanical limits described in the product documentation.
- Ekip UP has been designed to operate with voltage and current values within the rated limits: do not install in systems that work at values that exceed these rated limits.
- Follow the safety procedures set by your company.
- Do not open lids or doors, do not work on devices before disconnecting all circuits and checking that they are disconnected with a measuring instrument.

General view of Ekip UP

3 - Main features

Versions and general functions

Ekip UP is a switchgear digital unit for monitoring, protection and controlling the performance of the plant, available in five versions:

Version	Measurements	Openings history	Basic protections	Plus protections	Power Controller
1. Monitor	☒				
2. Protect	☒	☒	☒		
3. Protect+	☒	☒	☒	☒	
4. Control	☒				☒
5. Control+	☒	☒	☒	☒	☒

Table 3: versions

All the Ekip UP versions can be fitted on a DIN 35mm guide or have a door and have been developed to work in specific conditions (page 14).

Measurements



All the Ekip UP versions carry out the following measurements:

- instantaneous, minimum and maximum phase and internal earth fault currents
- instant, minimum and maximum network voltage and phase voltage
- active, reactive and apparent power (total and phase)
- total active, reactive and apparent energy
- network frequency
- spike and power factor
- datalogger and waveform measurements
- measurements recording
- events log
- power quality

Ekip UP Protect, Protect+ and Control+ versions also show the openings history.

The description of all the measurements is available from page 46.

Protections



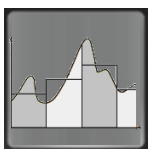
Ekip UP Protect, Protect+ and Control+ versions have the following protection functions:

Name	Protect	Protect+	Control+
Basic protections (L, S, I, G, IU, 2I, MCR, UV, OV, VU, UF, OF, RP, LC, Iw, Power Factor, Neutral)	☒	☒	☒
Plus protections (S2, D, UV2, OV2, UF2, OF2, S(V), RV, OP, OQ, UP, RQ, S2(V), ROCOF, Adaptive Protection)		☒	☒
Trip history	☒	☒	☒
Programmable status and functions	☒	☒	☒
Zone selectivity		☒	☒
Synchrocheck Protection (in the presence of <i>Ekip Synchrocheck</i>)	☒	☒	☒
Gext protection (in the presence of <i>S.G.R. sensor</i>)		☒	☒
RC Protection (in the presence of <i>RC toroid</i>)	☒	☒	☒

Table 4: protections

The description of all the protections is available from page 60.

Power Controller



Ekip UP Control and Control+ versions can be configured with the Power Controller function to optimize load management of its plant.

The description of the function is available from page 118 and dealt with fully in White Paper 1SDC007410G0201 “Managing loads with Ekip Power Controller for SACE Emax 2”.

Main connections

Ekip UP has a touchscreen display to access the menus for configuring and checking parameters, measurements, and information (page 29).

The Ekip UP supply is guaranteed by the *Ekip Supply* module (page 135), fitted to the upper terminal board, which also enables further modules to be connected (see following chapter).

On the terminal board the external connections of Ekip UP are also available:

- *Ekip Signalling 4K*, to manage programmable inputs/outputs (page 138)
- *Zone selectivity*, to manage trip signals between several devices (page 79-80)
- *External sensors for earth fault or residual current* (page 190)

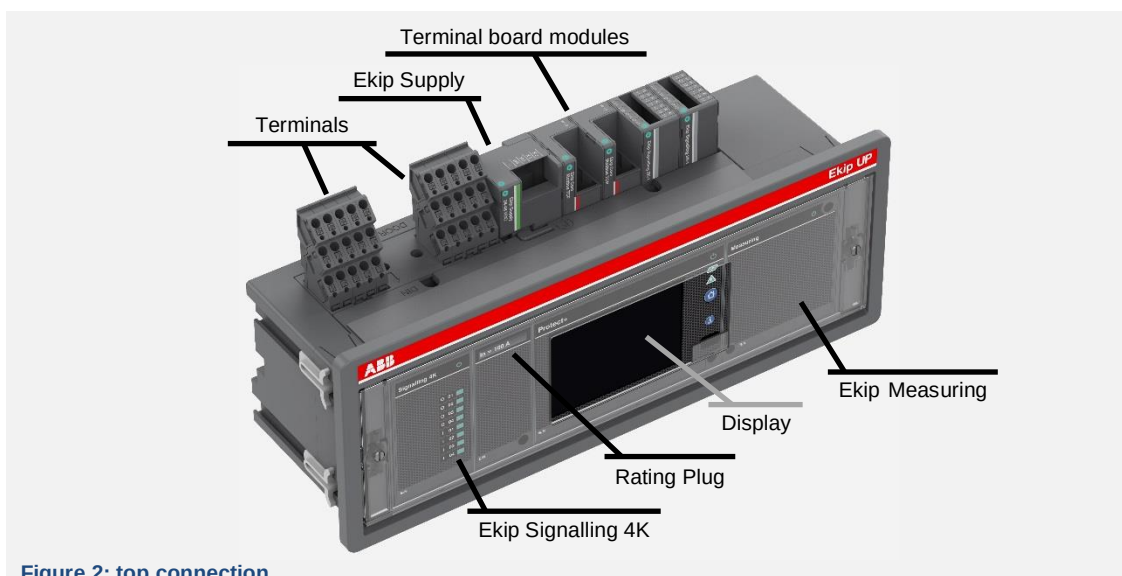


Figure 2: top connection

The measures can be taken by connecting Ekip UP to the plant lines:

- Current measurements: Ekip UP has to be connected to *current sensors*, which are available in various models (page 130), which are in turn installed on each phase; the rated unit current can be configured with the interchangeable *Rating Plug* module (page 134), placed next to the display.
- Voltage measurements Ekip UP can be connected to the main lines directly or with external transformers (page 140); voltage measuring is supported by the Ekip Measuring module (page 140).

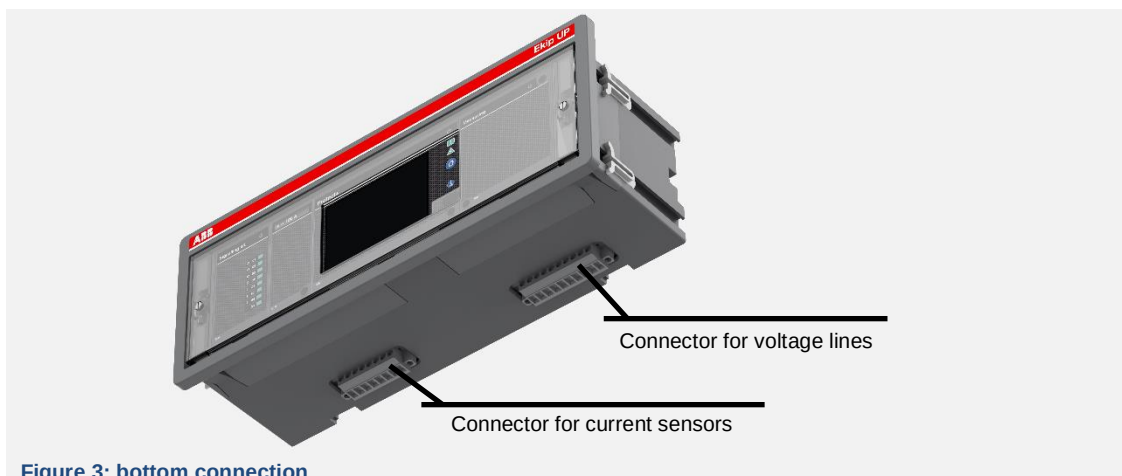


Figure 3: bottom connection

4 - Operating conditions

Introduction Ekip UP has been developed and certified to work in specific environmental, electrical and mechanical conditions set out below.

Standards Ekip UP and their accessories conform to international standards:

- IEC 60255-26 (ECM requirement) and IEC 60255-27 (Safety requirement)
- IEC 61000-6-2 (EMC-Immunity Standard) and IEC 61000-6-4 (emission standard)
- IEC 61010-1 (General requirement)
- UL 508 (Standard for Industrial Control Equipment), except for *Ekip Synchrocheck* and *Ekip Signalling 2K* conform to UL1066
- DNV-GL (type approval certificate)
- RINA (type approval certificate)

They conform to the following directives:

- CE "Low Voltage Directives" (LVD) 2014/35/EU
- CE "Electromagnetic Compatibility Directive" (EMC) 2014/30/EU
- UL and cULus

Warnings and precautions before installation



WARNING! Before carrying out installation, make sure that:

- Ekip UP is disconnected from all sources of energy
- all environmental, electrical and mechanical operating conditions are complied with.



IMPORTANT: persons trained in installing the Ekip UP and accessories must use the appropriate safety equipment.

Overall dimensions and weights

Ekip UP can be fitted to a 35 mm DIN guide or door; the overall dimensions in both configurations can be found in the file on the ABB website ([LINK](#)); the file contains the following drawings:

- Drawing 1: overall Ekip UP dimensions together with terminals and modules if fitting to DIN guide and door; door dimensions
- Drawing 2: overall dimensions of the current sensors, in all the set types

The overall dimensions of Ekip UP with modules and terminals fitted are approximately:

Fitting	Overall Dimensions (L x H x D)
DIN Guide	~ 296 mm x ~ 135 mm x ~ 95 mm
Door	~ 296 mm x ~ 135 mm x ~ 95 mm 86.2 mm x 282.4 mm x ≥ 2 mm (dimensions of hole of the door)

Table 10: dimension

Ekip UP with modules weighs ~ 1 kg.

Environmental conditions

Fit the switch in a dry environment without dust or corrosive acids and in such a way that it is not subject to blows or vibrations.

If this is not possible, fit the device by protecting it suitably.

IP Protection Class

Ekip UP ensures an IP 40 protection class. Nevertheless, Ekip UP should be installed in a properly ventilated switchgear in which penetration by dust is reduced.



NOTE: IP protection class guaranteed by transparent cover fitted to Ekip UP

Operating and storage temperatures The operating features of Ekip UP and accessories are guaranteed with ambient temperature between -25 °C and +70 °C (+60 °C in application compliant to UL standard)

Depending by type, the current sensors guarantee a correct working in different ambient temperature:

- type A and B: -25 °C ÷ +70 °C
- type C: -30 °C ÷ +105 °C

Store Ekip UP in a dry dust-free environment that is devoid of corrosive chemical agents; the ambient storage temperatures must be ensured, with Ekip UP in the original packaging, between -40 °C and +70 °C.

Particular atmospheric conditions Ekip UP can operate in particularly difficult industrial atmospheres. It has been tested in accordance with:

- IEC 60068-2-1: dry cold climate
- IEC 60068-2-2: dry hot climate
- IEC 60068-2-30: humid hot climate

Mechanical vibrations Ekip UP complies with the following mechanical compatibility standards and classes.

- IEC 60255-21 class 1 (vibrations, shocks and blows), with DIN guide assembly
- IEC 60255-21 class 2 (vibrations, shocks and blows), with door assembly

Altitude Ekip UP maintains its rated operating features up to 2000 m above sea level.

Above this height, the fall in dielectric strength and the diminished refrigerating power of the air must be considered (contact ABB for evaluation of details)

Electromagnetic compatibility The use of specific devices in industrial installations can cause electromagnetic disturbances to the electrical plant; Ekip UP conforms to Directive 2014/30/EU and to the standards:

- IEC 60255-26
- IEC 61000-6-2
- IEC 61000-6-4

 **WARNING! Full electromagnetic compatibility in accordance with IEC 60255-26 is ensured by connecting Ekip UP and Ekip Supply to an ABB model CP-D 24/1,3 feeder.**

Electrical specifications Correct operation of Ekip UP is ensured by primary currents and voltages within well-defined ranges and characteristics:

Parameter	Operating limits
Primary current	0.03 - 16 In ⁽¹⁾
Primary voltage	0 - 1150 VAC ⁽²⁾
Rated frequency	50 / 60 Hz ±10 %

Table 11: Electrical specifications

 **NOTES:**

(1) range refers to each phase. In refers to the rated size defined by the Rating Plug fitted to the Ekip UP, which is available in 100 A to 6300 A models

(2) up to 690 VAC is possible to connected directly the voltages to the device; for higher voltages, external transformers have to be used, see chapter dedicated to Ekip Measuring module on page 140

Auxiliary supply Ekip Supply, supplied as standard with Ekip UP, to enable the unit to be supplied and the terminal board modules to be connected; see the dedicated chapter on page 135 for functioning details.

5 - Receipt

Introduction Every Ekip UP ordered is supplied with the following packing

- main packing with Ekip UP, terminal board modules and current sensors (if foresee type B, C and D)
- packing with current sensors type A, if foresee
- packing of external accessories modules not mounted on terminal box, if specified in order

The packings are listed ISTA® and have following dimensions:

- main packing: 460 mm x 347 mm x 154 mm.
- packing with current sensors type A: 410 mm x 515 mm x 515 mm (supplied on a platform 515 mm x 515 mm)

Identifying and checking packing

Examine the status of the packing and check that:

- the information on each packing tag matches the information in the order
- the boxes are undamaged and completely closed

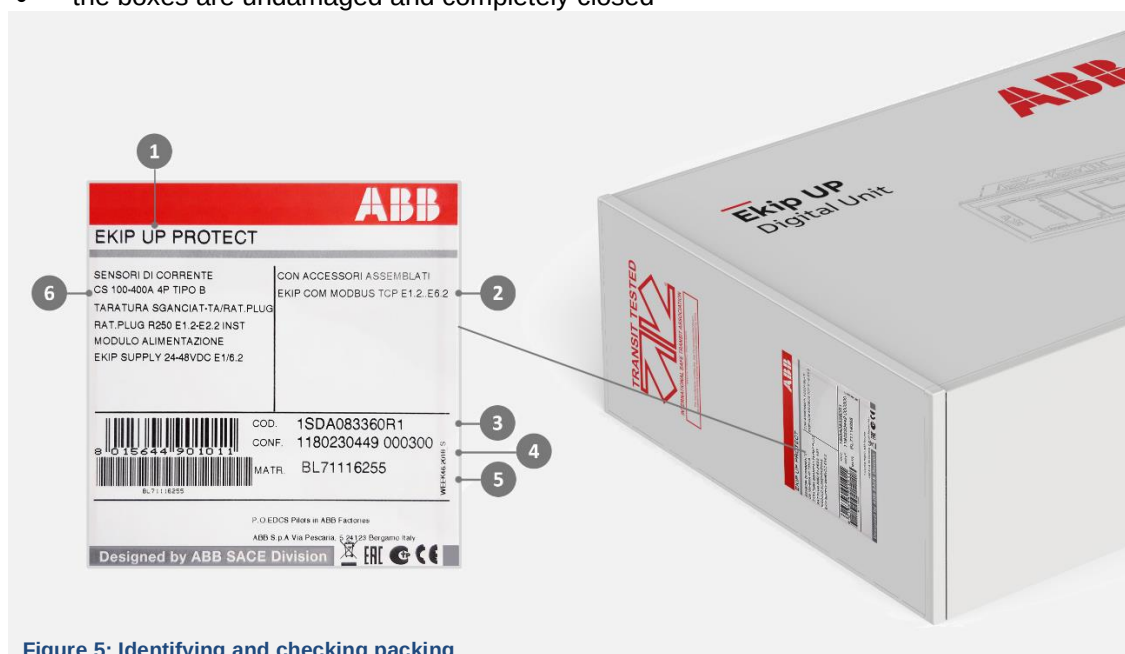


Figure 5: Identifying and checking packing

Pos.	Description
1	Short description of model
2	Description of possible accessories
3	Commercial code
4	Confirmation number
5	Ekip UP serial number
6	Ekip UP characteristics

Table 14: packing

Opening packing

1. Open the box.



Figure 6: opening 1



Figure 7: opening 2

2. Remove upper containing protection.



Figure 8: opening 3



NOTE: For disposal of the packing, see "Decommissioning" on page 28

Check of material

Examine the state of the material received and check that it matches the purchase order and is completely undamaged, in particular, check: Ekip UP version, *Rating Plug* size, terminal block modules, model and quantity of current sensors.



IMPORTANT: also check the material before storage

The other accessories ordered with Ekip UP are supplied in their respective packing: check the accompanying documentation for each product to conform that the version and contents are correct.

Reporting damage or consistency

If upon receipt damage to the packing or inconsistencies between the order and the tags identifying the product or the product itself are detected, contact ABB; ABB must be alerted within seven days of receipt of the material.



NOTE: quote the *Packing List* number (displayed on the packaging) and the product serial number.

Interface and menus

10 - Interface presentation

- Functions** The Ekip UP operating interface enables:
- signals and measurements to be displayed that relate to the current functions or recorded events
 - the parameters, the present protections and other unit functions to be configured
 - parameters for connected accessories modules to be set
 - tests to be run

Components The Ekip UP interface comprises a touchscreen display, rapid access pushbuttons, status LED and a service connector for certain external accessories:

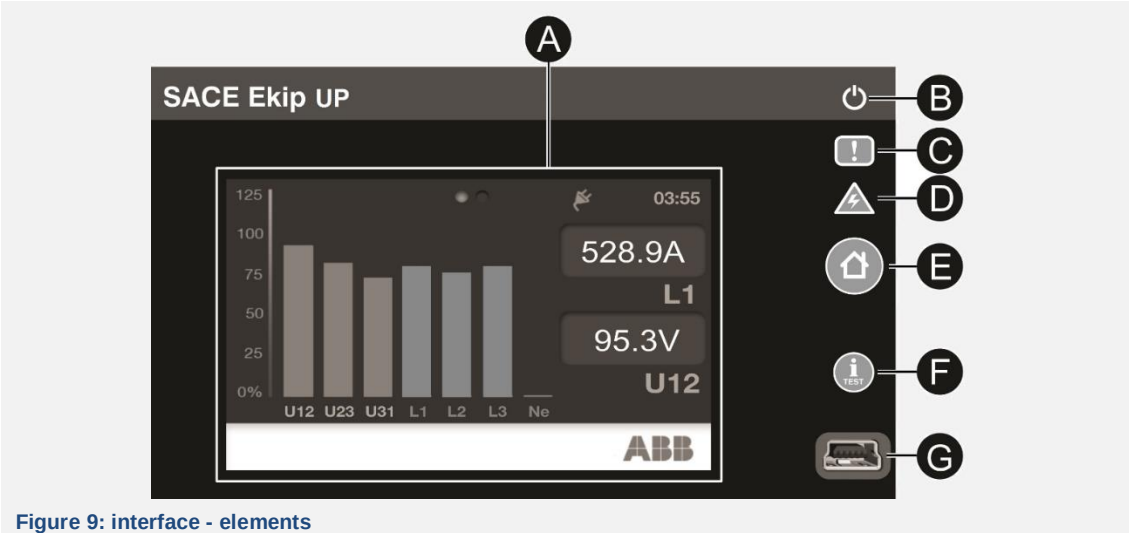
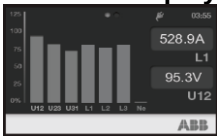


Figure 9: interface - elements

Pos.	Description
A	Single-touch colour display touchscreen
B	Power LED
C	Warning LED
D	LED Alarm
E	HOME pushbutton
F	iTEST pushbutton
G	Service connector

Table 27: interface elements

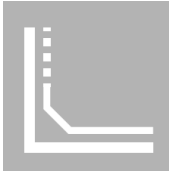
Display



The Ekip UP touchscreen display is a single-touch, colour display
The touchscreen function is active with the unit ON.

Protections

Operating principle



The protection functions are available with the Ekip UP Protect, Protect+ and Control+ versions.

Each protection is combined with a different signal (current, voltage, frequencies, powers, etc) but the operating principle is the same:

1. If the measured signal exceeds the set **threshold**, the specific protection is activated (pre-alarm and/or **alarm**).
2. The **alarm** is displayed and depending on the set protection parameters, after an interval of time (timing), it may be converted into an **open command (TRIP)**.
3. The TRIP is combined with one or more unit contacts in order to be able to command external actuators/contactors and interrupt the electric network



NOTE:

- if the measured signal returns below the set threshold before the trip time has lapsed, Ekip UP exits alarm and/or timing status and returns to normal operating condition.
- all the protections have a default configuration: check the parameters and modify according to plant needs before commissioning

References

Many protection thresholds are shown on Ekip UP in 2 different parameters: as absolute and relative values.

The relative value depends on the type of measurement:

Type of protection	Reference	Description
Current	In	Rated current of the rating plug
Voltage	Un	Set network voltage
Frequency	fn	set frequency
Power	Sn	$\sqrt{3} \times I_n \times U_n$

Table 80: protection references

Open/close commands and status contacts

Presentation

In order to optimize the trip protections, Ekip UP manages:

- command contacts (outputs: open and close command), for actuators for interrupting the supply line
- status contacts (inputs: open and closed) to confirm the outcome of the command

Following a command, Ekip UP waits for the actuator to switch and supply the correct information on the status change; if the information is incorrect, Ekip UP sends the alarm.

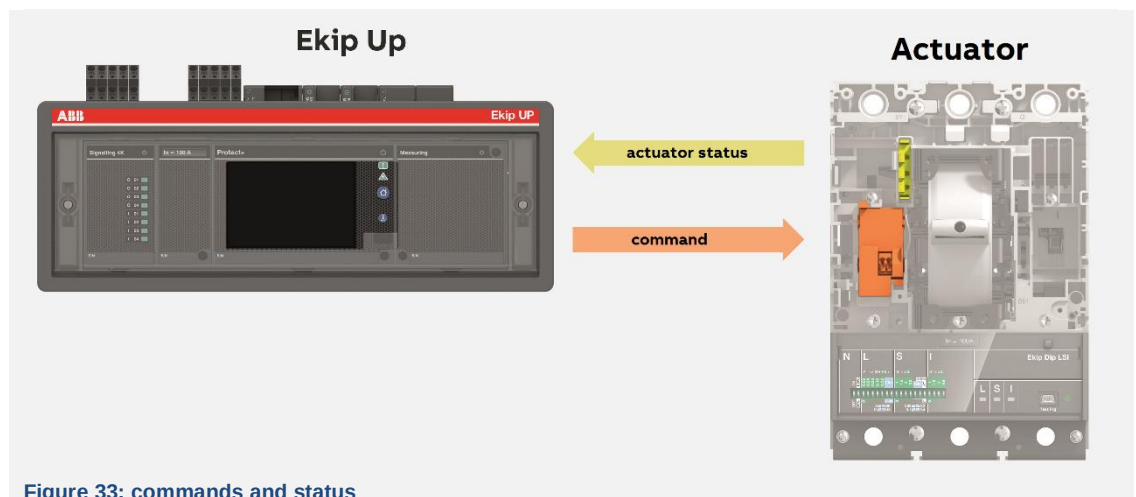


Figure 33: commands and status

Open/close commands and status contacts [2]

Open command

Ekip UP in the Protect, Protect+ and Control+ versions is always supplied with the O 01 contact of the *Ekip Signalling 4K* module configured to manage the open command (*YO Command*) of all the protections.

The contact is normally one; following a TRIP, the contact is closed for at least 200ms.

The contact manages external actuators that have the following electrical characteristics:

Characteristic	Maximum limit
Maximum switchable voltage	150 VDC / 250 VAC.
Switching power	2 A @ 30 VDC, 0.8 A @ 50 VDC, 0.2 A @ 150 VDC, 4A @ 250 VAC

Table 81: opening commands



NOTE:

- valid table data with resistive load
- the electrical characteristics between the contacts as described for Ekip Signalling 4K module on page 136

Close command

Ekip UP in the Protect, Protect+ and Control+ versions is always supplied with the O 02 contact of the *Ekip Signalling 4K* module configured to manage the closed command (*YC Command*) of external actuators in the prescribed cases (programmed commands, tests).

It is nevertheless possible to deactivate the configuration of the contact as a *Close command* in the *Settings - Digital unit - Breaker connections* menu (page 121).

The functional characteristics described for the open command on contact O 01 apply.

Status contact (open and closed)

Ekip UP in the Protect, Protect+ and Control+ versions is supplied with the contact I 01 and I 02 of the *Ekip Signalling 4K* module that are configured for reading the status of the actuator that are commanded by the unit.

There are two configurations for managing the contacts and the combined information.

Config	Contact	Contacts characteristics	Info with short circuit ⁽³⁾	Info with open circuit ⁽³⁾
A ⁽¹⁾	I 01	Configured for status reading: Open	Open	--
	I 02	Configured for status reading: Closed	Closed	--
B ⁽²⁾	I 01	Configured for status reading: Open/Closed	Open	Closed
	I 02	Free (programmable by user)	--	--

Table 82: status contact



NOTES:

- (1) can be used if the actuator has two contacts; each referring to a different status; if Ekip UP receives information simultaneously on Open and Closed status it reports the glitch as "Unit not defined"
- (2) can be used if the actuator has only one contact referring to the Open status; the non Open condition is interpreted by Ekip UP as a status: Closed
- (3) valid informations with inputs configured as Active close (default); the inputs can also be confired as Active open, in the unit menu

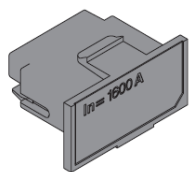
If not requested (during ordering phase) Ekip UP is supplied in configuration A.

It is nevertheless possible to deactivate the configuration of both inputs as *Status contacts* in the *Settings - Digital Unit - Breaker Connections* menu (page 121).

Connections

Check the electrical diagram 1SDM000116R0001 for the connections of the contacts.

33 - Rating plug



The *Rating Plug* that is supplied with Ekip UP defines the rated current I_n , which is necessary for the measurement ranges and for setting the current protections (for I_n). It is fitted to a dedicated frontal connector that the user can access.

Ekip UP continuously monitors the presence of the *Rating Plug*, and reports its absence and any fitting or installation errors.

If a new model is fitted, upon startup, Ekip UP shows the installation request.

In the *About - Digital Unit* menu, the *Rated Current* field is available that shows the I_n current read by the user.

Versions Different sizes (100A up to 6300A), can be ordered in two version: one classic and one that activate the Rc protection; the two versions use different label

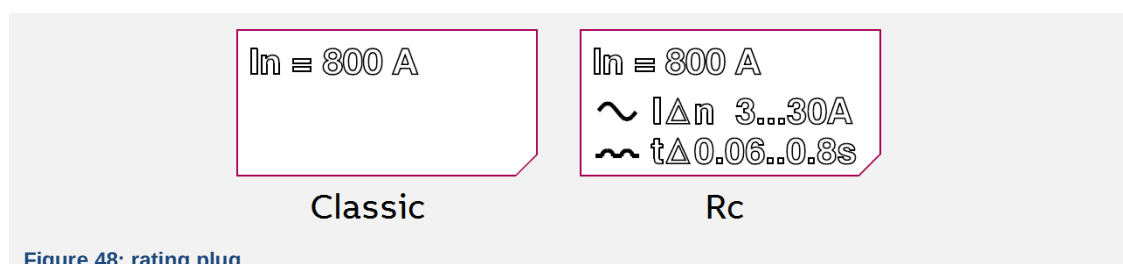


Figure 48: rating plug

Replacement The module can be replaced by the user; any *Rating Plug* can be fitted that has a maximum rated current that is equal to the current of the sensor fitted to the unit.

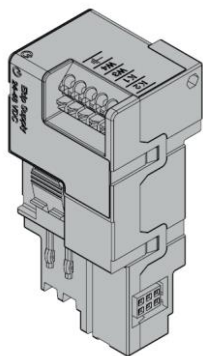


NOTE: if present the sensor type C 290mm it's possible to fit Rating Plug with size from 2000 A up to 6300 A

More information on fitting and the *Rating Plug* installation procedure is available from <http://www.abb.com/abblibrary/DownloadCenter/>, in particular in Getting Started 1SDH002004A1001.



IMPORTANT: in order to avoid undesired alarms or tripping, switch off and disconnect main power supply before changing the *Rating Plug*.



Ekip Supply is an accessory supply module.

Performs three functions:

- Supplies auxiliary supply to Ekip UP.
- Enables terminal board modules to be supplied and connected to Ekip UP.
- Acts as a bridge for the Local Bus between Ekip UP and the external electronic accessories.

Electrical specifications

Module	Supply voltage	Maximum power consumption without accessories ⁽¹⁾	Maximum power consumption with accessories ⁽²⁾	Maximum inrush current
Ekip Supply 24-48VDC	21.5-53 VDC	4 W	10 W	2 A for 20 ms

Table 161: ekip supply - performances

-  **NOTE:**
- (1)

Ekip UP with standard modules
- (2)

Ekip UP with standard modules + four modules on terminal board

Interface

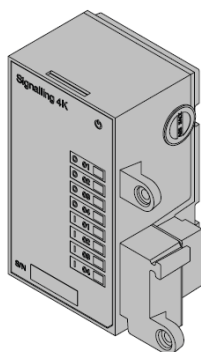
The module has a power LED to signal the presence of an input supply:

- Off: no power supply
- On (steady beam): powered up

Connections

For external cabling, use AWG 22-16 cables with a maximum external diameter of 1.4 mm, with reference to the electrical diagrams for 1SDM000116R0001.

36 - Ekip Signalling 4K



Ekip Signalling 4K is a signalling accessory that enables programmable inputs/outputs to be managed.

The module has:

- four contacts for output signals and relative status LED
- four digital inputs and relative status LED
- a power LED with the startup status of the module



NOTE: the availability of some inputs/outputs can be limited for the *Protect*, *Protect+* and *Control+* versions because they are used for specific functions (open/close commands and status reading, see page 61)

Supply *Ekip Signalling 4K* runs with Ekip UP powered up by auxiliary supply.



NOTE: in the absence of an auxiliary supply, the output contacts are always in an open position and the statuses of the inputs are not valid

Input Ekip UP can be configured in such a way that the status of the inputs corresponds to actions or signals, with different programming options (see *Menu* on page 139)

Each input (H1, H2, H3, H4) must be connected with reference to the common contacts (HC). The module permits two logic statuses, interpreted by Ekip UP according to the configuration selected for each contact:

Status	Electrical condition	Configuration of contact	Status detected by Ekip UP
Open	Circuit open ⁽¹⁾	Active open	ON
		Active closed	OFF
Closed	Short circuit ⁽¹⁾	Active open	OFF
		active closed	ON

Table 165: ekip signaling 4k - input



(1): circuit open: > 100 k Ω ; short circuit: < 50 Ω

Output Ekip UP can be configured in such a manner that the contacts of each output are closed or open according to one or more events, with different programming options (see *Menu* on page 139)).

Each output consists of 2 contacts (K3-K7, K4-K8, K5-K9, K6-K10), isolated from unit and from the other outputs, that have the following electrical characteristics:

Characteristics	Maximum limit ⁽¹⁾
Maximum switchable voltage	150 VDC / 250 VAC.
Switching power	2 A @ 30 VDC, 0.8 A @ 50 VDC, 0.2 A @ 150 VDC, 4A @ 250 VAC
Dielectric strength between open contacts	1000 VAC (1 minute @ 50 Hz)
Dielectric strength between each contact and coil	1000 VAC (1 minute @ 50 Hz)

Table 166: ekip signaling 4k - output



(1): data on a resistive load

Interface The module has three signalling LEDs:

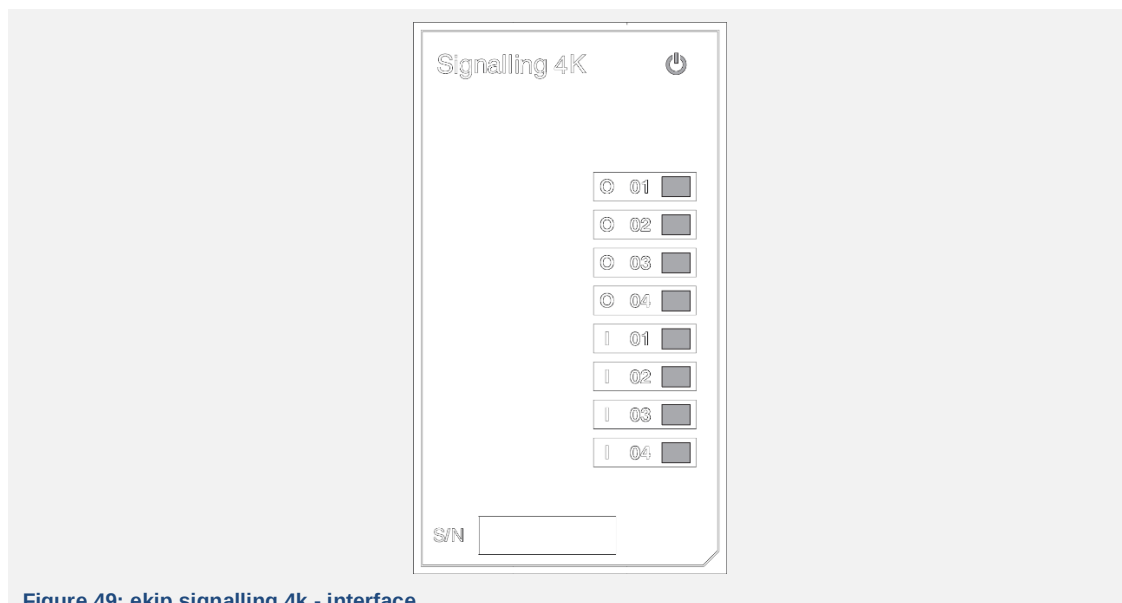


Figure 49: ekip signalling 4k - interface

LED	Description
Power	Report presence in input power supply: • Off: no power supply • On (steady beam): powered up
O 01, O 02, O 03, O 04	Indicate status of the contacts of each output: • off: open contact • on: closed contact
I 01, I 02, I 03, I 04	Indicate status of the contacts of each input: • off: circuit open • on: short circuit

Table 167: ekip signaling 4k - interface

Menu If the Ekip Signalling 4K module is detected correctly by Ekip UP the specific configuration area in the *Modules - Settings* menu is activated.

This menu contains the submenus of all the available inputs and outputs (according to the Ekip UP version being used), containing all the configuration parameters.

Input Parameters

All the available inputs enable the following parameters to be configured:

Parameter	Description	Default
<i>Polarity</i>	Defines whether the input is defined as ON by Ekip UP when it is open (<i>Active open</i>) or when it is closed (<i>Active Closed</i>)	Active closed
<i>Delay</i>	Minimum duration of activation of the input before the status change is recognized; the delay is expressed in seconds, which are settable in a range: 0 s - 100 s with 0.01 s step  NOTE: • if the source is deactivated before this time has elapsed the status change is not recognized • with delay = 0 s the status change must be anyway greater than 300 μS	0.1 s

Table 168: ekip signaling 4k – input parameters

Output Parameters

All the available outputs enable the following parameters to be configured:

Parameter	Description	Default
<i>Signal source</i>	Event that activates the output and switches the contact. Different protection, status and threshold proposals are displayed; Custom mode can be configured via Ekip Connect to extend the solutions and combine several events	None
<i>Delay</i>	Minimum duration of presence of the source before the output is activated; the delay is expressed in seconds, which are settable in a range: 0 s - 100 s with 0.01 s step  NOTE: - if the source is deactivated before this time the output is not switched - with delay = 0 s the source must be present for more than 300 μS	0 s
<i>Contact type</i>	Defines the rest status of the contact with a non-present source between: open (NO) and closed (NC)	NO
<i>Latched⁽¹⁾</i>	Enables the output (and relative status LED) to be maintained active (ON) or be deactivated (OFF) until the event disappears.	Off
<i>Activation time Minimum⁽¹⁾</i>	Defines the minimum closure time of the contact following the rapid presence of sources: - Source duration < min. activation= the contact is activated for the minimum activation time - Source duration $\geq$ min. activation= the contact is activated for the time that the source is present It is possible to choose between: 0 ms, 100 ms, 200 ms	0 ms

Table 169: ekip signaling 4k – output parameters



(1): if Ekip Measuring is used for the Power Controller function, the following considerations apply:

- Latched:* deactivate all the Latched configuration of the outputs used for Power Controller
- Minimum activation time:* the Power Controller option is available in addition to those that have already been described: if selected, the output and active latching is active for a set time that depends on the function, regardless of the persistence of the event that activated it.

Information

In the *About-Modules* menu, the specific menu of the module is available, in which the status of the inputs (*On/Off*) and of the outputs (*Open/Closed*) are present.

Test

If the *Ekip Signalling 4K* module is detected correctly, the test area in the Test menu is activated.
For details of test characteristics, see page 126.

Connections

Refer to the electrical diagrams for 1SDM000116R0001 for the connection of all the input/outputs in all possible configurations:

- Monitor and Control+ versions
- Protect, Protect+ and Control versions with/without close command and without status contacts
- Protect, Protect+ and Control versions with/without close command and with one status contact
- Protect, Protect+ and Control versions with/without close command and two status contacts

Low Voltage Product Life Cycle Plan



Full range of life cycle services and support

Limited range of life cycle services and support

Replacement and end-of-life services

Life cycle plan 2025

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Further information

The ABB LCM (Life Cycle Management) model is designed to manage an orderly transition to replacement products or to choose from various lifetime extending
At the same time the model ensures access to continuous support for our

NOTE : LCM stats may change on country basis. Please visit Service for low-voltage page to verify situation in your country (see link below)

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[For more information on low voltage products life cycle management and available services please visit Service for low-voltage products web page.](#)

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			Legend: A=Active, C=Classic, L=Limited, O=Obsolete		End of volume production	2026		2027		2028		2029		2030		Last Buy	Spare Part end of availability	New Product	Service solutions	
						H1	H2	H1	H2	H1	H2	H1	H2	H1	H2					
Product Line / Range	Family	Standard / Range	Product Main Type	Trip unit / Other Details																
ExternalDigitalUnits																				
External Releases	Ekip UP+	IEC/UL	Ekip UP+		Active	A	A	A	A	A	A	A	A	A	A					
External Releases	Ekip UP	IEC/UL	Ekip UP		2023-Jan	O	O	O	O	O	O	O	O	O	O		2022-Sept en Ekip UP +			
Arc Guard System	TVOC-2		TVOC-2-240, TVOC-2-48	Arc Monitors	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		TVOC-2-240-C, TVOC-2-48-C	Arc Monitors with com module	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		TVOC-2-DP*	Detectors standard	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		TVOC-2-DP*-S	Detectors supervised	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		TVOC-2-OP*		Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	CSU-2		CSU-2LV		Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	CSU-2		CSU-2MV		Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	CSU-2		RC120		Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	CSU-2		RC200		Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		TVOC-2-E1, TVOC-2-E3	Extension units standard	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		TVOC-2-E6	Extension unit supervised	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		TVOC-2-H1	External HMI	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		TVOC-2-COM	Communication module	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		TVOC-2-MK1	Cable straps	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		1SFA663006R1001, 1SFA663006R1002	Mounting kits	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		1SFA663005R1001	Label	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		TVOC-2-MK2	HMI mounting kit	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC-2		1SFA663006R1010	Mounting bracket	Active	A	A	A	A	A	A	A	A	A	A					
Arc Guard System	TVOC		TVOC	1SFA663001R1001, 1SFA663001R1002, 1SFA663001R1003, 1SFA663001R1004	2016-Jul	O	O	O	O	O	O	O	O	O	O		2017-Jan	New TVOC-2 1SFA664R1001, 1002, 1003, 1004		
Arc Guard System	TVOC		Detectors 1 2 4 6 8 10 15 20 30 60m	1SFA663003R1020, 1SFA663003R1040, 1SFA663003R1060, 1SFA663003R1080, 1SFA663003R1100, 1SFA663003R1150, 1SFA663003R1200, 1SFA663003R1300, 1SFA663003R9001		C	C	C	C	C	C	C	C	C	C		Sold as spare part for TVOC	New TVOC-2 detectors		
Arc Guard System	TVOC		Detectors 3 25 35 40 45 70m	1SFA663003R1030, 1SFA663003R1250, 1SFA663003R9002, 1SFA663003R9003, 1SFA663003R9004	2019-Dec	O	O	O	O	O	O	O	O	O	O		2020-Dec	No replacement	New TVOC-2 detectors	
Arc Guard System	TVOC / TVOC-2		Current sensing unit	1SFA663002-A	2019-Dec	O	O	O	O	O	O	O	O	O	O		2020-Jan	No replacement	CSU-2LV, CSU-2MV	
Arc Guard System	TVOC / TVOC-2		TVOC-1TO2-OP* Metal/plastic connection between TVOC-2 and CSU	1SFA664004R2200, 1SFA664004R2300, 1SFA664004R2010, 1SFA664004R2020, 1SFA664004R2040, 1SFA664004R2060, 1SFA664004R2100		C	C	C	C	C	C	C	C	C	C		Sold as spare part for old CSU	TVOC-2OP*		
Arc Guard System	TVOC / TVOC-2		TVOC-1TO2-OP* Metal/plastic connection between TVOC-2 and CSU	1SFA664004R2005, 1SFA664004R2080, 1SFA664004R2150, 1SFA664004R2250	2019-Dec	O	O	O	O	O	O	O	O	O	O		2020-Dec	No replacement	TVOC-2OP*	
Arc Guard System	TVOC / TVOC-2		Metal/metal connection between CSUs	1SFA663004R1010, 1SFA663004R1100, 1SFA663004R1300, 1SFA663004R1005, 1SFA663004R1080, 1SFA663004R1250, 1SFA663004R1020, 1SFA663004R1150, 1SFA663004R1040	2019-Dec	O	O	O	O	O	O	O	O	O	O		2020-Dec	No replacement	TVOC-2OP*	
Arc Guard System	TVOC / TVOC-2		Metal/metal connection between CSUs	1SFA663004R1060, 1SFA663004R1200		C	C	C	C	C	C	C	C	C	C		Sold as spare part for old CSU	TVOC-2OP*		