
WHITE PAPER

Ekip UP

The new solution for renewables monitoring and protection



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Application

Ekip UP is the multifunction protection relay that meets the digitalization needs of electric power distribution for monitoring, protection and control, offering simplicity of use, flexibility and modular plug-and-play solutions.

Connecting active users to the distribution grid is subject to compliance with legal requirements.

The Interface Protection System (IPS) is a relay with dedicated protections that is able to meet these requirements, especially for cogeneration plants and production plants using a low-voltage solar, wind or hydroelectric source of renewable power. In particular, the generation system installed in the user's plant must be separated from the grid whenever the voltage and frequency val-

ues of the grid are outside the ranges prescribed by regulations. This separation is brought about by an interface device (ID) that is tripped after an opening command is received from IPS.

Further, in solar parks managed by string inverters and relative fuses, **restricted earth fault protection relays (REF)** of the connection line to the low-voltage/medium-voltage substation are often used. Possible faults are identified that are not protected by low-voltage circuit breakers, and





the medium-voltage switch upstream is commanded to isolate the substation. This is the most effective and competitive solution for maintaining the plant's operating safety.

There is sometimes also a requirement to **prevent active power from being delivered to the utility**.

If this requirement must be met, the power generated on-site should be reduced in response to reduced on-site consumption.

On the other hand, on-site consumption must be optimized so as to **maximize green power generation**.

These applications increasingly require **energy monitoring**, which is fundamental for the competitiveness of renewable sources.

Two-directional measurement capacity, the possibility of communicating with local supervision systems and connectivity to energy management platforms are frequent requirements that must be met.

Solutions

In its Protect+ and Control+ versions, ABB's new Ekip UP digital unit is able to meet all these needs in a single versatile device.

Ekip UP performs IPS relay functions in active plants connected to the medium-voltage distribution grid. This advanced function is possible because it conforms to standard **CEI 0-16**, which is aligned with European standards EU 2016/631, EU 2016/1388 and EU 2016/1447.

Among its 35 protections, Ekip UP also offers restricted earth fault protection **REF (ANSI 87)** by homopolar toroids installed on the star center of the medium-voltage/low-voltage switchgear and can command switches both by a wired signal and by native advanced communication protocols like IEC 61850.

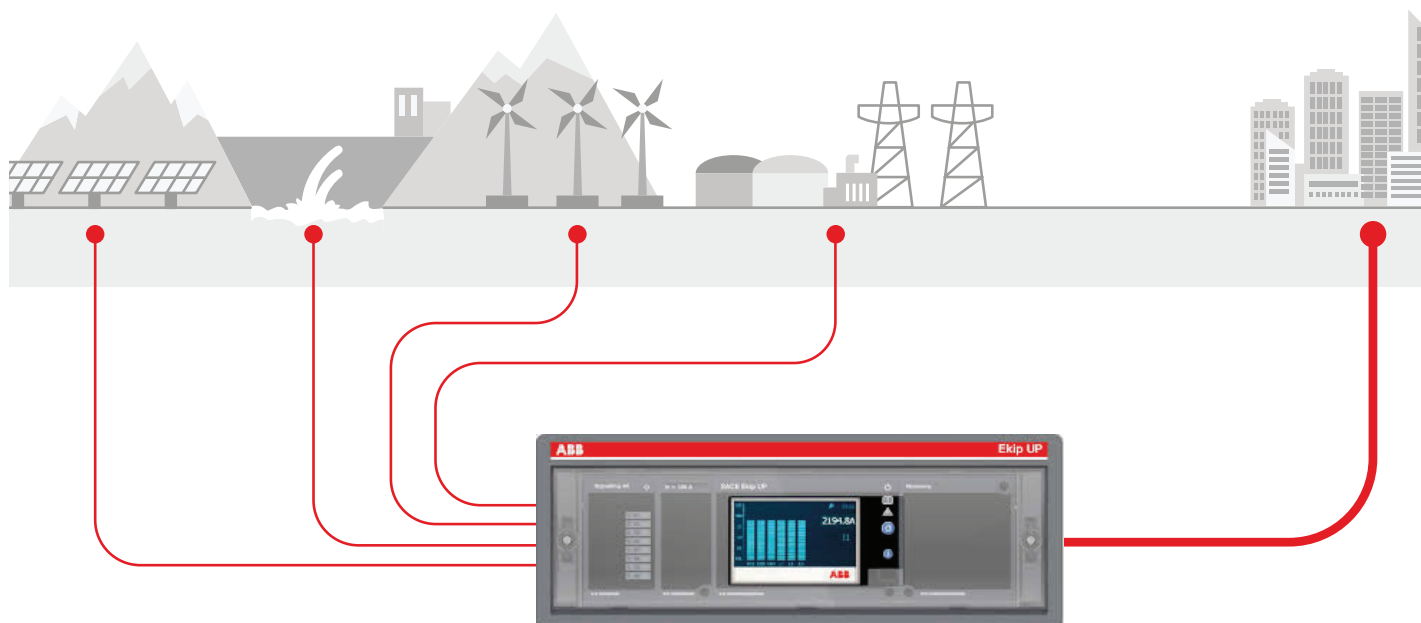
In hybrid systems, or low-voltage plants in which generation and loads are present, Ekip UP, through power reverse signals **RP (ANSI 32R)** at the point of delivery to the power grid, can disconnect solar strings and then reconnect them cyclically when the event is restored. This is made possible by the load shedding logic that is integrated into the device.

Further, Ekip UP can receive from local supervision systems the limit power signal to be impor-

ted from the utility, enabling it to manage power with its own control algorithms (**Power Controller**) so that the plant loads are fed mainly by the distributed energy resources before the power distribution grid. These logics also can be used in the demand response programs with the grid operator or load aggregator.

Owing to its versatility, Ekip UP can adapt the protection thresholds (**Adaptive Protections**) on the basis of the grid topology, creating logics for coordinating and selecting resources inside the plant.

Ekip UP incorporates nine modular connectivity languages and an integrated gateway that permits the transfer of over 3.000 measured energy data items to the **ABB Ability™ EDCS** platform. The two-directional measurements of the main electric parameters-such as current, voltage, power, energy, power factor and the integrated grid analyzer for identifying electric quality up to the 50th harmonic-make additional devices like multimeters and external gateways unnecessary. The digital unit has data loggers with two buffers for fault diagnosis.



Ekip UP as an interface protection system

When an interruption occurs at the distribution grid level, Ekip UP detects that the voltage and frequency values are outside the prescribed range. The reference standards state that the local generation system must be separated by an ID.

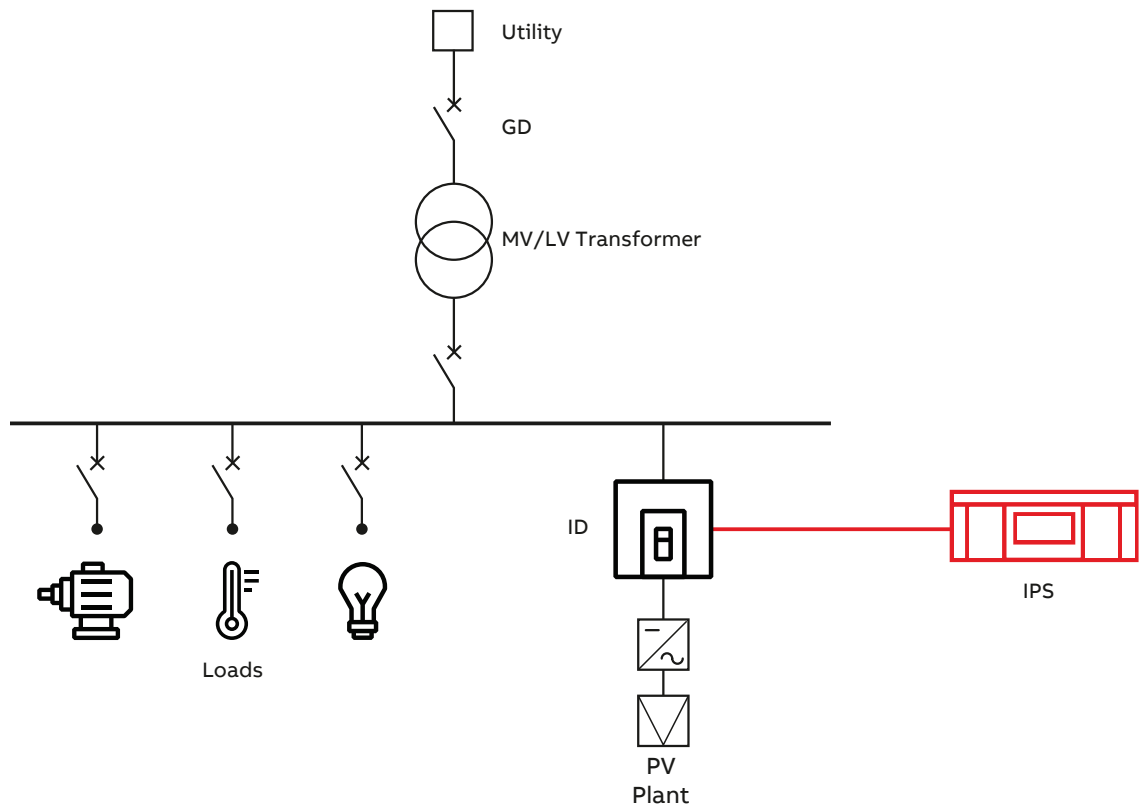
Using Ekip UP as IPS presents multiple advantages:

- Ekip UP performs interface protection functions with every possible low-voltage switching apparatus (open or enclosed switch or circuit breaker, contactor) and also recloses automatically when grid conditions are restored.

- The relay is able to perform the dual function of Interface Protection System and Generator Protection (SPDG), especially for rotating machines like cogenerators or mini hydroelectric plants. This reduces the number of components required in the protection system in the switchgear.
- Ekip UP is easy to use because of Ekip Connect software, which permits immediate and intuitive commissioning. The product is already configured with the settings provided by the standard CEI 0-16 and the reclosing logics shown on the wiring diagram.

¹ Check the 27.S2 configuration with 0.15Un threshold.

Example of use of Ekip UP as an interface relay



Solutions



Technical catalog Ekip UP

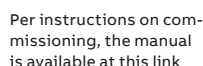


Online configurator

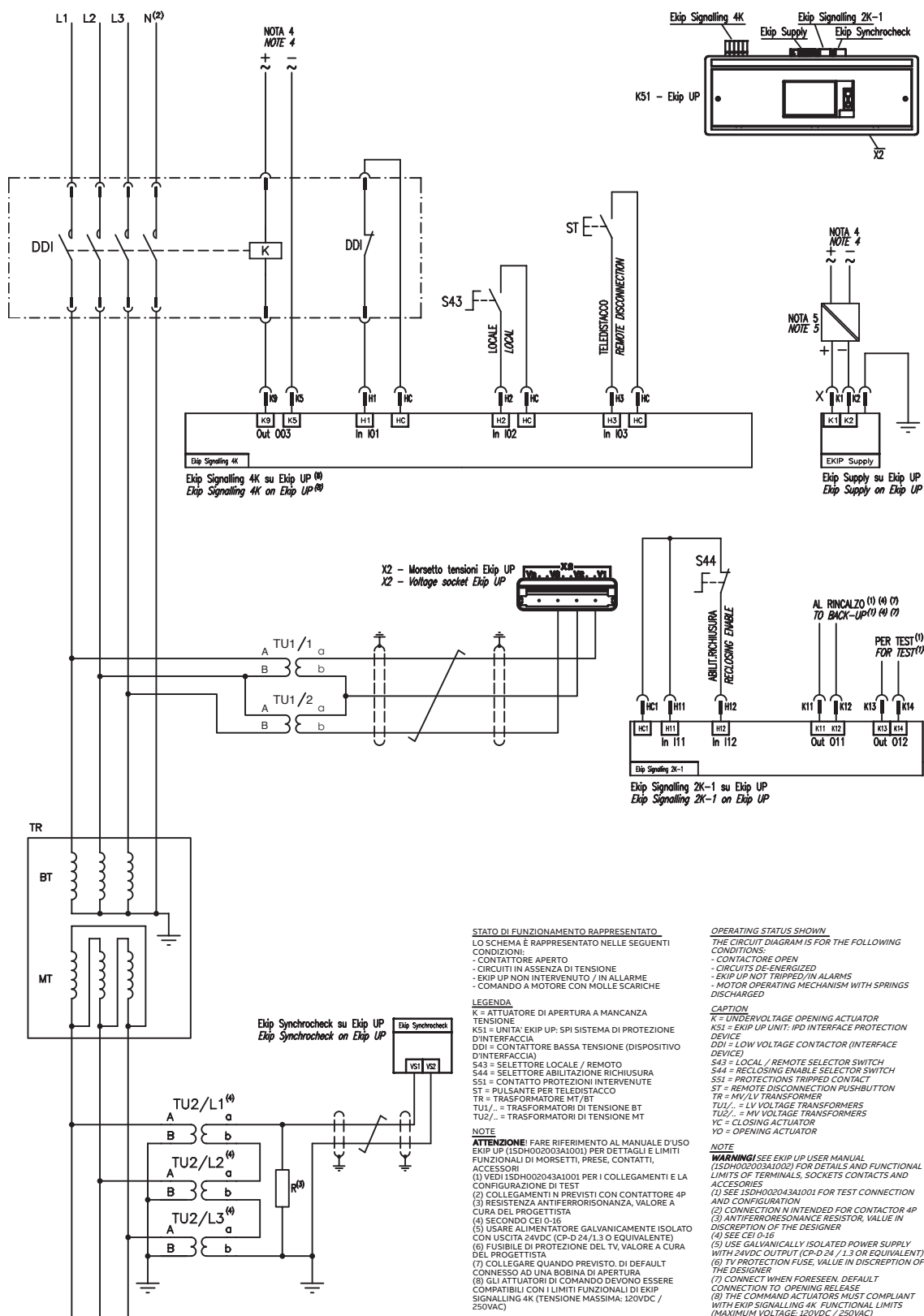
Codes to be selected

Code	Quantity	Description	Notes
Minimum configuration for IPS CEI 0-16 (supplied loose)			
1SDA107690R1	1	Ekip UP Protect+ for IPS	The code specifies Ekip UP Protect+ unit with 24-48VDC supply, a medium voltage homopolar voltage signal reception module, and I/O systems required for automatic reconnection
E43925370	3	ABB TJC	Medium-voltage/low-voltage TV for open or equivalent star/triangle connection
TVVCC400C100	2	IME BTV10	Low voltage/low voltage TV, secondary voltage: 100V. Class 0.5, absorption 10VA; class 3P absorption 30VA. It is possible to use other TVs compliant with the CEI 0-16 standard
Possible accessories in the case of hybrid applications (supplied loose)			
1SDA074156R1	1	Ekip Com IEC61850	2 slots are available for accessory modules like native IEC61850 module (also available with redundant version 1SDA076170R1).
1SDA082894R1	1	Ekip Com Hub	2 slots are available for accessory modules as gateways for a cloud platform (other modules, such as for temperature monitoring, are available in the technical catalogue 1SDC001051D0901).
1SDA083372R1	1	Openable CS 3P, type C 120	The code is designed to measure $I_n=1600A$. If the system is with neutral, the relative 4p (1SDA083373R1) code can be used. It is also possible to use the same openable CS 3P type C100 (1SDA085566R1) or 4p (1SDA085564R1) sensors.
	1	Rating Plug	Rated current (I_n) up to 4000A can be modified with relative rating plug as per technical catalogue.
	1	Toroids	The unit can be equipped with differential or homopolar toroids, as specified in the technical catalogue.
1SDA082921R1	1	Adaptive load shedding	Adaptive disconnection of the loads; the basic version is already available by default.
1SDA074171R1	Up to 3	Ekip 10k	Additional I/O up to 3 outer units on DIN guide.

Alternatively, it is possible to order the Ekip UP Protect+ (1SDA083361R1) or Control+ (1SDA083363R1) basic unit and configure the unit with the necessary accessories up to $I_n=6300A/U_e=1150V$, as specified in technical catalogue or online configurator.

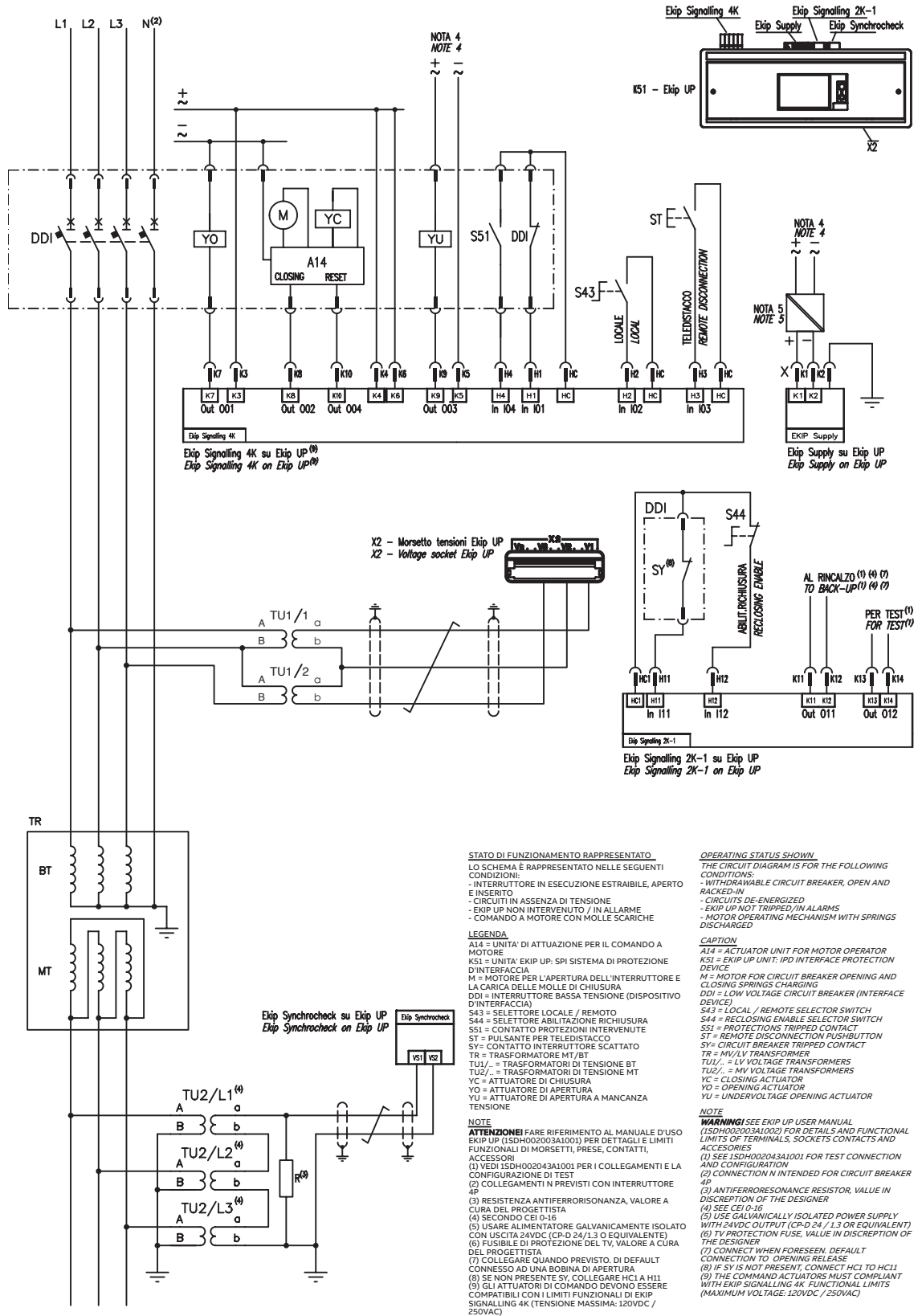


SCENARIO 1: SCHEMA APPLICATIVO PER EKIP UP USATO COME SISTEMA DI PROTEZIONE DI INTERFACCIA (CEI 0-16) CON CONTATTORE
SCENARIO 1: APPLICATION DIAGRAM FOR EKIP UP AS INTERFACE PROTECTION SYSTEM (CEI 0-16) WITH CONTACTOR



Solutions

SCENARIO 2: SCHEMA APPLICATIVO PER EKIP UP USATO COME SISTEMA DI PROTEZIONE DI INTERFACCIA (CEI 0-16) E RICHIUSURA AUTOMATICA DI DISPOSITIVO DI INTERFACCIA (INTERRUTTORE O SEZIONATORE SCATOLATO ABB)
 SCENARIO 2: APPLICATION DIAGRAM FOR EKIP UP AS INTERFACE PROTECTION SYSTEM (CEI 0-16) AND AUTOMATIC RECLOSING OF INTERFACE DEVICE (ABB MOLDED CASE CIRCUIT BREAKER OR SWITCH-DISCONNECTOR)



Solutions



Metal framework ABB
System Pro E Power



ABB AF



ABB CP



ABB HRC



ABB ATT

Interface Board

The following is an example of components for making a CEI 0-16 interface board (standard IEC) with Ekip UP as an IPS in a three-phase system and $U_e=400V$

Some preliminary notes:

- Recommended metal cabinet: ABB System Pro E Power or equivalent.

- For active systems with power above 400 kW, it is necessary to provide redundancy for failure to disconnect the interface device. This can be a contactor of conformant size.

Recommended family: ABB AF or equivalent.

- The suggested 24/48VDC supply unit is ABB CP-D 24 1.3 (code 1SVR427043R0100) or equivalent. Other ABB supply units are available in

In [A]	ICU [kA]	ID - type	ID - code	ID - description	YU - code	YU - description
160	36	Enclosed circuit breaker	1SDA067020R1	XT2N 160 TMA 160-1600	1SDA066399R1	UVR-C 220-240Vac/ Vdc F/P XT1÷4
250	36	Encased circuit breaker	1SDA068092R1	XT4N 250 TMA 250-2500	1SDA066399R1	UVR-C 220-240Vac/ Vdc F/P XT1÷4
400	36	Enclosed circuit breaker	1SDA100345R1	XT5N 400 TMA 400-4000	1SDA104944R1	YU 220..240V AC - 220..250V DC
630	36	Enclosed circuit breaker	1SDA100347R1	XT5N 630 TMA 630-6300	1SDA104944R1	YU 220..240V AC - 220..250V DC
800	36	Enclosed circuit breaker	1SDA100718R1	XT6N 800 TMA 800-8000	1SDA104944R1	YU 220..240V AC - 220..250V DC
1250	50	Encased circuit breaker	1SDA101369R1	XT7S M 1600 Ekip Dip LS/I In=1600A	1SDA073700R1	YU 220-240V AC/DC
1600	42	Open circuit breaker	1SDA070861R1	E1.2B 1600 Ekip Dip LI	1SDA073700R1	YU E1.2..E6.2 220-240V AC/DC
2000	42	Open circuit breaker	1SDA071021R1	E2.2B 2000 Ekip Dip LI	1SDA073700R1	YU E1.2..E6.2 220-240V AC/DC
2500	66	Open circuit breaker	1SDA071141R1	E2.2N 2500 Ekip Dip LI	1SDA073700R1	YU E1.2..E6.2 220-240V AC/DC
3200	66	Open circuit breaker	1SDA071141R1	E4.2N 3200 Ekip Dip LI	1SDA073700R1	YU E1.2..E6.2 220-240V AC/DC
4000	66	Open circuit breaker	1SDA071191R1	E4.2N 4000 Ekip Dip LI	1SDA073700R1	YU E1.2..E6.2 220-240V AC/DC

the CP family (for example, CP-E/CP-C and CP-B buffers).

- Anti-ferroresonance resistance for medium-voltage homopolar voltage is the designer's responsibility. It is recommended if TV medium voltage/low voltage is used. ABB TJC is Tesla TR 318 22R/J.
- Other optional accessories, like low-voltage/low-voltage TV protection fuses, are the responsibility of the designer and depend on the transformers used. Suggested family: ABB HRC. The opening coil is an optional redundancy, and the choice depends on the ID used.

- If required by the grid operator, a GSM modem must be fitted for remote actuation. Recommended model: ABB ATT or equivalent.

YC - code	YC - description	M - code	M - description	Aux - code	Aux - description
		1SDA066466R1	MOE 220÷250Vac/ dc XT2-XT4	1SDA066431R1 1SDA066424R1	AUX-C 1Q+1SY 250V F/P XT1÷XT4 AUX-SA 1S51 250Vac/dc XT2-4
		1SDA066466R1	MOE 220÷250Vac/ dc XT2-XT4	1SDA066431R1 1SDA066424R1	AUX-C 1Q+1SY 250V F/P XT1÷XT4 AUX-SA 1S51 250Vac/dc XT2-4
		1SDA104885R1	XT5 MOE 220...250V AC/DC	1SDA104784R1 1SDA066429R1	AUX-C 1Q+1SY 400Vca/cc XT5 F/P AUX-S51-C 250V AC
		1SDA104885R1	XT5 MOE 220...250V AC/DC	1SDA104784R1 1SDA066429R1	AUX-C 1Q+1SY 400Vca/cc XT5 F/P AUX-S51-C 250V AC
		1SDA104895R1	XT6 MOE 220...250V AC/DC	1SDA066431R1 1SDA066429R1	AUX-C 1Q+1SY 250V AC AUX-S51-C 250V AC
1SDA073687R1	YC 220-240V AC/DC	1SDA104922R1	M 220-250 V AC/DC	1SDA073750R1 1SDA073776R1 1SDA073770R1	AUX 4Q 400Vac E1.2-XT7 S51 250Vac E1.2-XT7 RTC 250Vac E1.2-XT7
1SDA073687R1	YC E1.2..E6.2 220- 240V AC/DC	1SDA073711R1	M E1.2 220-250V AC/ DC+S33 M/2 250V	1SDA073770R1	RTC 250V E1.2
1SDA073687R1	YC E1.2..E6.2 220- 240V AC/DC	1SDA073711R1	M E1.2 220-250V AC/ DC+S33 M/2 250V	1SDA073770R1	RTC 250V E1.2
1SDA073687R1	YC E1.2..E6.2 220- 240V AC/DC	1SDA073725R1	M E2.2...E6.2 220-250V AC/DC+S33 M/2 400V	1SDA073773R1	RTC 250V E2.2...E6.2
1SDA073687R1	YC E1.2..E6.2 220- 240V AC/DC	1SDA073725R1	M E2.2...E6.2 220-250V AC/DC+S33 M/2 400V	1SDA073773R1	RTC 250V E2.2...E6.2
1SDA073687R1	YC E1.2..E6.2 220- 240V AC/DC	1SDA073725R1	M E2.2...E6.2 220-250V AC/DC+S33 M/2 400V	1SDA073773R1	RTC 250V E2.2...E6.2

Solutions

Ekip UP as Restricted Earth Fault relay

In solar parks with string inverters protected by fuses, the low-voltage supply feeder coming from the substation does not have circuit breakers to ensure an economic solution².

To protect this line, REF ("restricted earth fault") relays should be provided that can identify earth faults and section them by means of the circuit breaker upstream on the medium-voltage side.

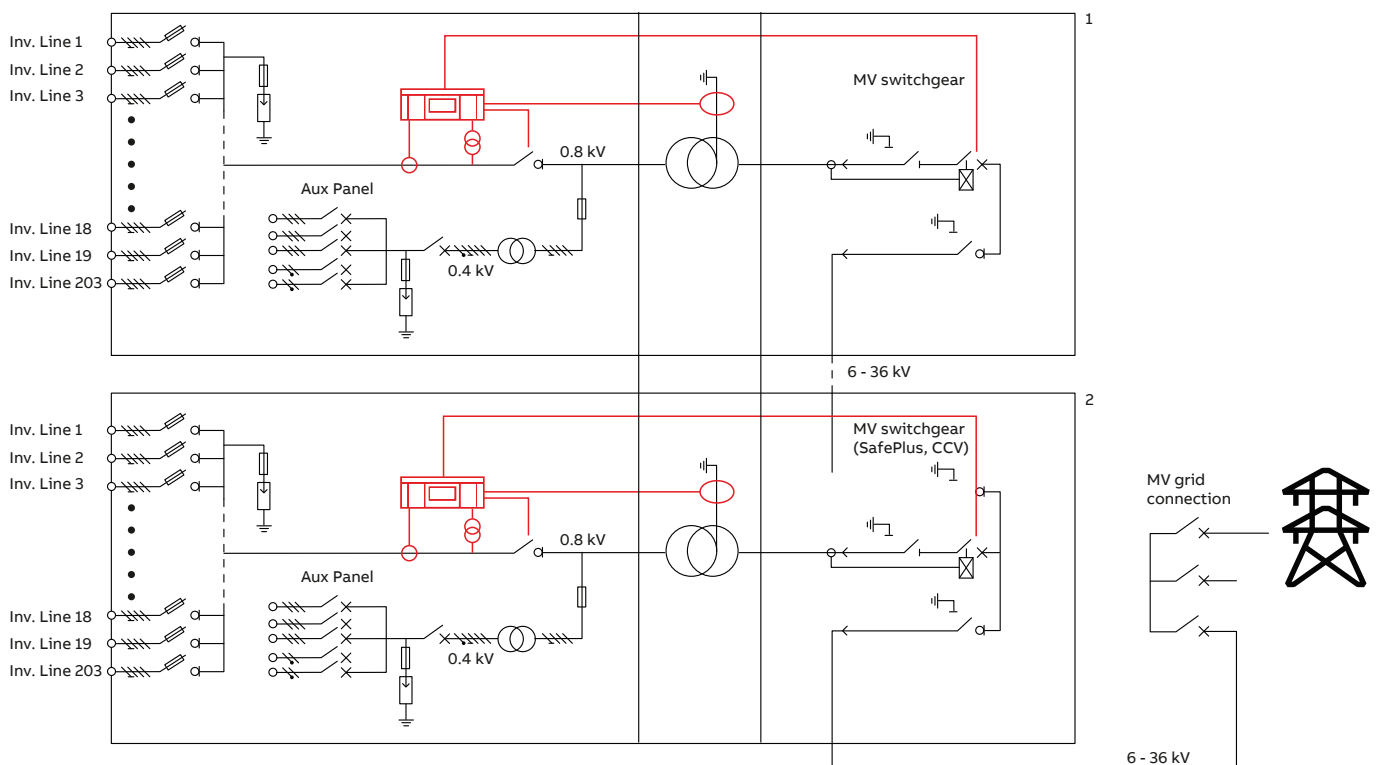
In its Protect+ or Control+ versions, through a homopolar toroid, Ekip UP measures the transit current in the center of the medium-voltage/low-voltage transformer connected to earth and, on the basis of the Gext protection threshold, sends the disconnection command to the medium voltage circuit breaker.

This signal can be wired with an output of the Ekip signalling module and/or by protocol, for example as GOOSE IEC61850 messages to the medium-voltage relay.

Using Ekip UP as a REF relay provides different benefits:

- Ekip UP can measure not only the current on the star center of the transformer but also the currents of the supply line by using its own Rogowski sensors. In this manner, the presence of restricted faults can be detected at the same time as the presence of non-restricted faults. Consequently, possible disconnecting systems can be used to increase the continuity of the medium-voltage service.
- The digital unit also has integrated numerous communication protocols on Ethernet to send the information on protections and alarms to supervision systems of the solar plant, avoiding the need for signal converters.
- The relay can monitor the quality of the energy. In particular, it can detect the harmonic content arising from malfunctions in the presence of string inverters and indicate their presence above pre-set thresholds without the need for other devices, like multimeters or a PLC. It also can work in systems with 800V rated voltage by TV connection.

² Sometimes there are circuit breakers for isolation in the event of transformer maintenance





Online configurator



Instruction manual

Example of use of Ekip UP as REF relay

Codes to be selected

Ekip UP Protect + (1SDA083361R1) or Control + (1SDA083363R1) can be configured as supply, rating plug and line current sensors³ as in the technical catalogue (1SDC001051D0901) or online configurator. In addition, there are some specific accessories for the REF configuration.

³ If current measurements are not necessary, CS type D bridges (1SDA104662R1) can be selected. Equally, if the voltages cannot be read specially in the systems that require external TVs ($U_e > 690V$), bridges for voltage take-up are supplied as standard.

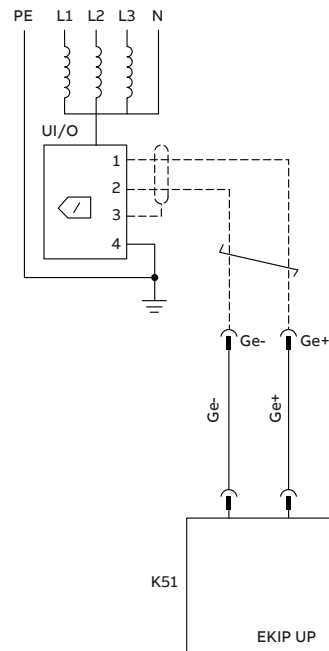
Minimum accessories configuration for REF (supplied loose)

Code	Quantity	Description	Notes
1SDA073743R1	1	Homopolar toroid 100A	Alternatively to other currents of the same toroid.
1SDA076248R1	1	Homopolar toroid 250A	Alternatively to other currents of the same toroid.
1SDA076249R1	1	Homopolar toroid 400A	Alternatively to other currents of the same toroid.
1SDA076250R1	1	Homopolar toroid 800A	Alternatively to other currents of the same toroid.
1SDA074156R1	1*	Ekip Com IEC61850	To send signals by protocol to medium-voltage relays.
1SDA074167R1	1*	Ekip Signalling 2K-1	To send wired signals to medium-voltage relay.

* Can be ordered as code configured on Ekip UP.

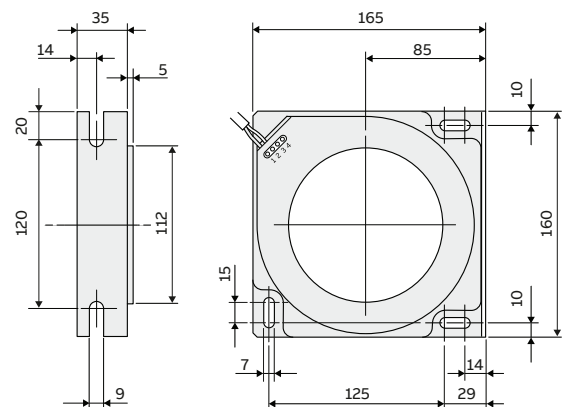
Wiring diagrams

Details on the Gext protection and on the homopolar toroid are available in the product manual. The following diagrams show the connection of the toroid to Ekip UP.



Dimensions

The dimensions follow of the homopolar toroid to be connected to terminals Ge+, Ge- with shielded and corded bipolar recess (Belden 9841 or equivalent type) of a length not exceeding 15m.



Solutions

Ekip UP as monitoring system

Monitoring the energy produced from renewable sources is fundamental to evaluating the economic return on the relative investment.

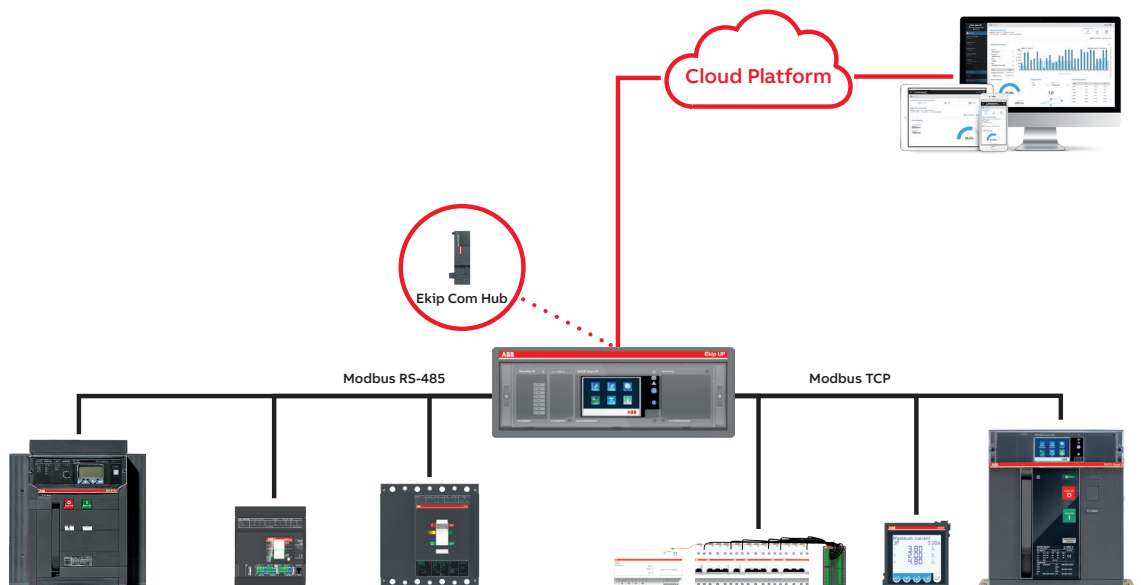
If local supervision systems are typically present in large parks, they are not so frequent in distributed generation plants, for example roof solar panels or mini hydroelectric plants. Ekip UP, the star of the ABB Ability™ architecture, permits direct connection of its data to remote energy management systems.

- Ekip UP sends its measured 3,000 data items to local systems by nine plus redundant communication protocols as to the platform in

Cloud ABB Ability™ EDCS ready for use, implementing plug-and-play monitoring.

- In solar installations, the digital unit is typically located at the general plant level and can receive information on the current and status of the string combiners (up to 96) with the connection to the CMS700 interfaces and Ekip Signalling Modbus TCP, enabling an immediate cloud architecture to be created.
- Since everything is integrated into the relay, external gateways with related wiring and commissioning are not necessary.

Ekip UP for connection to ABB Ability™ EDCS





Online configurator

Codes to be selected

All versions of Ekip UP (Monitor, Protect, Protect+, Control, Control+) must be configured with supply, rating plug and line current sensors as per the

technical catalogue (1SDC001051D0901) or online configurator. To complete the energy monitoring system, the codes to be followed are based on having up to four cartridges in Ekip UP.

Minimum accessories configuration for energy monitoring (supplied loose or supply configured on Ekip UP)

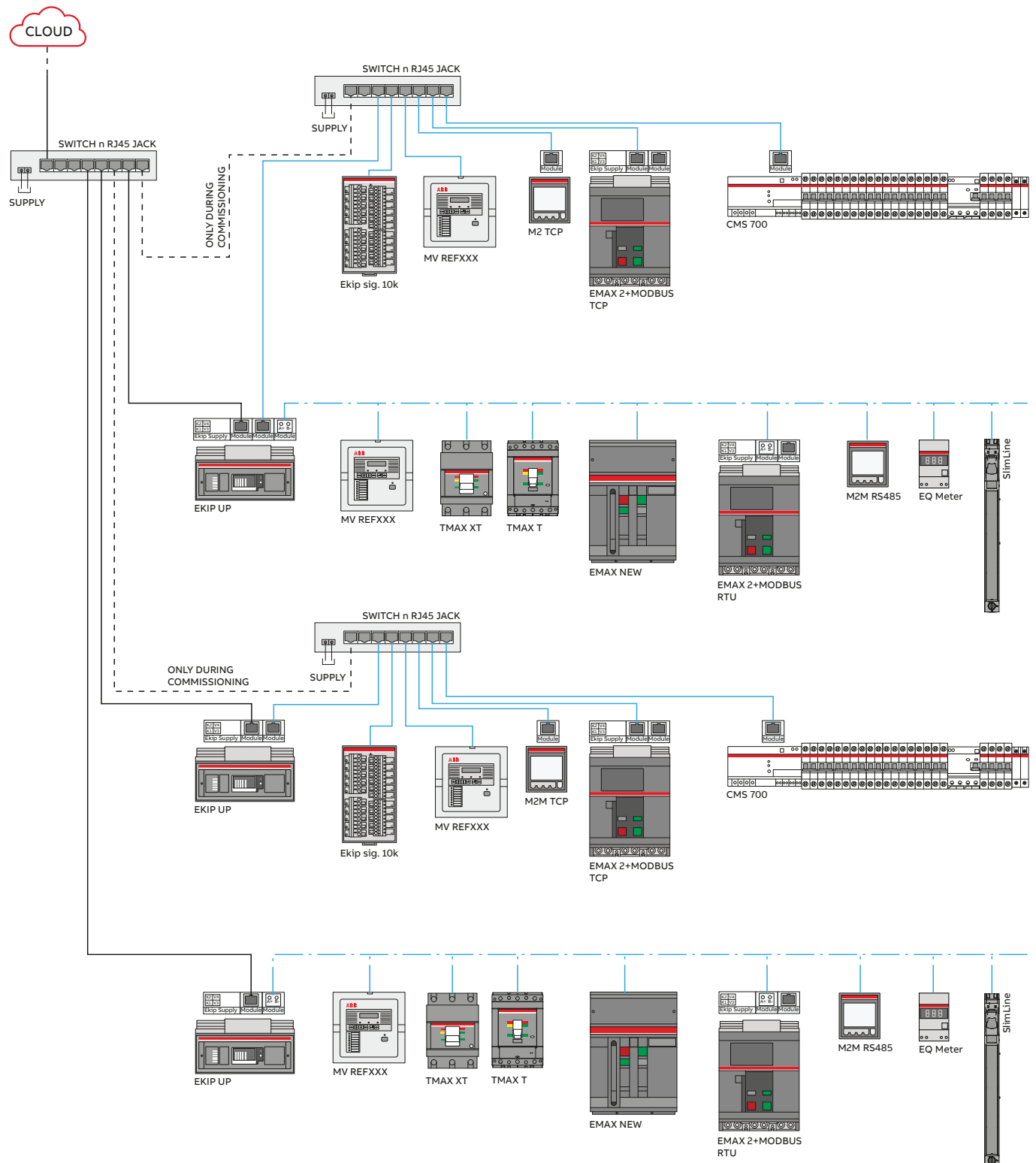
Code	Quantity	Description	Notes
1SDA074150R1	1	Ekip Com Modbus RS-485	For ABB Ability™ EDCS or local SCADA/BMS architecture.
1SDA074151R1	1	Ekip Com TCP Modbus	For ABB Ability™ EDCS and local SCADA/BMS architecture.
1SDA082894R1	1	Ekip Com Hub	For ABB Ability™ EDCS architecture.
1SDA074152R1	1	Ekip Com Profibus	For architecture with PLC.
1SDA074153R1	1	Ekip Com Profinet	For architecture with PLC.
1SDA074154R1	1	Ekip Com DeviceNet™	For architecture with PLC.
1SDA074155R1	1	Ekip Com EtherNet/IP™	For architecture with PLC.
1SDA074156R1	1	Ekip Com IEC61850	For architecture with local Scada/BMS.
1SDA074157R1	1	Ekip Com R Modbus	Redundancy in Ekip UP communication.
1SDA074158R1	1	Ekip Com R Modbus	Redundancy in Ekip UP communication.
1SDA074159R1	1	Ekip Com R Profibus	Redundancy in Ekip UP communication.
1SDA074160R1	1	Ekip Com R Profinet	Redundancy in Ekip UP communication.
1SDA074161R1	1	Ekip Com R DeviceNet™	Redundancy in Ekip UP communication.
1SDA074162R1	1	Ekip Com R EtherNet/IP™	Redundancy in Ekip UP communication.
1SDA076170R1	1	Ekip Com R IEC61850	Redundancy in Ekip UP communication.
1SDA082485R1	1	Ekip Signalling Modbus TCP	For information on string status.
1SDA085693R1	1	Ekip Signalling 3T-1 AI - Time PT1000*	For monitoring environmental parameters (temperature and other parameters 4-20mA input).
1SDA085694R1	1	Ekip Signalling 3T-2 AI - Temp PT1000*	For monitoring environmental parameters (temperature and other parameters 4-20mA input).

* External probe PT1000 with 3m of cable is available with code 1SDA085695R1 (supplied loose).

Solutions

Wiring diagrams

Example of grid diagram for connection between Ekip UP and cloud system.





Basic Load

Ekip UP as Reverse Power control unit

In several countries, grid reverse power is not allowed. In other words, when solar production in the plant exceeds load consumption, solar production has to be reduced to avoid penalties. Distribution grids are, in fact, not at all suitable for receiving power from distributed active sources. Ekip UP Protect, Protect+ or Control+ integrates the RP (“reverse power”) alarm and the “Basic Load Shedding” logic with which to be able to avoid this issue.

By wiring its output programmed on the “RP alarm” event on the status input⁴, when the power reverse event measured with the sensors at the interface point with the distribution grid (PCC) is

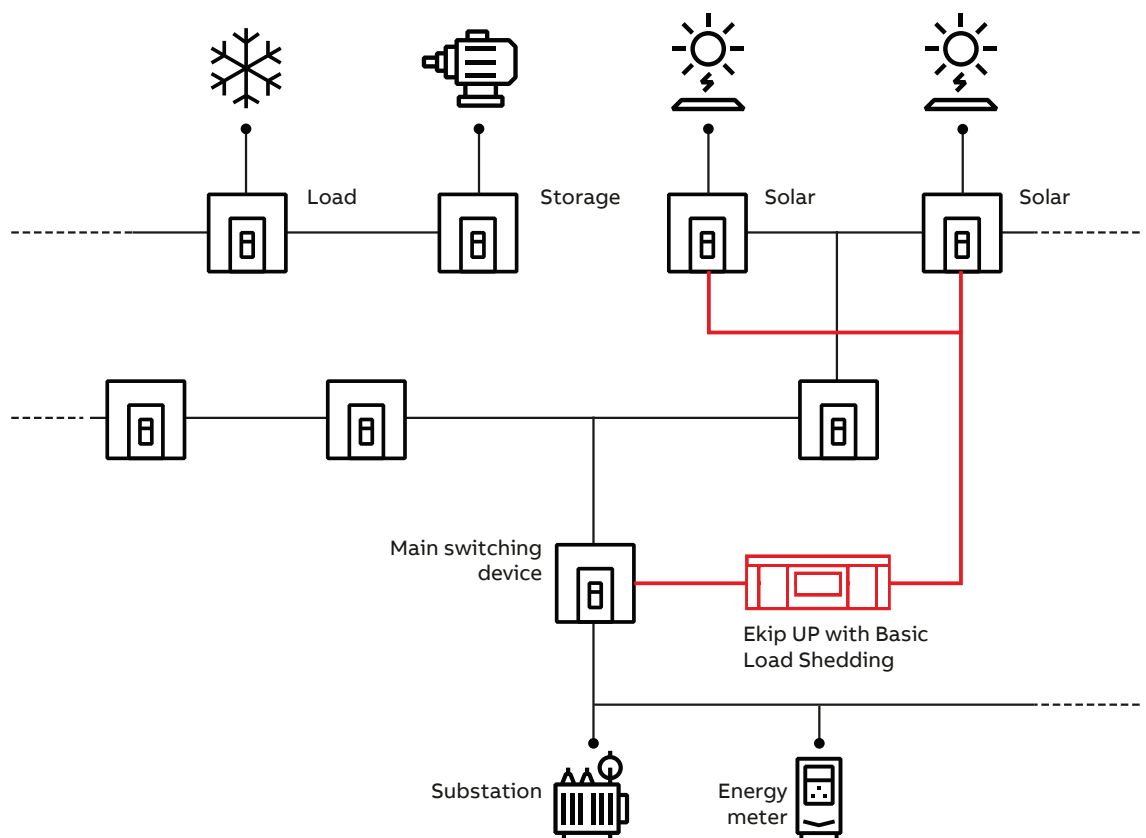
present, Ekip UP activates disconnection of the generation units considered to be active loads.

Typically, they are string solar inverters controlled by Ekip UP, for example by motorized circuit breakers, contactors or if possible, a relative digital interface connected to the Ekip Signalling modules of Ekip UP, such as Ekip 10k.

When absorption power is restored by the utility grid, the alarm finishes and the inverters are re-connected cyclically with a configurable delay.

⁴ “RP alarm” is available in the “Custom” menu in the programmable logics of the Ekip Connect commissioning software for the Ekip Signalling modules, for example Ekip 4k. Note that in this configuration the status input, for example 4k.In1, is not considered for the status of a switch but only for the reverse power event.

Ekip UP for avoiding reverse power in the grid



Solutions



Online configurator

- As Ekip UP implements the load-shedding logics on board that have already been programmed and tested by ABB together with the reverse power event, the power-shedding logics do not need to be implemented in the PLC, making implementation much more immediate.
- For the same reason, a single unit reduces the components in the switchgear and the complexity of their wiring, i.e. a single unit reduces the possibility of error.
- The logic is defined to avoid penalties in critical conditions, with the possibility of receiving feedback if the contactors are used to actuate the shedding.

Codes to be selected

In its Protect (1SDA083360R1), Protect+ (1SDA083361R1), Control+ (1SDA083363R1) versions, Ekip UP must be configured with supply, rating plug and line current sensors as shown in the technical catalogue (1SDC001051D0901) or online configurator. The RP alarm and the basic load-shedding function are supplied as standard in these versions

Ekip Signalling modules are necessary for managing up to 15 inverters. The number of modules depends on how many string inverters are controlled.

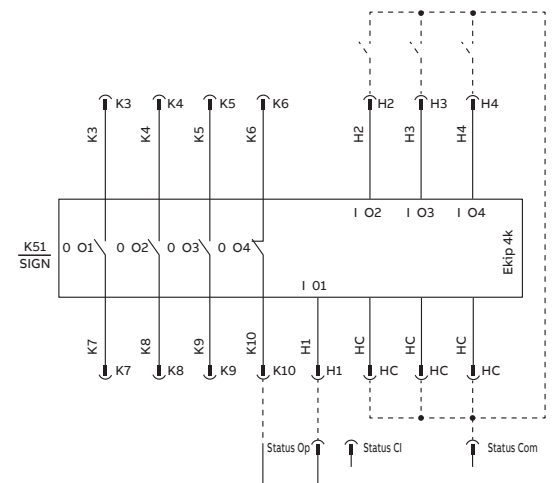
Typical configuration of accessories for RP control (supplied loose)

Code	Quantity	Description	Notes
1SDA074171R1	up to 3	Ekip 10k	DIN guide unit with 11 inout/10 outout connected by local bus to Ekip UP, up to maximum of 3. Each load needs 1 I/O if managed with digital contactor/interface and with 2 I/O if managed with motor-driven switch.

Wiring diagrams

Here are the wiring diagrams of the Ekip Signalling 4k contacts of Ekip UP to activate the load-shedding logic when the power reversal is present.

In the following example, the 4k.O4 contact is programmed on "RP Alarm (Blocked trip)" and is wired on 4k.In1 programmed as "CB Open." All the Ekip UP protections are disabled except for RP ANSI 32R, which is set as a signal only.



Ekip UP breaker connections			
Configure connections between Ekip UP digital unit and circuit breaker.			
Open breaker output	Not connected	4K O2	4K O1
Close breaker output	Not connected	4K I1/4K I2	Open 4K I1
Open/Close breaker inputs	Not connected		

Verify on display or on the commissioning tool Ekip Connect that the input 4k.In1 is configured as "active open".

Programming 4k.In1 as in example

OUTPUTS

Status

O1 Open	O1 Closed	O2 Open	O2 Closed	O3 Open	O3 Closed	O4 Open	O4 Closed
---------	-----------	---------	-----------	---------	-----------	---------	-----------

Configuration

O1 Used as Open Breaker Output

O2

O3

O4

Contact type Normally open Normally closed

Self-latching Off

Signal source Custom 0xB880

Delay 0,00 s 100,00 s

Min activation time 0 s 100 s 200 s Power controller

Trigger

Trigger type Custom...

Trigger Programmable Status H

Programmable Status I	<input checked="" type="checkbox"/>
Programmable Status L	<input checked="" type="checkbox"/>
Programmable Status M	<input checked="" type="checkbox"/>
Programmable Status N	<input checked="" type="checkbox"/>
Programmable Status O	<input checked="" type="checkbox"/>
Programmable Status P	<input checked="" type="checkbox"/>
Programmable Status Q	<input checked="" type="checkbox"/>
Programmable Status R	<input checked="" type="checkbox"/>

Operation ☒ AND ☐ OR

Programmable Status H
Programmable status information (summary).

Register value 0xB880

OK

Cancel

Prog Status Parameters R

Trigger type Custom

Trigger OpCodes Custom 0x9D10

Delay On 6,00 s

Delay Off 0,00 s

Trigger 1 ☒ On

AlarmWarning 2 L

T alarm	<input checked="" type="checkbox"/>
T alarm (Blocked Trip)	<input checked="" type="checkbox"/>
IJ alarm (Blocked Trip)	<input checked="" type="checkbox"/>
RJ alarm (Blocked Trip)	<input checked="" type="checkbox"/>
RP alarm (Blocked Trip)	<input checked="" type="checkbox"/>
UF alarm (Blocked Trip)	<input checked="" type="checkbox"/>
OF alarm (Blocked Trip)	<input checked="" type="checkbox"/>
Contact Volar PreAlarm	<input checked="" type="checkbox"/>

AlarmWarning 2 L
Critical malfunction and blocked trip protection function.

Trigger 2 ☐ Off

Global 1 L

CB closed	<input checked="" type="checkbox"/>
CB connected	<input checked="" type="checkbox"/>
CB in test	<input checked="" type="checkbox"/>
CB tripped	<input checked="" type="checkbox"/>
CB ready to close	<input checked="" type="checkbox"/>
CB underfed	<input checked="" type="checkbox"/>
CB open	<input checked="" type="checkbox"/>
Trip command failed	<input checked="" type="checkbox"/>

Global 1 L
Global status information (summary).

Trigger 3 ☐ Off

Global 1 L

CB closed	<input checked="" type="checkbox"/>
CB connected	<input checked="" type="checkbox"/>
CB in test	<input checked="" type="checkbox"/>
CB tripped	<input checked="" type="checkbox"/>
CB ready to close	<input checked="" type="checkbox"/>
CB underfed	<input checked="" type="checkbox"/>
CB open	<input checked="" type="checkbox"/>
Trip command failed	<input checked="" type="checkbox"/>

Global 1 L
Global status information (summary).

Register value 0x9D10,0x0000,0x0000

Programming 4k.Out4 as in example

Settings A Settings B

Current protections

L 49	S 50	S 51	I 50
G 50	IJ 46	D 67	
S(V) 51V	S(V) 51V2	MCR	Next 50G

Voltage protections

OV 59	OV 59	UV 27	UV 27	VU 47
OV2	OV2	UV2	UV2	

Frequency protections

OF 81H	OF 81H	UF 81L	UF 81L	ROCOF 81R
OF2	OF2	UF2	UF2	

Power protections

OP 320F	UP 32LF	RP 32R
OQ 320F	RQ 40/32R	

Reverse active power protection (RP - ANSI 32R) ☒ On

Protection behaviour Signal Trip

Threshold P11 -1,000 Sn -0,100 Sn

Time t11 1,00 s 100,00 s

Advanced Settings

Cancel Apply



—
WP Emax 2, all-in-one innovation
Load Shedding

Setting RP signal - setting on basis of signal application

For settings in the Basic Load Shedding tool in Ekip Connect 3 and the connection of Ekip UP to the loads with Ekip Signalling modules, see WP⁵.

⁵ This document refers to the Emax 2 platform but is equally applicable to Ekip UP, which shares the same electronic platform. In their communication card, ABB inverters dispose of an @5VDC input for remote control. This is wired with NO output of Ekip 10 connected to Ekip UP unit.

Solutions



Power Controller

Ekip UP as load power control unit

Ekip UP Control or Control + also can manage the power absorbed by the loads via the dedicated algorithm ("Power Controller").

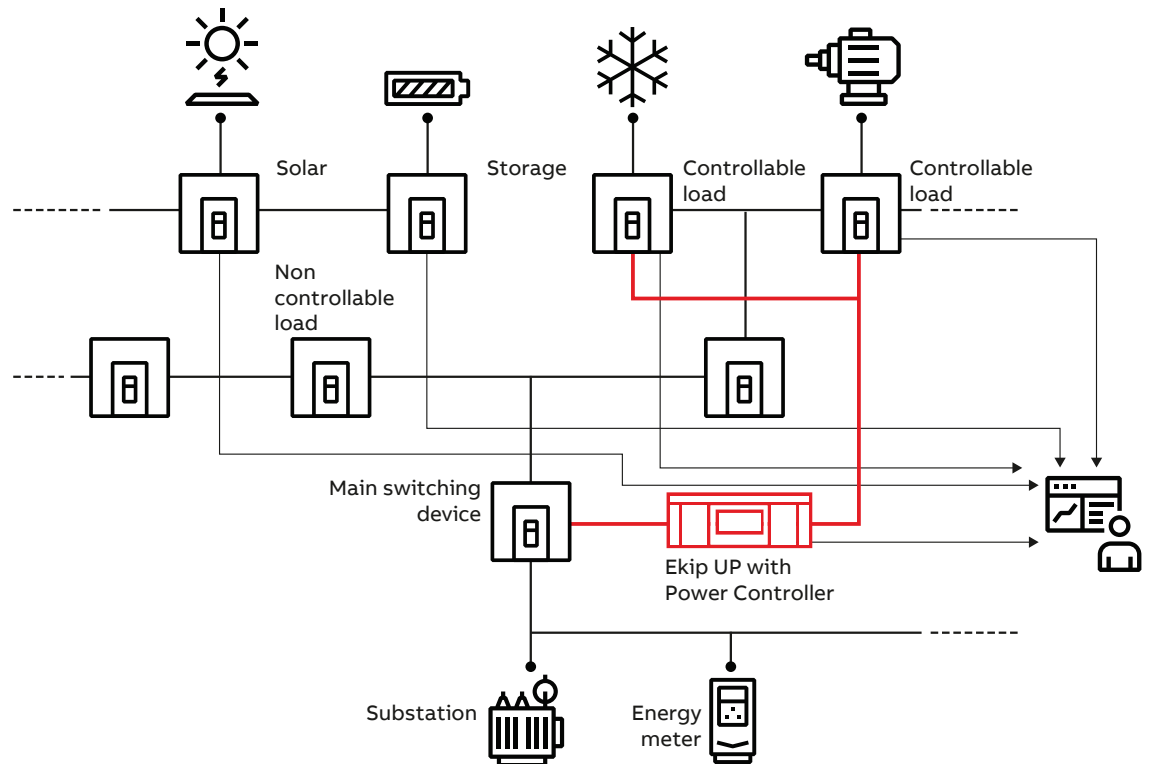
In a microgrid with accumulation systems (batteries), all the main utilities are supervised, and the SCADA system can use the communication protocol to set the best power removed by the grid according to self-consumption optimization logics.

Ekip UP is positioned at the interface point with the distribution grid and will act on the loads with its I/Os on the relative motor-driven

switches or contactors so that the average power on a set time window is less than that set by SCADA.

- The patented Ekip UP algorithm for managing the power absorbed by the loads enables energy-efficiency logics to be actuated just by defining parameters for the settings without any need for programming.
- The unit has at its disposal protocols for the reading and writing interface with SCADA systems, avoiding additional converters.
- The Power Controller also can be used for demand response programs to enable the relative financial benefits for the plant owner.

Ekip UP for managing the power absorbed by the grid





—
Online configurator



—
WP 1SDC007410G0201



—
CMS700

Codes to be selected

In its Control (1SDA083362R1) and Control+ (1SDA083363R1) versions, Ekip up must be configured with a power supply, rating plug and line current sensors as prescribed in the technical catalogue (1SDC001051D0901) or online configurator.

The Power Controller function is supplied as standard in these versions.

By using load units other than generation units, this function is an alternative to the reverse power control.

Ekip Signalling modules are necessary for managing loads up to 15 units. The number of modules depends on how many loads are controlled.

For settings in Power Controller wizard in Ekip Connect 2 and the Ekip UP connection to the loads with Ekip Signalling modules, see WP 1SDC007410G0201⁶.

⁶ This document refers to the Emax 2 platform but is equally applicable to Ekip UP, which shares the same electronic platform.

Typical configuration of accessories for load power control (supplied loose)

Code	Quantity	Description	Notes
1SDA074171R1	fino a 3	Ekip 10k	DIN guide unit with 11 inout/10 outout connected by local bus to Ekip UP, up to maximum of 3. Each load needs 1 I/O if managed with digital contactor/interface and with 2 I/O if managed with motor-driven switch.
1SDA074151R1	1*	Ekip Com Modbus TCP	For interface or local SCADA/BMS.
1SDA074156R1	1*	Ekip Com IEC61850	For interface or local SCADA/BMS.

* Can also be ordered as code configured on Ekip UP.

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