



USER MANUAL 2TFH900001A1001-A

# E-Box



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# 1. INTRODUCTION

## 1.1 Glossary and definitions

Term	Definition
E-Box	Digital Experience Box basic on Ekip UP device
Ekip UP	Switchgear digital unit for monitoring, protecting and controlling plant
Protect	Ekip UP versions which use in E-BOX
EAM	ABB Ability™ Energy and Asset Manager

## 1.2 Contents

Overview	This manual describes the characteristics of E-Box, including: <ol style="list-style-type: none"> <li>1. General overview</li> <li>2. Managing operations: receipt, installation, commissioning</li> <li>3. Identify and removed devices to the EAM plant</li> <li>4. accessories</li> </ol>
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### Distribution and organization of information

For optimizing to use and configure E-Box and facilitate to use of ABB digital EAM solution, the following tasks should be performed in sequence, which are available in the product technical documentation (user manual, startup, and electrical diagram) :

Tasks	Description	Documents
1	Ekip UP catalog	1SDC001051D0201
2	Ekip UP user manual	1SDH002003A1002
4	Ekip UP getting start	1SDH002004A1001
5	Ekip COM HUB getting start	1SDC200063B0204

### Production notes

The information in this document will including English and Chinese languages, that will meet legislative and/or commercial product needs.

## 2. SAFETY

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 momentaneous.
- 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.

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## 3. RECEIPT

### Introduction

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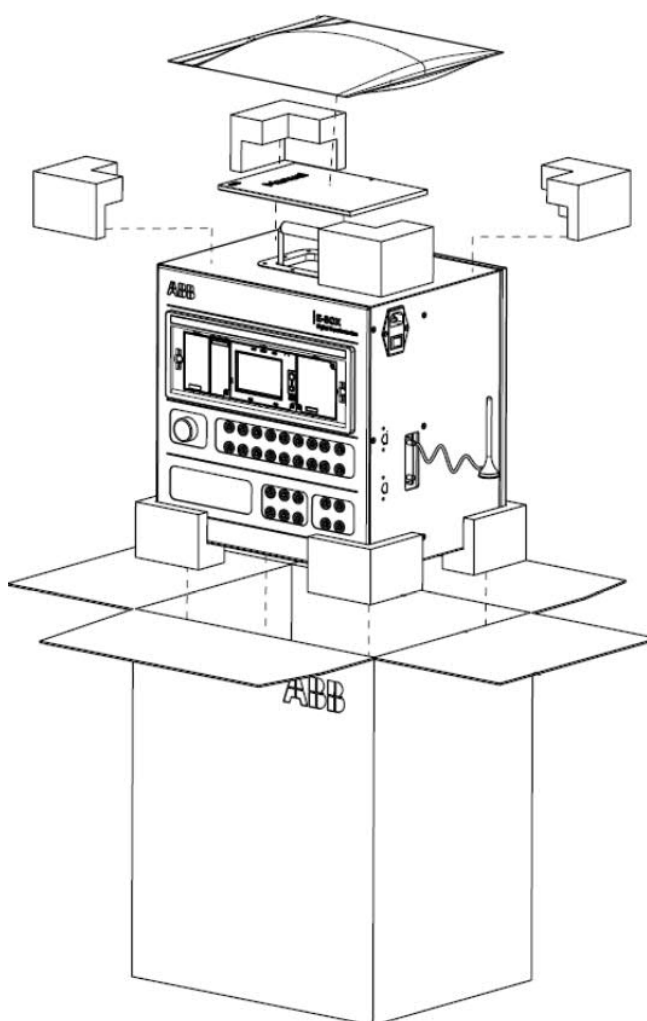
Every E-BOX order is supplied with the following packing:

- E-BOX
- Packing with temperature sensor PT1000
- Packing of external accessories not mounted on the E-BOX

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### Open the box

### Opening packing



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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.



### Check of material

If 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.

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## 4. INSTALLATION

Product overview

<i>Description</i>		<i>Picture</i>																																	
<table border="1"> <thead> <tr> <th><i>Pos.</i></th> <th><i>Description</i></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Ekip UP protect</td> </tr> <tr> <td>2</td> <td>Programable LED</td> </tr> <tr> <td>3</td> <td>Ekip 4K DI/DO</td> </tr> <tr> <td>4</td> <td>Introduction and Instructions</td> </tr> <tr> <td>5</td> <td>Temperature sensor input</td> </tr> <tr> <td>6</td> <td>Voltage measurement input</td> </tr> <tr> <td>7</td> <td>Modbus RS-485</td> </tr> <tr> <td>8</td> <td>CAN BUS</td> </tr> <tr> <td>9</td> <td>Energize power port</td> </tr> <tr> <td>10</td> <td>Ethernet port</td> </tr> <tr> <td>11</td> <td>Modbus TCP port</td> </tr> <tr> <td>12</td> <td>Wireless router</td> </tr> <tr> <td>13</td> <td>RJ1</td> </tr> <tr> <td>14</td> <td>RJ2</td> </tr> <tr> <td>15</td> <td>4P/3P selector</td> </tr> <tr> <td>16</td> <td>Antenna</td> </tr> </tbody> </table>	<i>Pos.</i>	<i>Description</i>	1	Ekip UP protect	2	Programable LED	3	Ekip 4K DI/DO	4	Introduction and Instructions	5	Temperature sensor input	6	Voltage measurement input	7	Modbus RS-485	8	CAN BUS	9	Energize power port	10	Ethernet port	11	Modbus TCP port	12	Wireless router	13	RJ1	14	RJ2	15	4P/3P selector	16	Antenna	 <p>The front view of the ABB E-Box device shows a grey metal enclosure with a handle on top. The front panel features a color touchscreen display (1) at the top left. Below the display is a green emergency stop button (2). To the right of the button are several indicator lights and buttons, including a red emergency stop button (3). Below these are two QR codes (4) and a set of colored buttons (5, 6). On the right side of the front panel, there is a power port (9), an Ethernet port (10), a Modbus TCP port (11), and a wireless router (12). A wavy antenna (16) is attached to the right side of the enclosure.</p>
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15	4P/3P selector																																		
16	Antenna																																		
	 <p>The internal view of the ABB E-Box device shows the interior of the enclosure with the door open. The internal components are labeled with callouts 13, 14, and 15. Callout 13 points to a terminal block with a wavy antenna (16) connected to it. Callout 14 points to a terminal block with two RJ45 ports (RJ1 and RJ2). Callout 15 points to a terminal block with a 4P/3P selector switch.</p>																																		

## Characteristics














Rated AC voltage	88 ... 264VAC or 125 ... 373VDC
Frequency range	47Hz ... 63Hz
Rated Power	68Wmax
Fuse in power port	3.15A
Operating temperature	-25°C ... +70°C
Storage temperature	-25°C ... +70°C

## Electrical Diagram

## Reading information

- A3 = Applications located on terminal board and connector of Ekip Up
- A4 = Indicative devices and connections for control and signaling, outside Ekip UP
- XF = Applications located on connector of E-BOX
- K51/COM = Communication module

## Graphical symbols for electrical diagrams (Standards IEC 617)

	Screen, shield (it may be drawn in any convenient shape)		Connection of conductors		Make contact
	Mechanical connection (link)		Terminal		Break contact
	Converter with galvanic separator		Plug and socket (male and female)		Current sensing element
	Conductors in a screened cable, three conductors shown		Voltage transformer		
	Twisted conductors, three conductors shown		Winding of three-phase transformer, connection star		



Ekip 4k

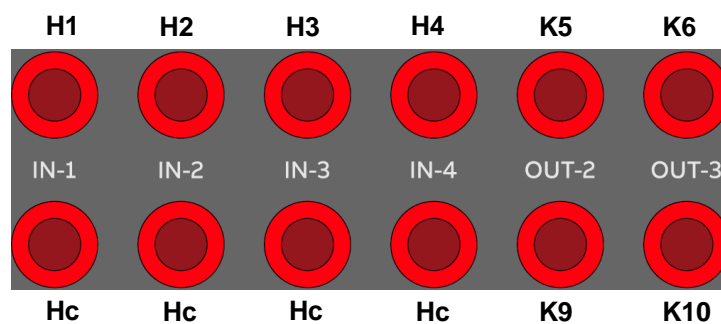
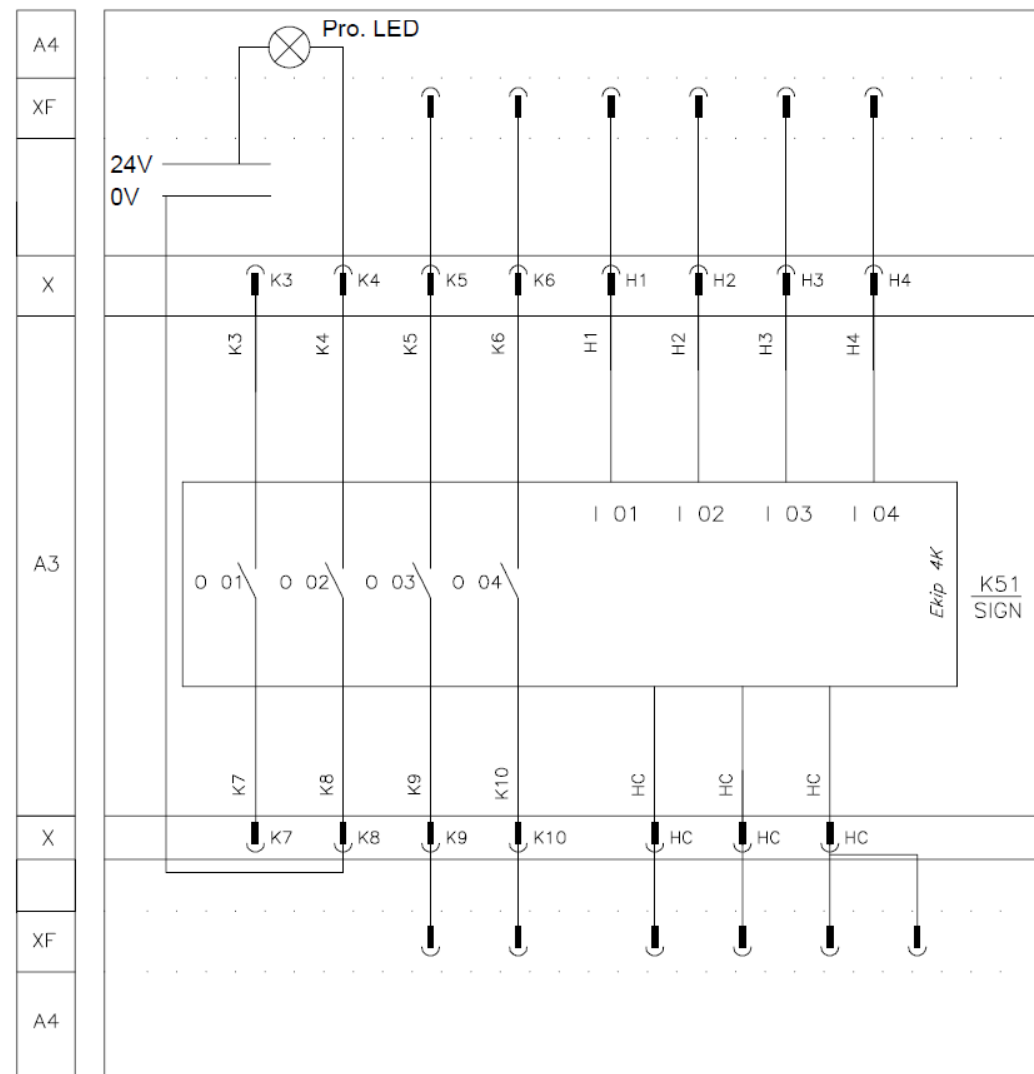


Diagram:



Modbus RS-485 & CAN

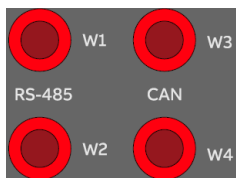
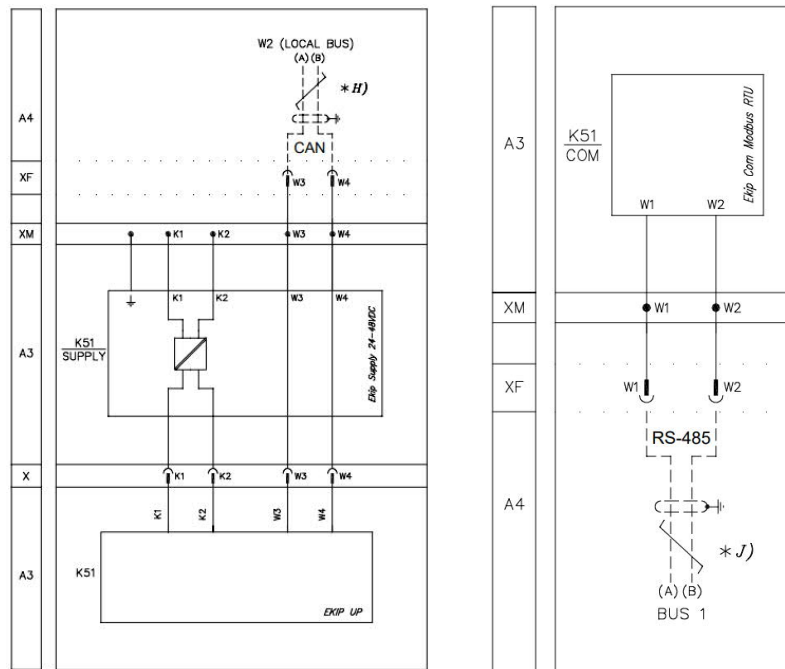


Diagram:



Temperature sensor

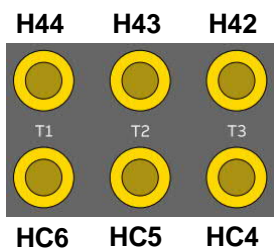
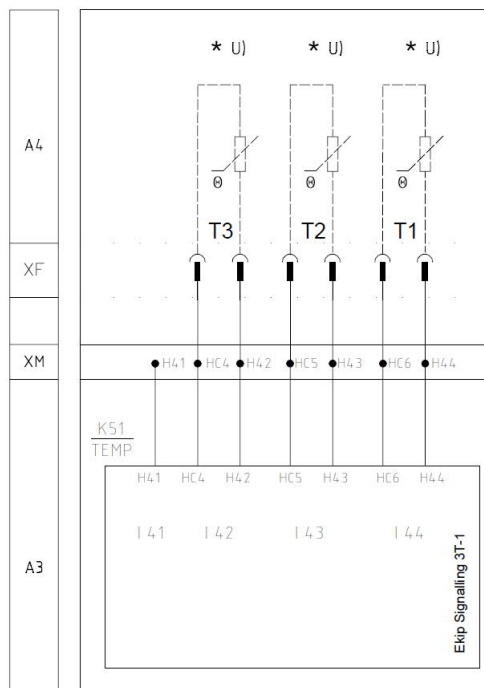


Diagram:



Voltage measuring

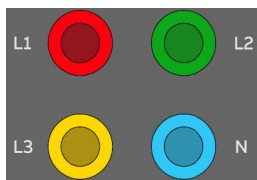
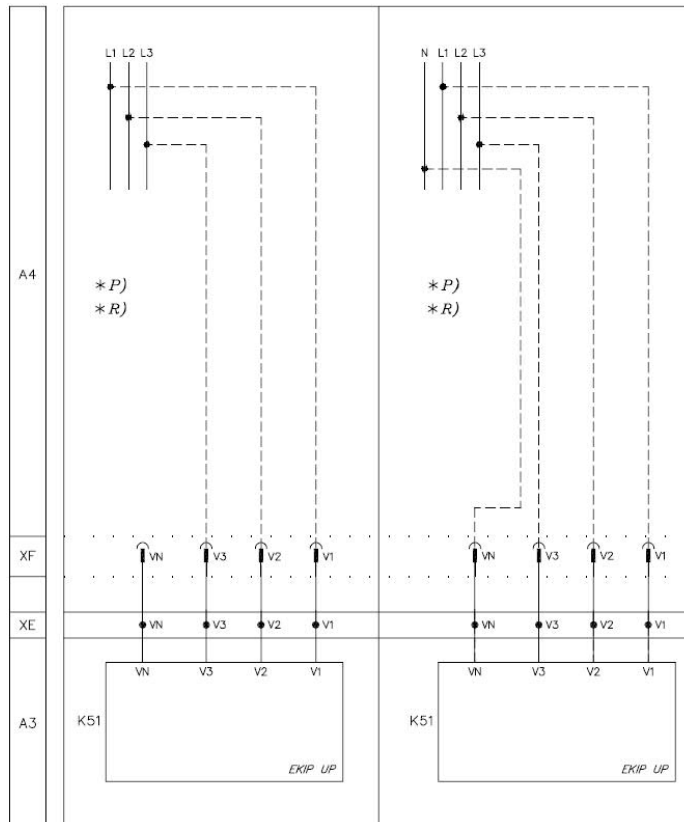
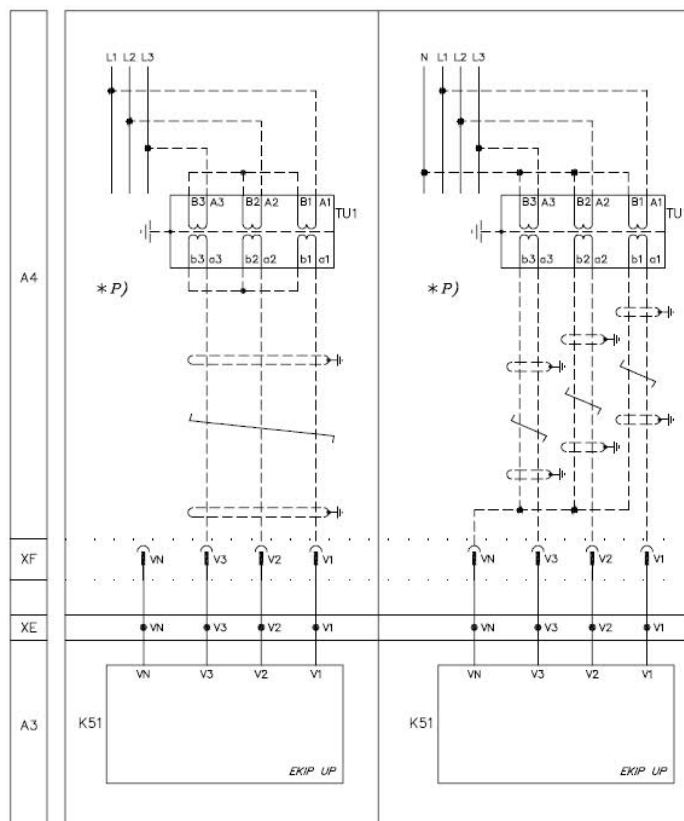


Diagram:

Voltage measure without external voltage transformer for 3P and 4P



Voltage measure without external voltage transformer for 3P and 4P



Current measuring

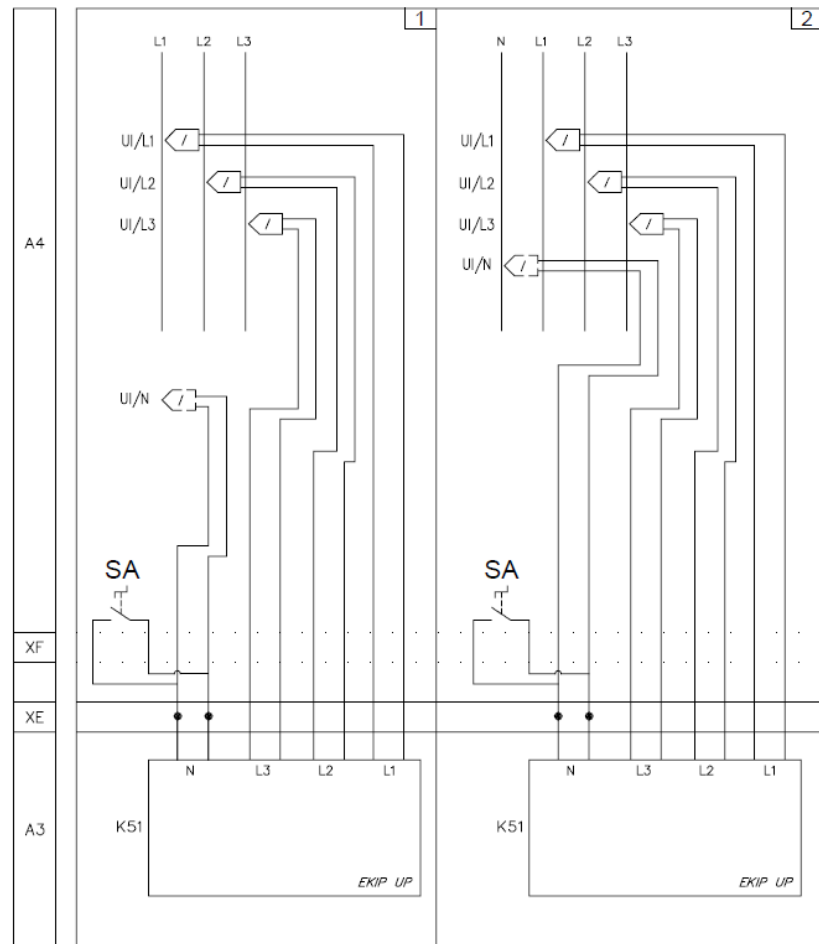
Select the selector SA to 3P position when E-BOX works on the 3 poles system, see figure 1.



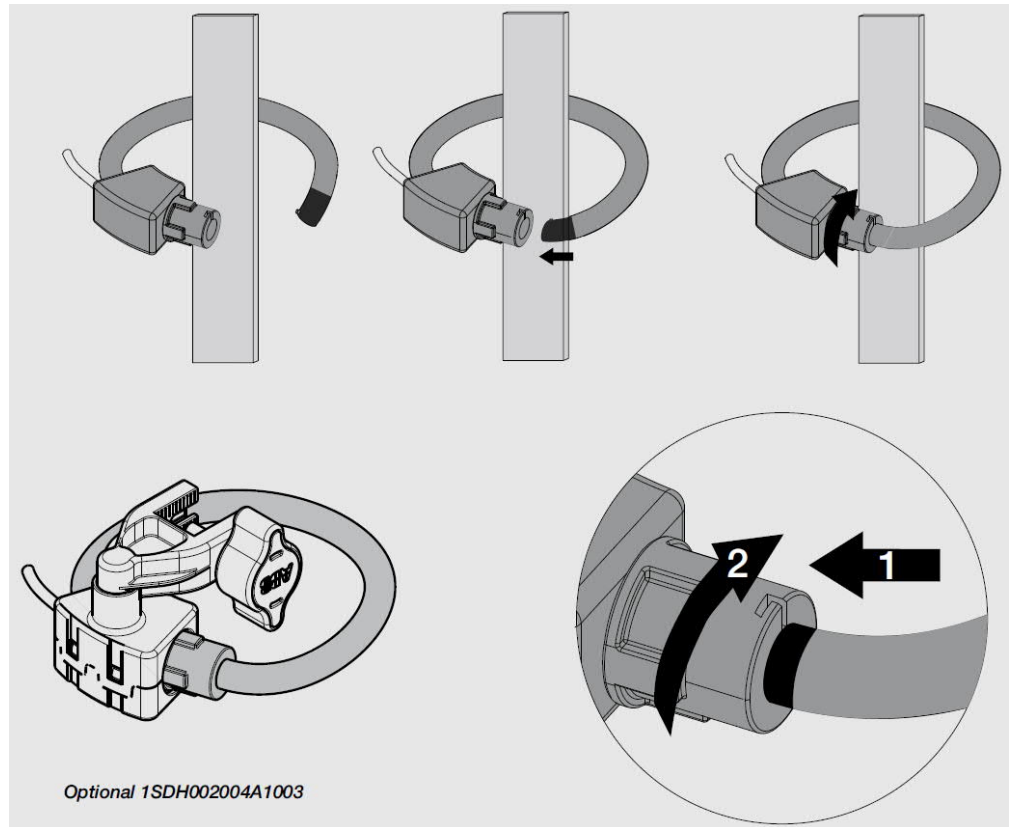
Select the selector SA to 4P position when E-BOX work on the 4 poles system, see figure 2.



Diagram:



## Type C current sensor mounted instruction:



## 5. COMMISSIONING

### 5.1. Use GSM connectivity for EAM


E-BOX provide inside GSM router, which can be used for publishing data to the ABB EAM. The default mode of the router is 3G/4G wireless routing. If you plug in the 2G/3G/4G card, the router will automatically recognize the network.

Supported banks:

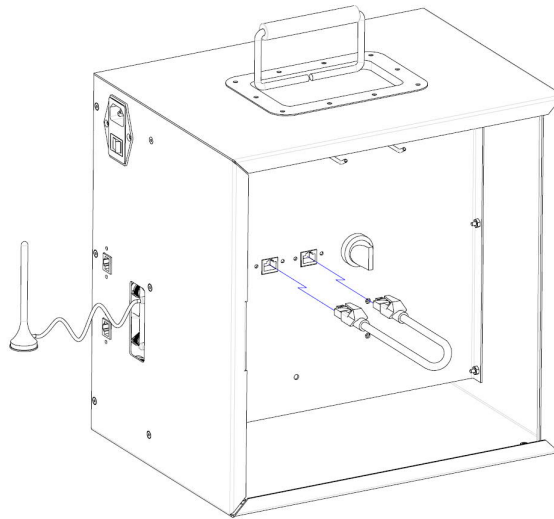
LTE(FDD) Bands	B1/2/3/4/5/7/8/17/20/28
LTE(TDD) Bands	B38/39/40/41
3G Bands	B1/2/5/8
2G Bands	B34/39

The router without LTE card installed and have standard SIM card slot, press the PUSH button, the SIM card slot will release.



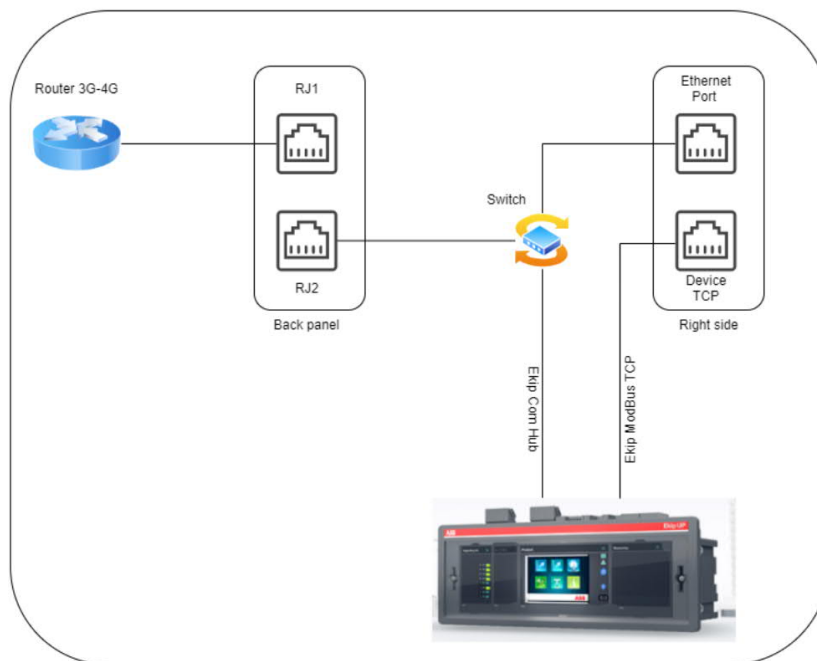
 **IMPORTANT:** Before insert SIM card, please power off the E-BOX.

Short the RJ1 and RJ2 with Ethernet cable when need to use GSM connectivity to EAM.



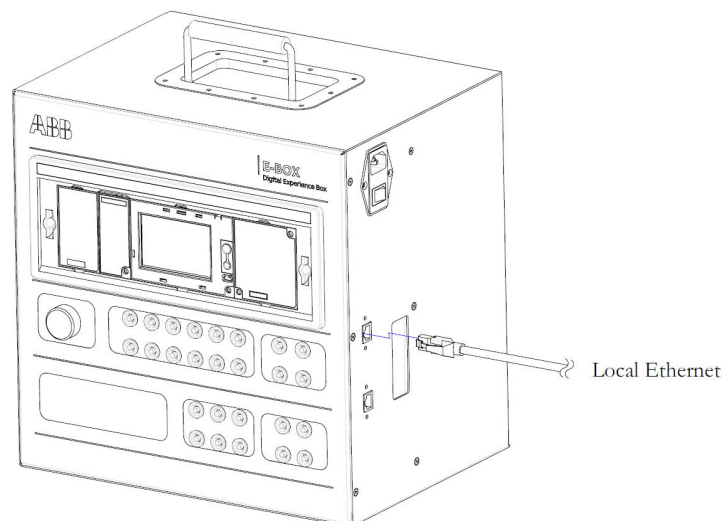
E-Box internal network:

### E-Box internal network



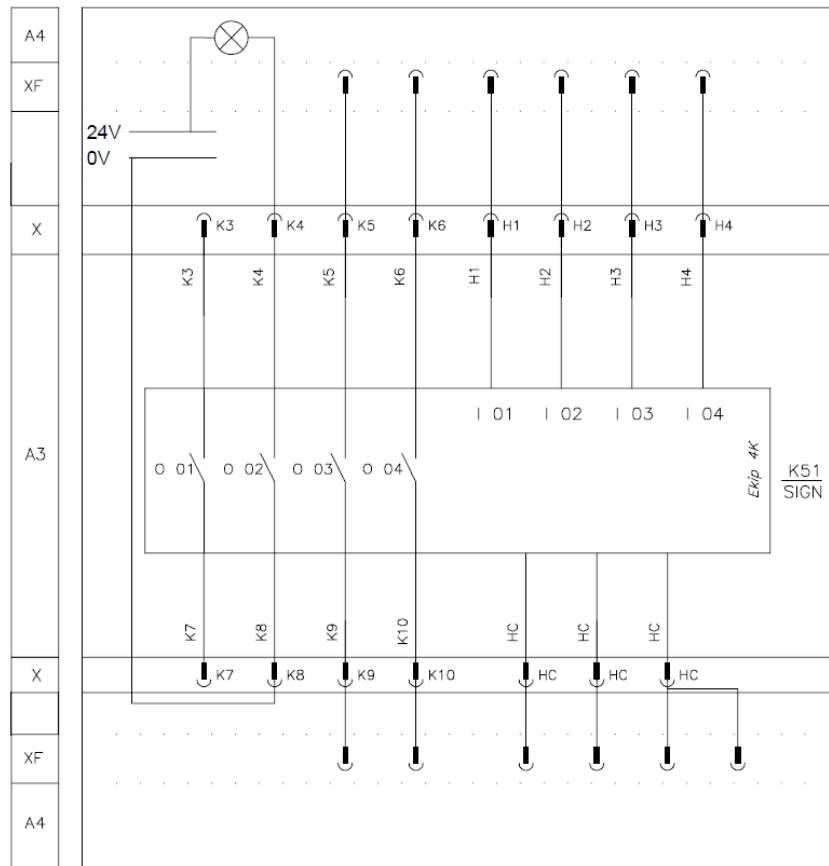
#### 5.2. Use local Ethernet connectivity for EAM

E-BOX can also directly to use local Ethernet to connect to EAM.



### 5.3. Programmable LED

A programmable LED on the E-BOX, which can provide programmable logic to demonstrate the powerful logical output of Ekip UP. For further information about find and add devices to EAM, please refers to Ekip UP user manual 1SDH002003A1002.

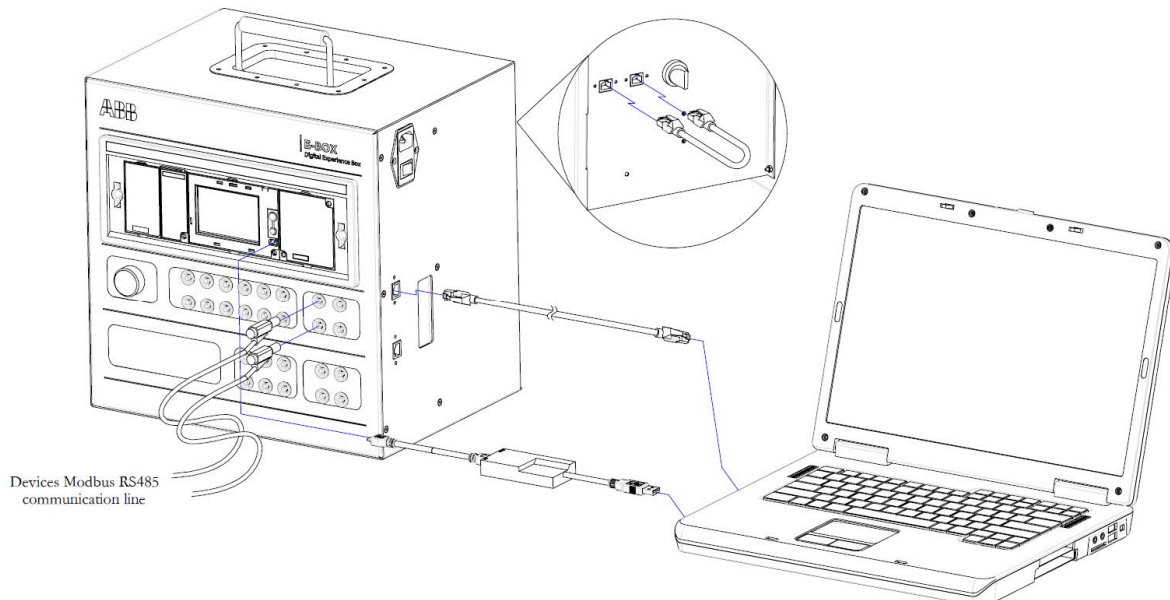


## 6. EAM (ABB ABILITY™ ENERGY AND ASSET MANAGER) – ABB CLOUD

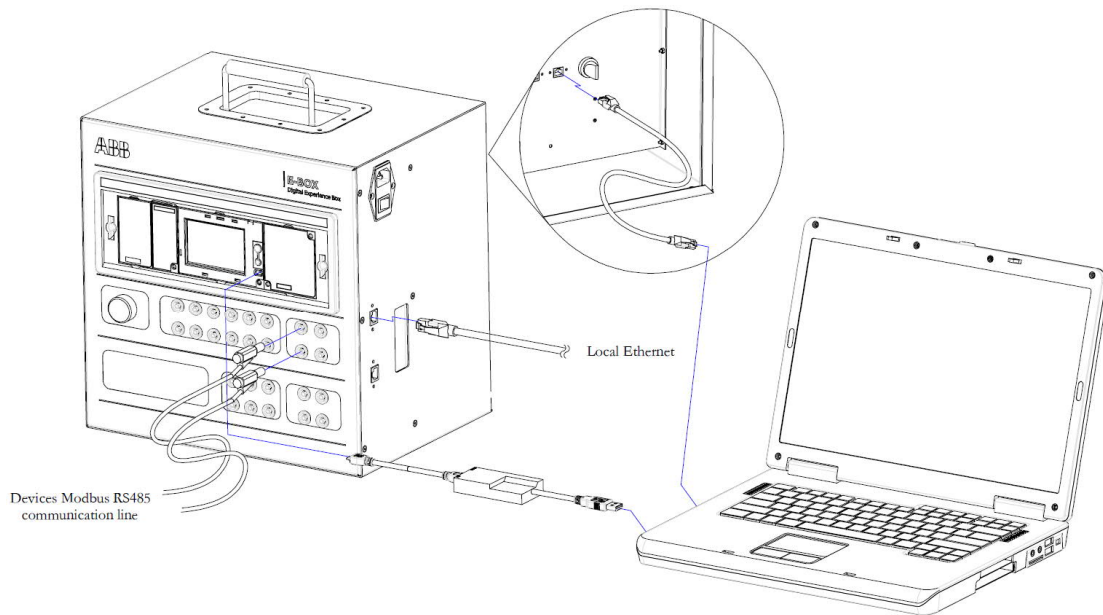
### 6.1. Extend external devices to EAM via using MODBUS RTU

E-box retains MODBUS RTU communication port for expanding external devices, it can be used for finding external RTU devices and adding them to the EAM.

When use inside GSM router to find devices add to EAM. Keep short RJ1 and RJ2, connect Ethernet port to laptop, which also connect Ekip T&P to Ekip UP mini USB in front.



When use local Ethernet to find devices add to EAM. Insert the local Ethernet to Ethernet port, connect RJ2 to laptop which also connect Ekip T&P to Ekip UP mini USB in front.



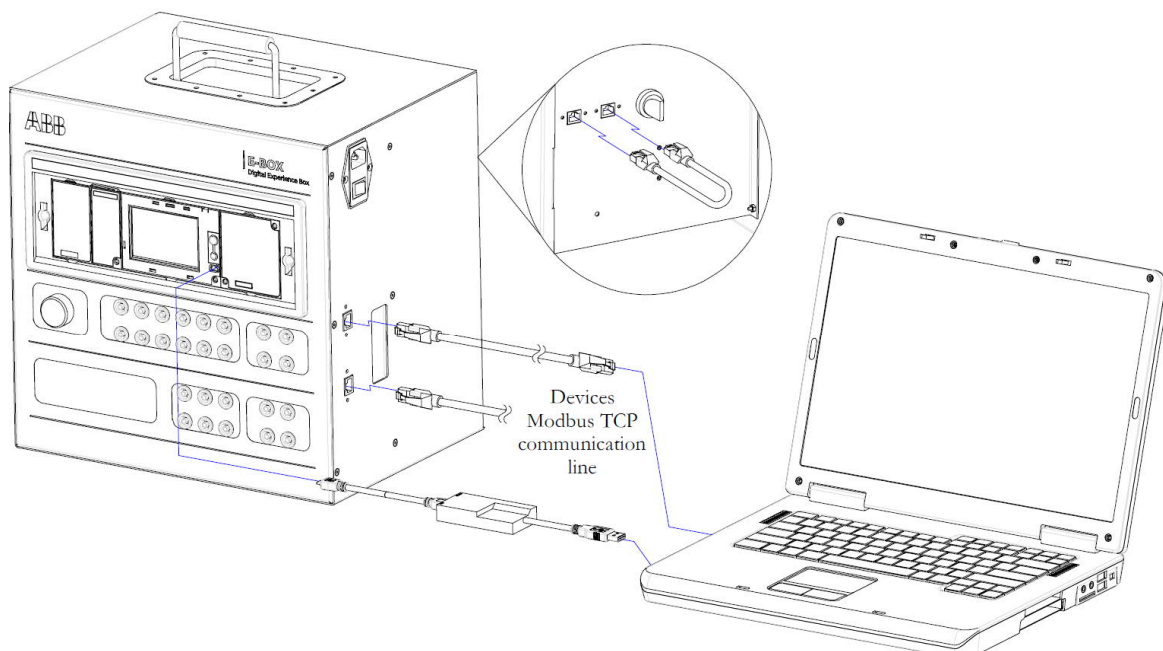
For further information about find and add devices to EAM, please refers to Ekip UP user manual 1SDH002003A1002 and Getting start of Ekip COM Hub 1SDC200063B0204.

**!** IMPORTANT: Before scan to find devices, please keep the IP of laptop same as Ekip COM HUB.

## 6.2. Extend external devices to EAM via using MODBUS TCP

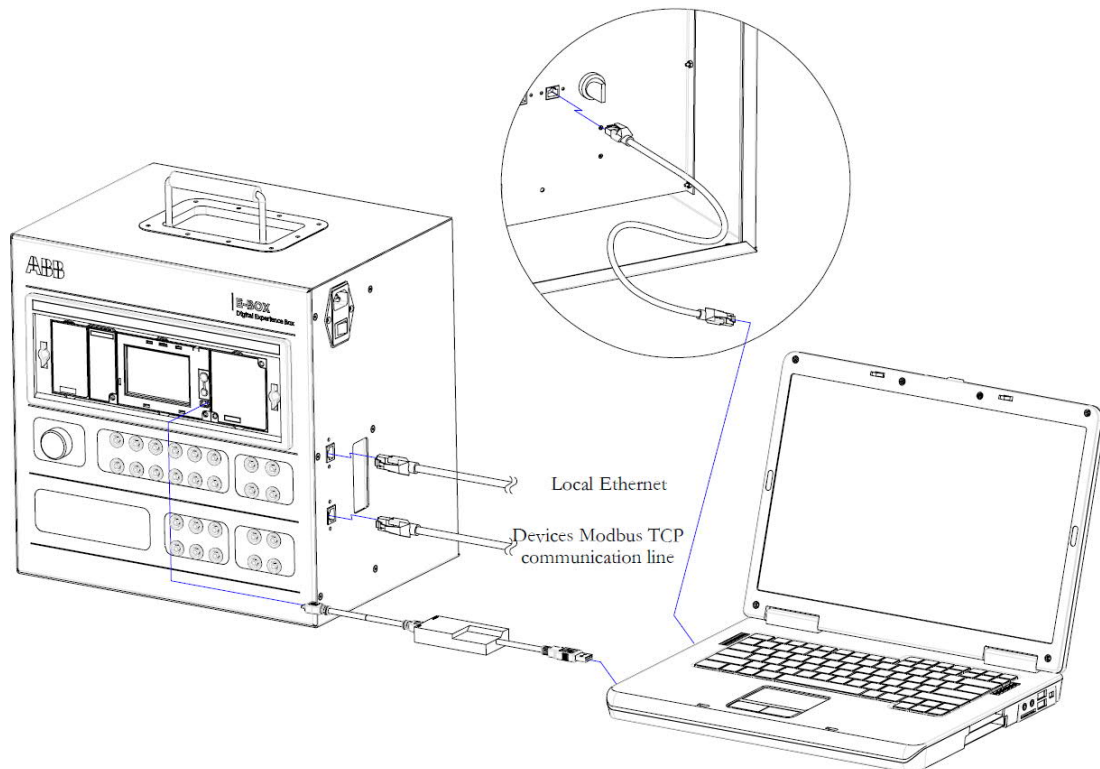
E-box retains MODBUS TCP communication port for expanding external devices, it can be used for finding external TCP devices and adding them to the EAM.

When use inside GSM router to find devices add to EAM. Keep short RJ1 and RJ2, connect Ethernet port to laptop, which also connect Ekip T&P to Ekip UP mini USB in front.





When use local Ethernet to find devices add to EAM. Insert the local Ethernet to Ethernet port, connect RJ2 to laptop which also connect Ekip T&P to Ekip UP mini USB in front.



For further information about find and add devices to EAM, please refers to Ekip UP user manual 1SDH002003A1002 and Getting start of Ekip COM Hub 1SDC200063B0204.

**!** IMPORTANT: Before scan to find devices, please keep the IP of laptop same as Ekip COM HUB.

## 1. 简介

### 1.3 术语定义

	说明
E-Box	Ekip UP 数字化体验箱
Ekip UP	监控, 保护和控制的监控单元
Protect	Ekip UP 版本
EAM	ABB 数字化能源资产管理平台

### 1.4 内容

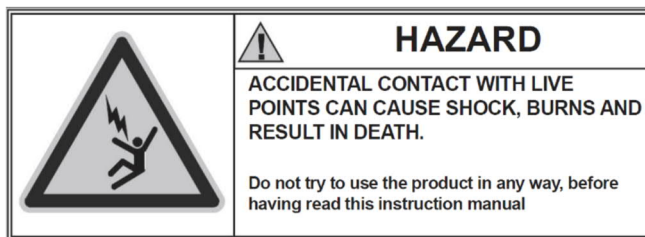
<b>概况</b>	<p>手册描述了 E-BOX 的特点, 包含如下:</p> <ol style="list-style-type: none"> <li>5. 总体概述</li> <li>6. 操作管理: 接收, 安装和运行</li> <li>7. 在 EAM 平台上识别新设备或者移除旧设备</li> <li>8. 附件</li> </ol>
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<b>信息组织及分布</b>	<p>为了优化 E-Box 的使用和配置, 并方便 ABB digital EAM 解决方案的使用, 相关使用方式可在产品技术文档(用户手册、白皮书和电气图)中找到, 链接如下:  <a href="https://new.abb.com/low-voltage/zh/products/circuit-breakers/ekip-up">https://new.abb.com/low-voltage/zh/products/circuit-breakers/ekip-up</a></p>
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<b>说明</b>	本文件中的资料将包括英文和中文, 以满足法律和/或商业产品的需要。
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## 2. 安全

### 安全指示



危险！电击危险！如果根据当地法律，没有被授权在带有带电电压的工厂上工作的人员，为了避免在组装、安装、维护或从服务中移除 Ekip UP 时存在任何潜在的电气风险，须断开或锁定所有电气供应。



### 警告！

- 对标准安装，使用，维护和操作的安全方面，包含但不限于：本文档包含安全和警告迹象表明违反或不当的安装、使用和维护，可能造成人员受伤及设备损坏等不安全行为。
- 本文没有对安全标准和厂端维护过程进行描述。应该注意的是，本文虽然包含警告和预防措施，但是没有提供该设备所有可能的使用情况。ABB 将调查每项危害事件，无论导致该结果的使用情况是否为 ABB 所推荐的。
- 任何实施操作的人员，无论选定的操作程序或使用的仪器是否为 ABB 所推荐的，都必须认真确保不会危及人身安全和系统安全。如需要进一步了解更多信息，请联系 ABB。
- 本文供专职人员使用，并且不能替代在安全规程方面所必需的课程和经验。
- 客户、安装人员或终端用户有责任应对所有信息安全措施，以防止由于连接到通信网络而产生的风险；这些风险包括未经授权的人员使用产品、改变产品的正常操作、获取和修改信息等。
- 客户、安装人员或终端用户需负责确保将这些警告进行公示，即使设备只是暂时无人看管均需要进行安全上锁。
- 本文件中包含的所有信息均为出版时的最新信息。ABB 保留随时修改文件而不另行通知的权利。

### 警告



### 警告！使用 Ekip UP 之前请认真阅读本手册

- 妥善保管本手册，以及一些可能使用到的文档。以便安装使用本产品时能及时查阅相关问题。
- 安装使用本产品时，严格遵守本产品描述的环境要求、电气和机械参数。
- 严禁超额使用本产品。
- 使用本产品请遵循相关安全管理规定。

### 3. 收货

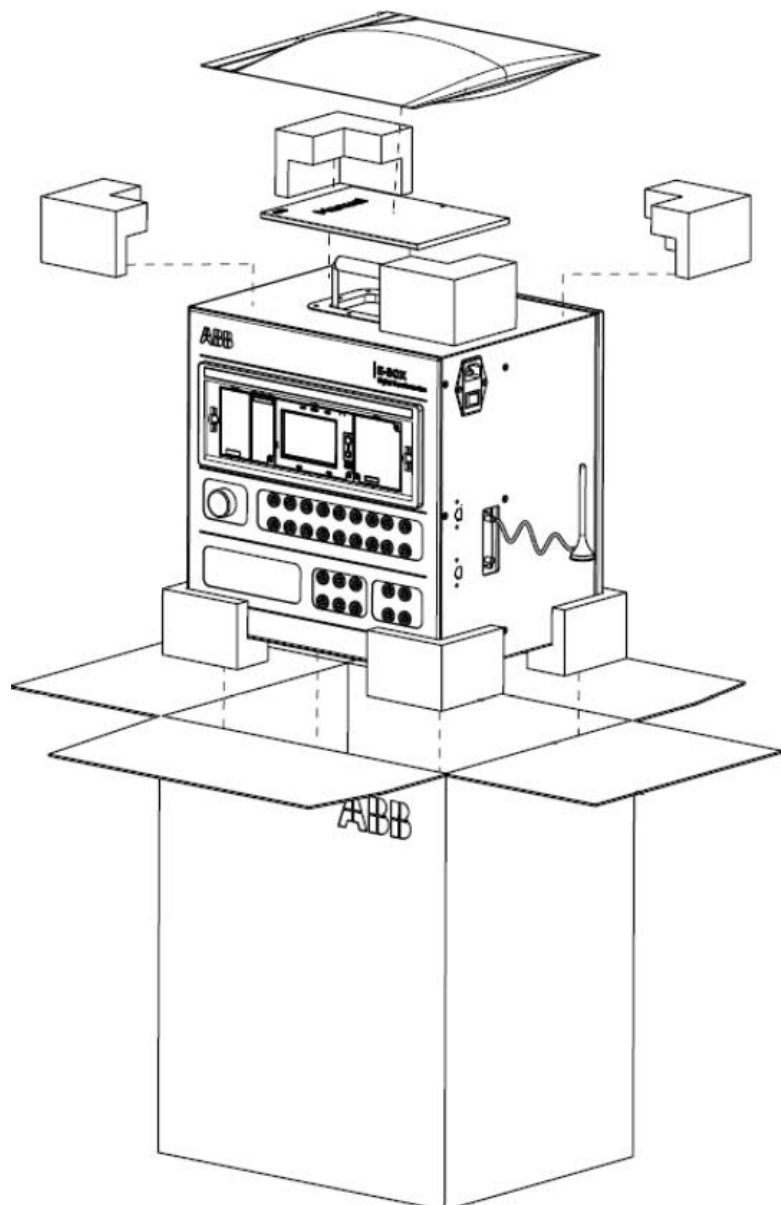
#### 说明

每个订单将会包含以下产品：

- E-BOX
- PT1000 温度传感器
- E-BOX 所使用到的线束附件包

#### 开箱

打开外包箱，取出相关物件。




#### 物料检查

检查收到的物料的状态，是否符合订单需求，是否完全没有损坏，特别要检查：Ekip UP 版本，额定插头电流等级。

如果发现收货包装损坏或订单与产品标签或产品不一致，请尽快联系 ABB。

## 4. 安装

### 产品概况

描述		图片																																	
<table border="1"> <thead> <tr> <th>位号</th> <th>说明</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Ekip UP 保护版</td> </tr> <tr> <td>2</td> <td>可编程 LED</td> </tr> <tr> <td>3</td> <td>4k 信号输入输出口</td> </tr> <tr> <td>4</td> <td>介绍与说明</td> </tr> <tr> <td>5</td> <td>温度传感器输入</td> </tr> <tr> <td>6</td> <td>电压测量输入</td> </tr> <tr> <td>7</td> <td>RS-485 通讯外扩</td> </tr> <tr> <td>8</td> <td>CAN 总线外扩</td> </tr> <tr> <td>9</td> <td>电源输入</td> </tr> <tr> <td>10</td> <td>以太网口</td> </tr> <tr> <td>11</td> <td>TCP 设备外扩</td> </tr> <tr> <td>12</td> <td>无线网关</td> </tr> <tr> <td>13</td> <td>RJ1</td> </tr> <tr> <td>14</td> <td>RJ2</td> </tr> <tr> <td>15</td> <td>4P/3P 选择开关</td> </tr> <tr> <td>16</td> <td>天线</td> </tr> </tbody> </table>	位号	说明	1	Ekip UP 保护版	2	可编程 LED	3	4k 信号输入输出口	4	介绍与说明	5	温度传感器输入	6	电压测量输入	7	RS-485 通讯外扩	8	CAN 总线外扩	9	电源输入	10	以太网口	11	TCP 设备外扩	12	无线网关	13	RJ1	14	RJ2	15	4P/3P 选择开关	16	天线	 
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## 参数














额定输入电压	88 ... 264VAC or 125 ... 373VDC
频率范围	47Hz ... 63Hz
额定功率	68Wmax
保险丝	3.15A
操作温度	-25°C ... +70°C
存储温度	-25°C ... +70°C

## 电气图

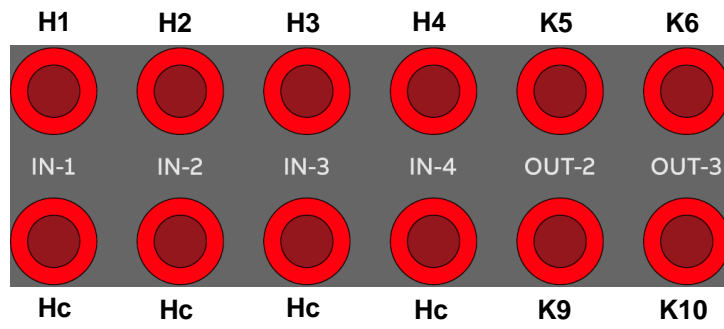
## 阅读信息

A3	= Ekip UP 产品上的连接器或插接端子
A4	= E-BOX 箱体外用于控制和信号的指示设备和连接
XF	= E-BOX 箱体上安装的指示和连接器
K51	= Ekip UP 保护版
K51/SIGN	= 装于 Ekip UP 上的 4k 信号模块
K51/TEMP	= 装于 Ekip UP 上的温度测量模块
K51/SUPPLY	= 装于 Ekip UP 上的电源模块
K51/COM	= 装于 Ekip UP 上的通讯模块

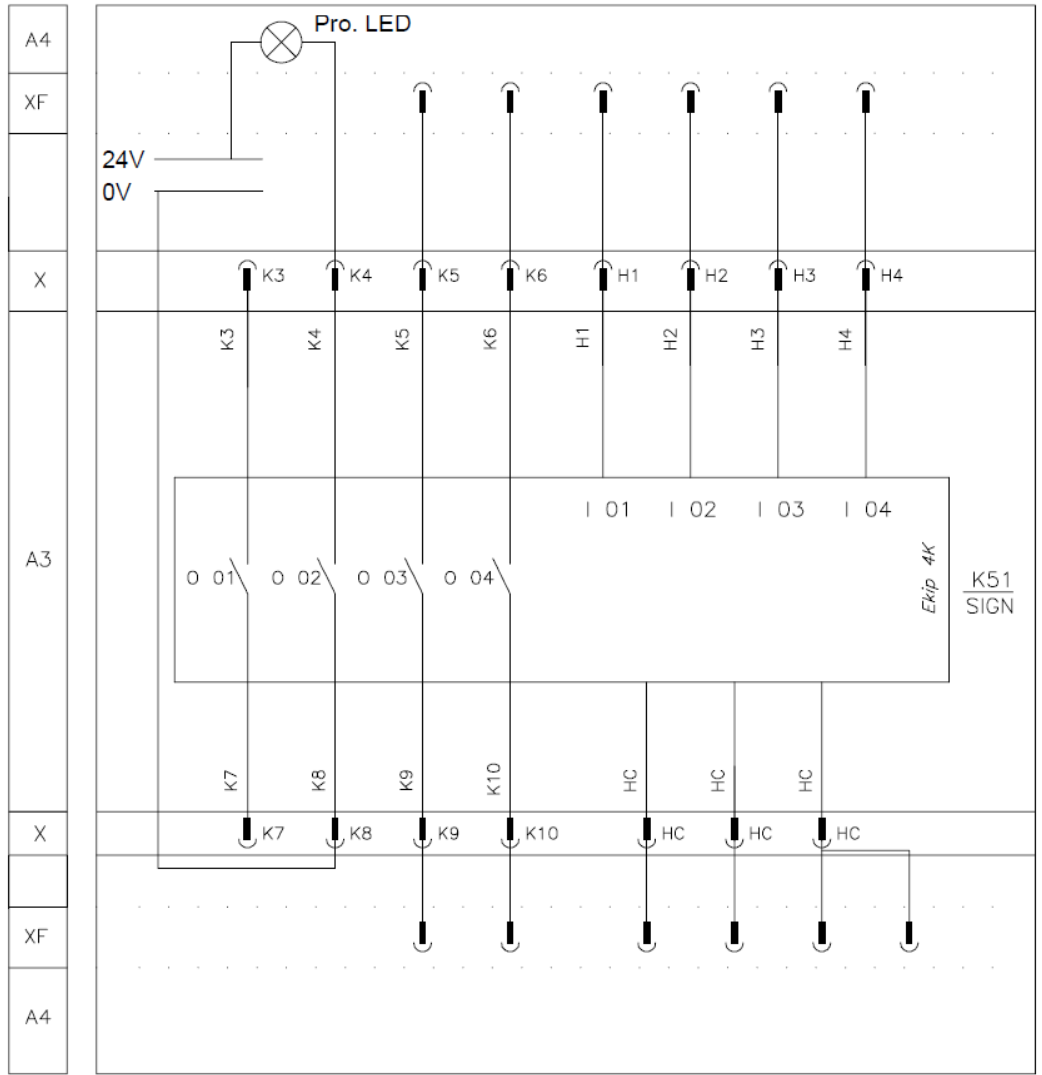
## 电气图图形符号(标准 IEC 617)

	Screen, shield (it may be drawn in any convenient shape)		Connection of conductors		Make contact
	Mechanical connection (link)		Terminal		Break contact
	Converter with galvanic separator		Plug and socket (male and female)		Current sensing element
	Conductors in a screened cable, three conductors shown		Voltage transformer		
	Twisted conductors, three conductors shown		Winding of three-phase transformer, connection star		

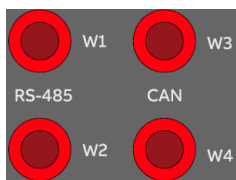
4k 信号输入输出



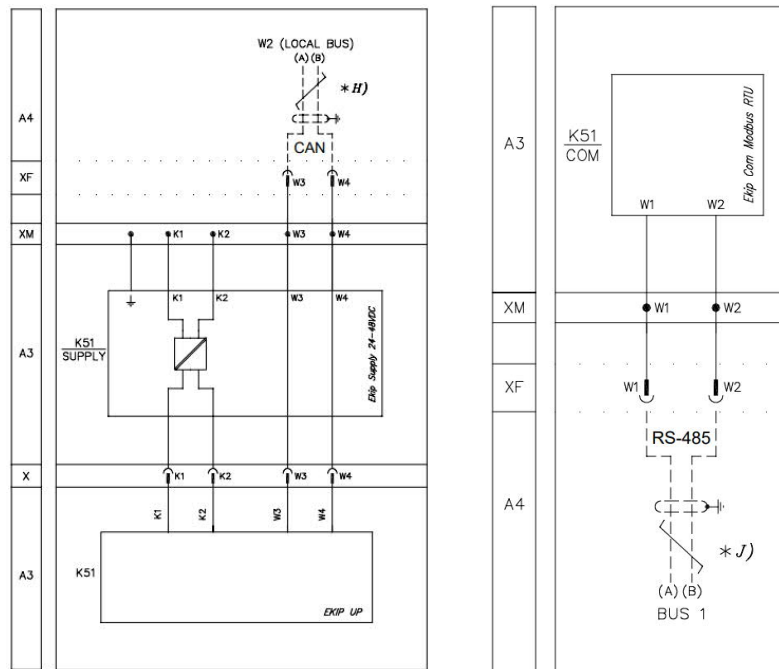
接线图:



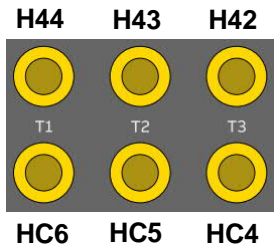
### RS-485 通讯 & CAN 总线外扩端口



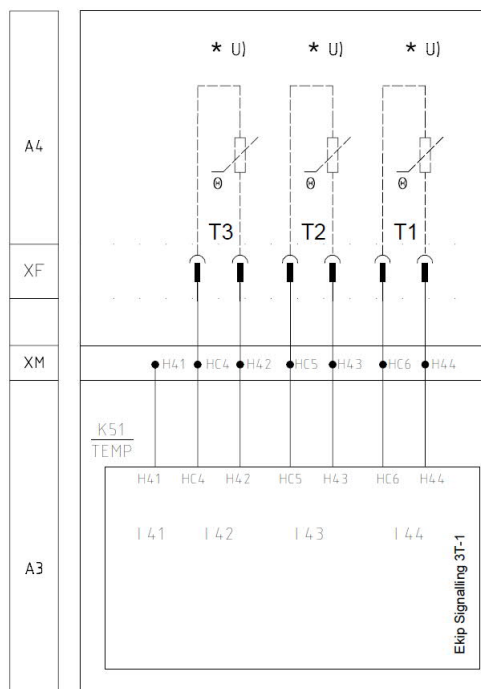
电气图:



### 温度传感器输入

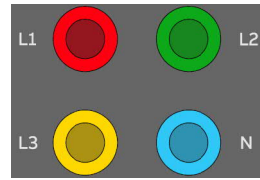


电气图:



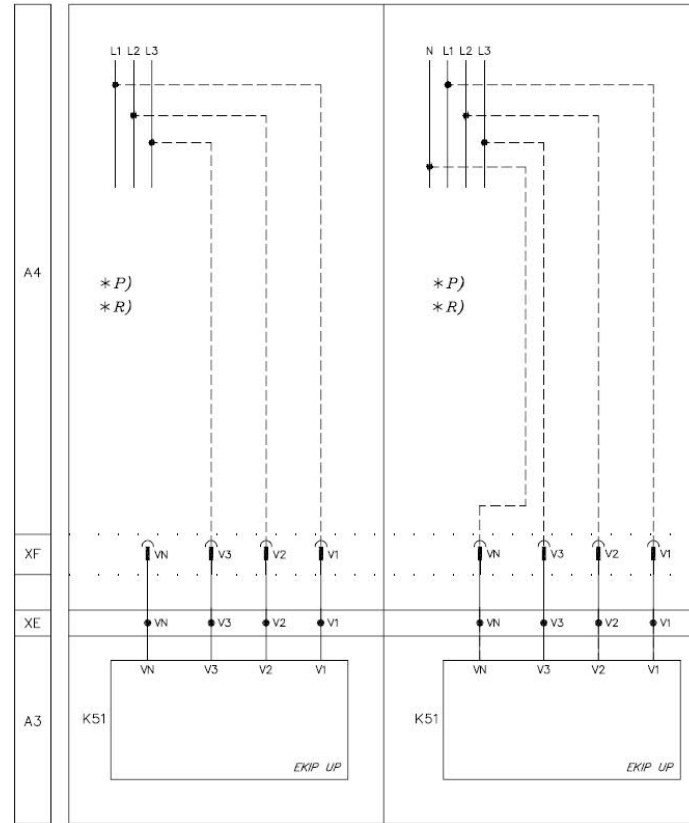


电压测量

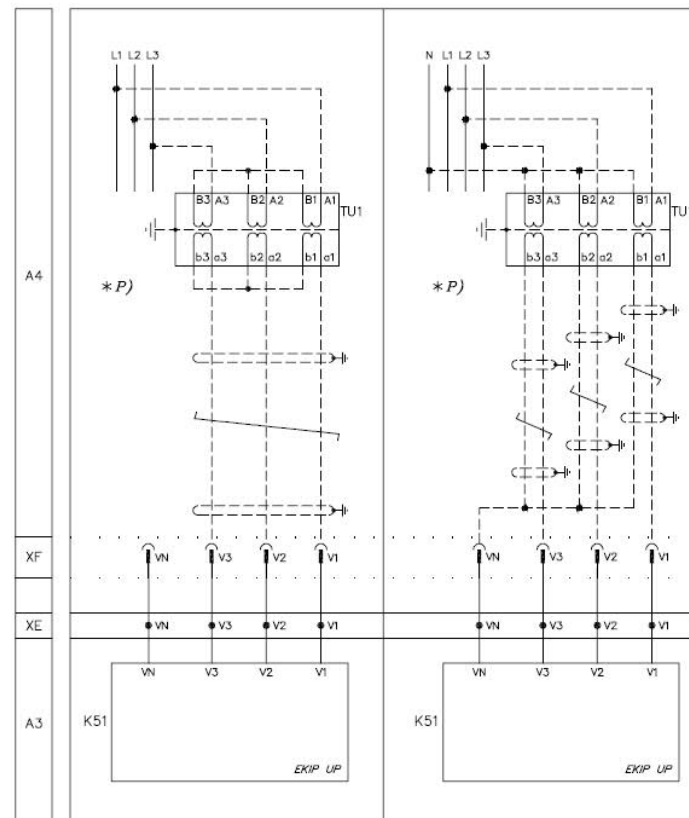


电气图:

无外置 3P 和 4P 变压器的电压测量



采用外置 3P 和 4P 变压器的电压测量



### 电流测量

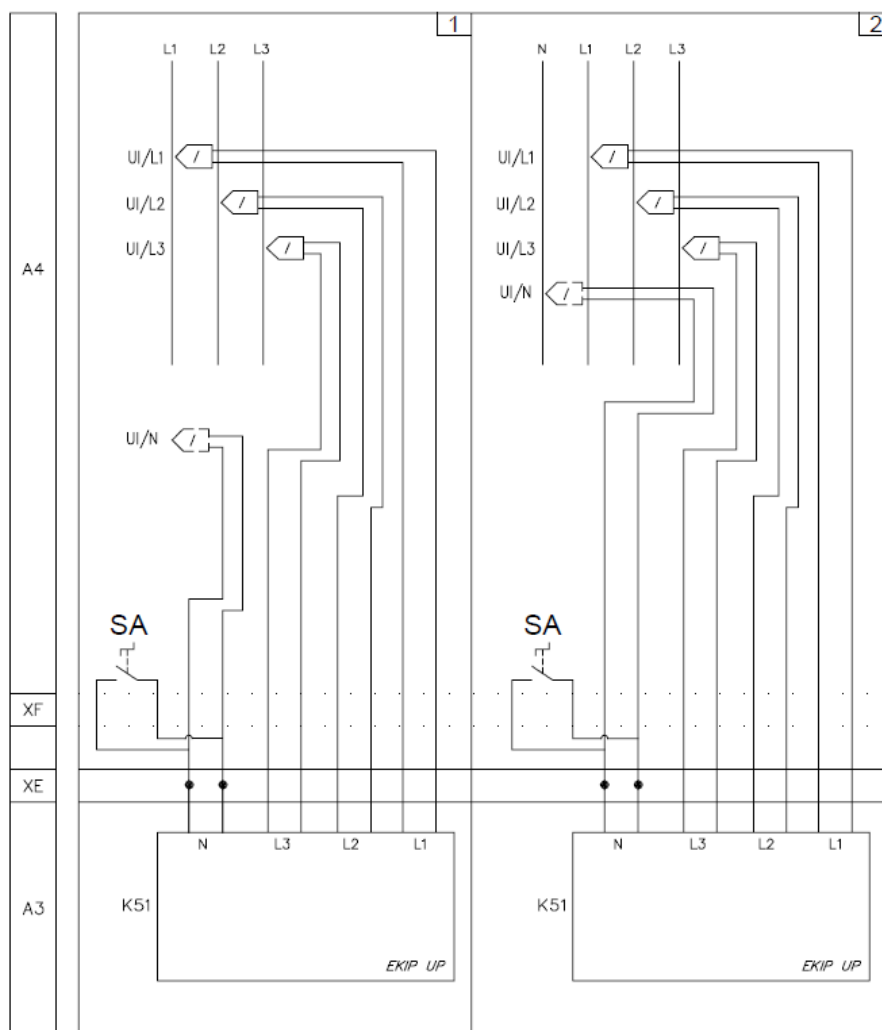
当 E-BOX 工作在 3 极系统时，选择开关 SA 需要拨到 3P 位置，如图片 1 所示。



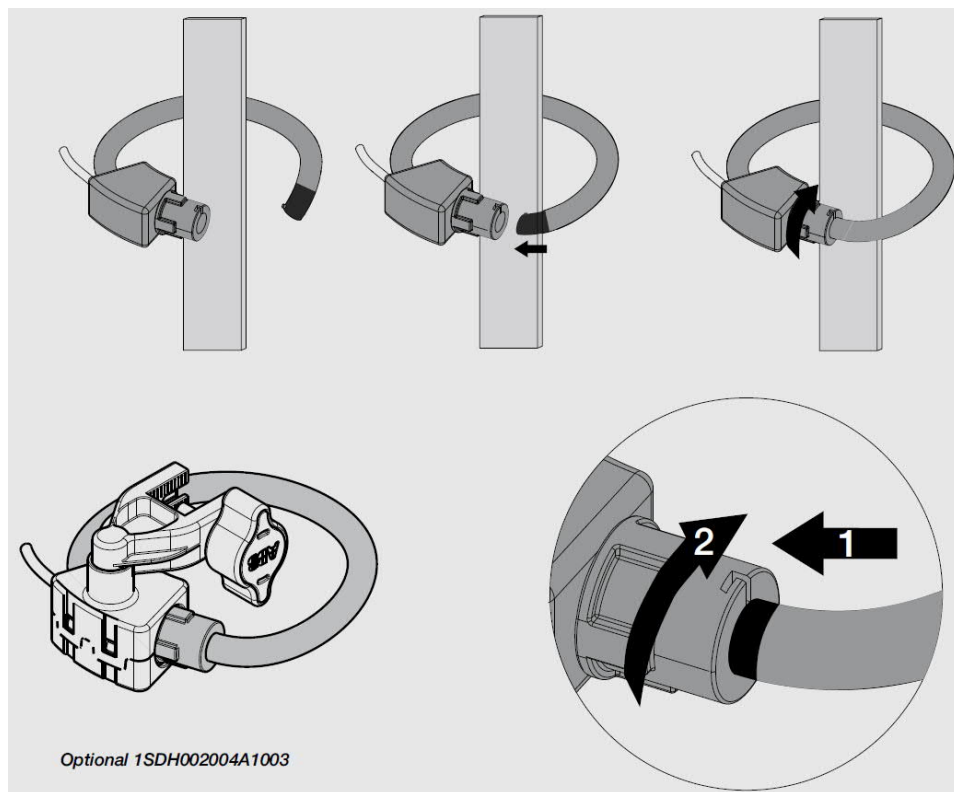
当 E-BOX 工作在 4 极系统时，选择开关 SA 需要拨到 4P 位置，如图片 2 所示。



电气图：



## C 型电流互感器安装指示:



## 5. 运行

### 5.1. 使用 GSM 连接到 EAM

E-BOX 提供了内部 3G/4G GSM 的交换机，可用于向 ABB EAM 平台发布数据。若插入 2G/3G/4G 信号卡或数据卡，交换机会自动识别并连接至网络。

支持波段:

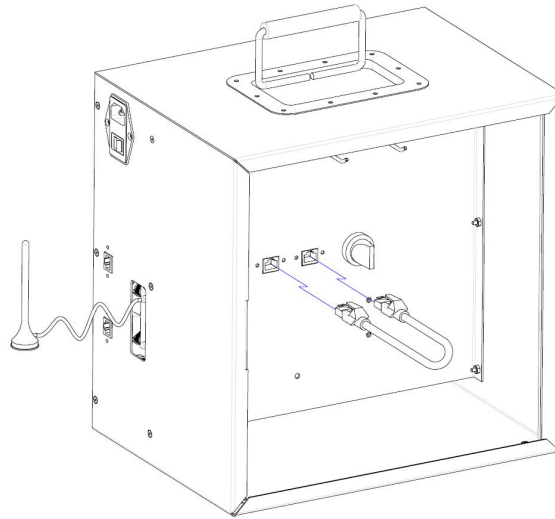
LTE(FDD) 频带	B1/2/3/4/5/7/8/17/20/28
LTE(TDD) 频带	B38/39/40/41
3G 频带	B1/2/5/8
2G 频带	B34/39

交换机携带标准 SIM 卡槽，默认出厂没有 LET 卡片。按压 PUSH 按钮，SIM 卡槽将会自动弹出。



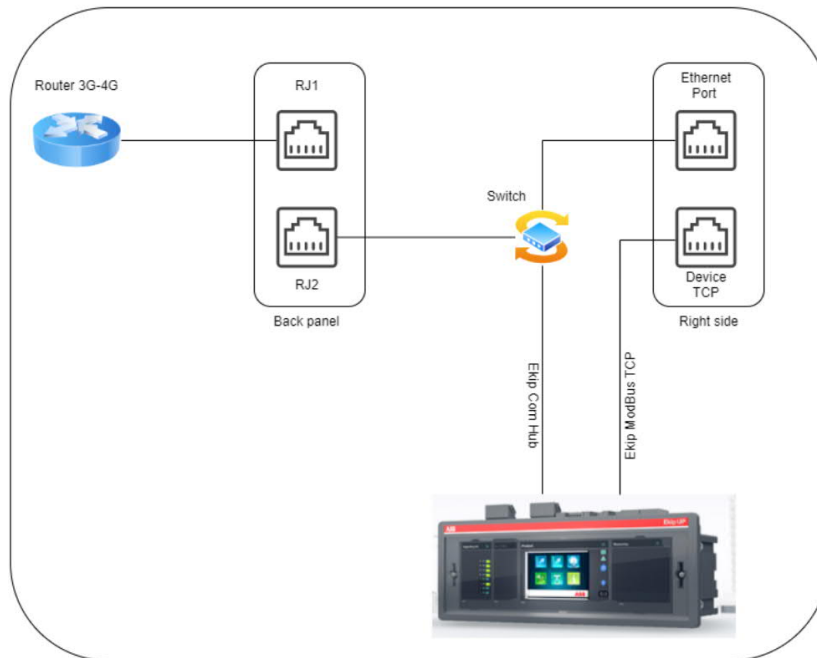
**!** **重要:** 插入 SIM 卡片之前，请断开 E-BOX 电源。

使用 GSM 连接至 EAM 时，还需要使用普通网线短接背部互感器舱内的 RJ1 和 RJ2。



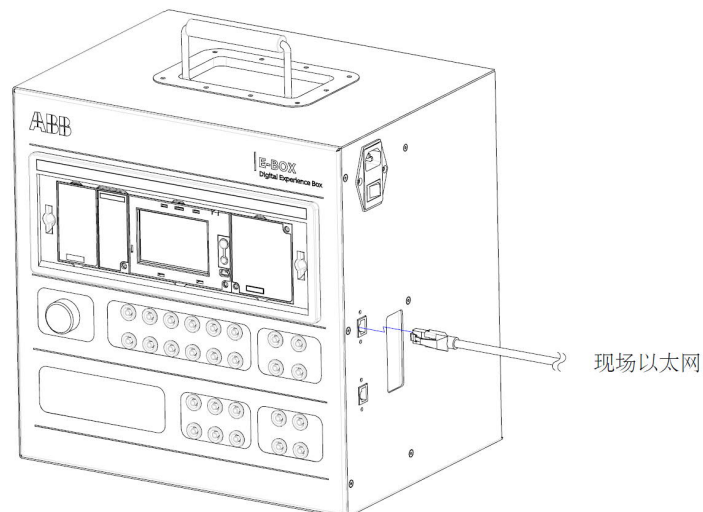
E-Box 内部框图：

### E-Box internal network



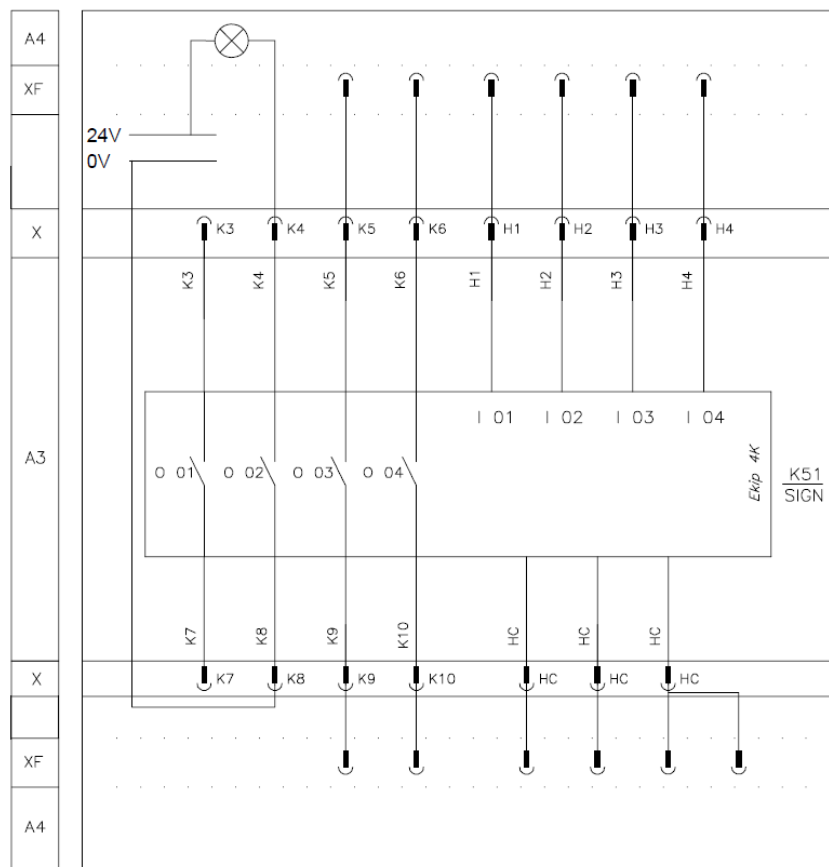
#### 5.2. 使用现场以太网连接 EAM

E-BOX 提供可直接使用现场以太网连接 EAM 平台，RJ1 和 RJ2 不能短接。



### 5.3. 可编程 LED

E-BOX 上的可编程 LED，可提供可编程逻辑来演示 Ekip UP 强大的逻辑输出。需要进一步了解相关信息，请参考 Ekip UP 用户手册 1SDH002003A1002A。



## 6. EAM

### 6.1. 仅限于中国的 EAM 权限转移

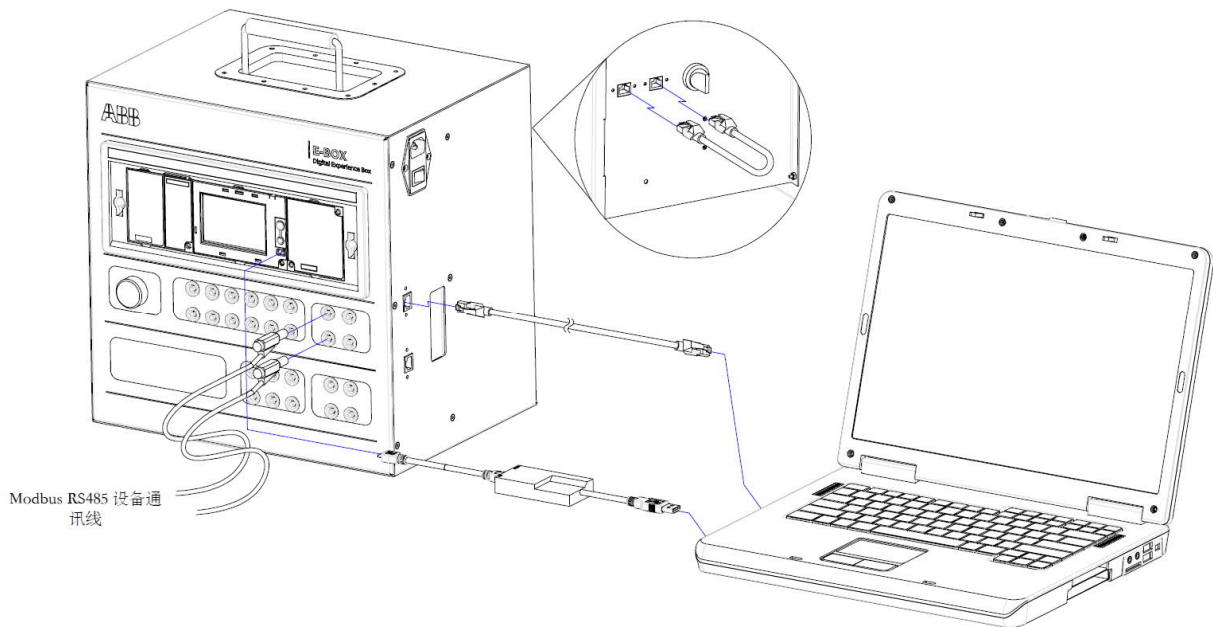
E-BOX 在出厂之前默认完成 EAM 建立，可以免费试用 1 个月。使用 EAM 之前，请邮件联系 [abbebox@126.com](mailto:abbebox@126.com) 并提供一个可使用的邮箱账号，这个邮箱账号将被转移为 EAM 的所有者权限。当接收到 EAM 邀请后，登录邮箱内的邀请地址进入 EAM 界面接收权限。如果有必要请在 EAM 的**配置**界面内移除 [abbebox@126.com](mailto:abbebox@126.com) 界面。

试用期 1 个月到期之后，如果需要继续使用 ABB EAM，欢迎使用 ABB Marketplace（链接：<https://marketplace.ability.abb.com.cn/zh-CN/apps/57081/EAM-->）进行订阅，如若需要帮助，烦请联系 ABB。

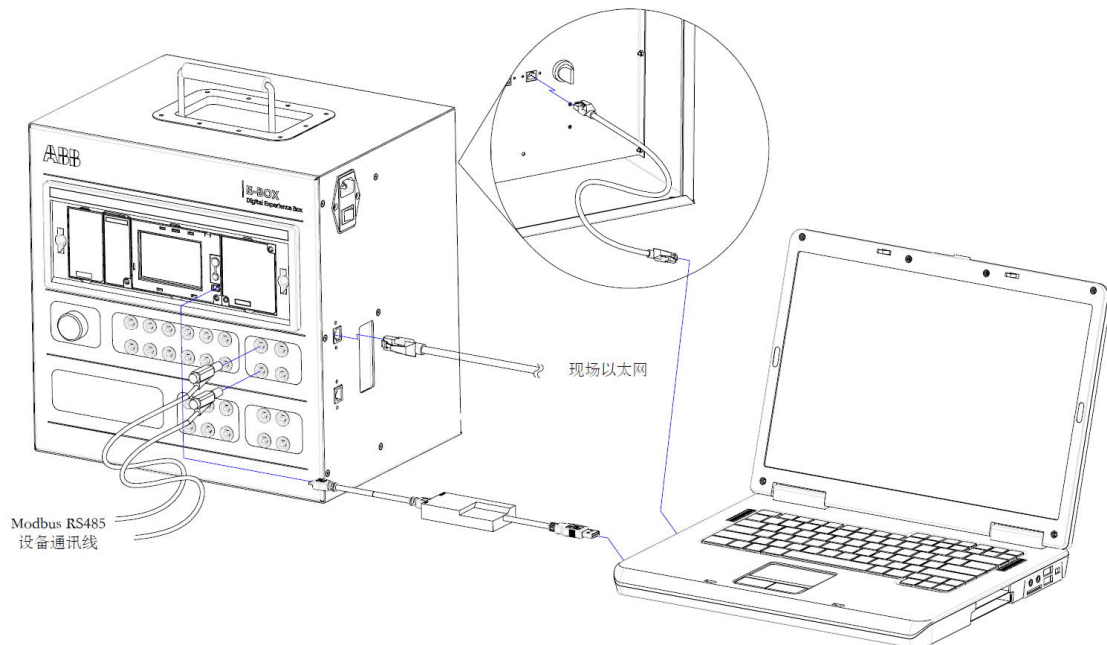
### 6.2. 使用 MODBUS RTU 扩展外部设备到 EAM 平台

E-box 保留了扩展外部设备的 MODBUS RTU 通信端口，可用于寻找外部 RTU 设备并将其添加到 EAM 平台中。

当使用内部 GSM 网关来添加设备到 EAM 时，保持 RJ1 和 RJ2 用普通网络线短接，将网络口连接到电脑，同时将 Ekip T&P 连接到 Ekip UP 前端 USB 端口上。



若需要通过以太网增加和上传数据到 EAM 网络时，需要接入至侧面的以太网口，连接 RJ2 到电脑上，同时将 Ekip T&P 连接到 Ekip UP 前端的 mini USB 接口上。



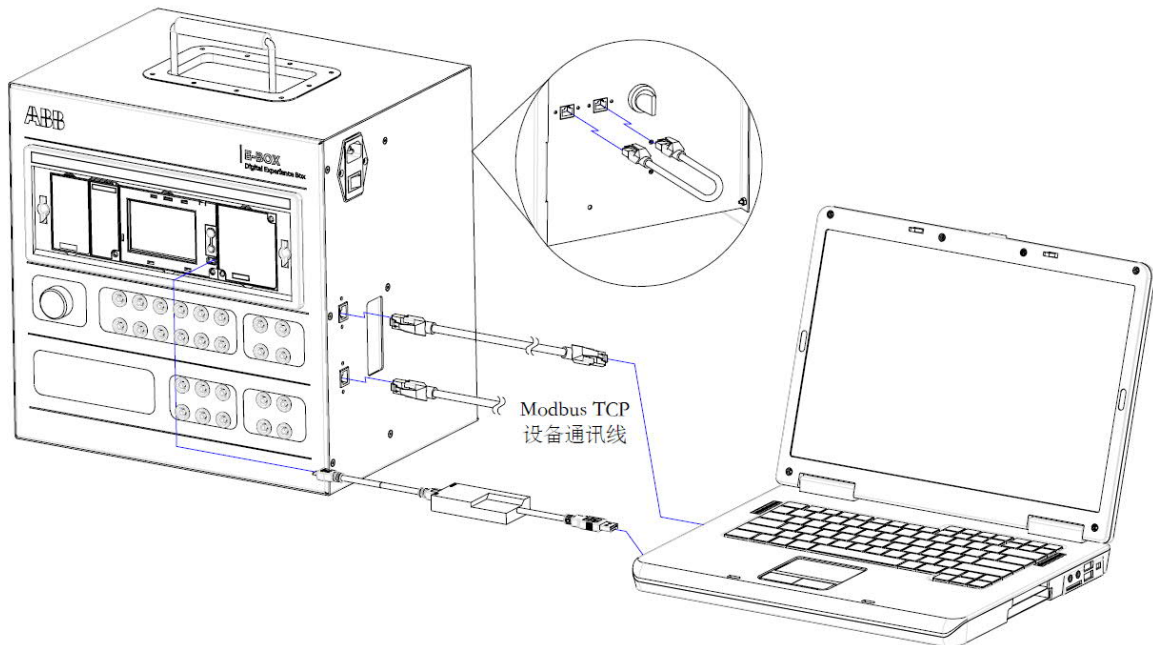
需要更多关于扫描和增加设备到 EAM 的信息，请参考 Ekip UP 使用手册 1SDH002003A1002 和 Ekip COM HUB 入门手册 1SDC200063B0204。

**重要：**扫描设备之前，需要保持电脑的 IP 和 Ekip COM HUB 的 IP 一致。

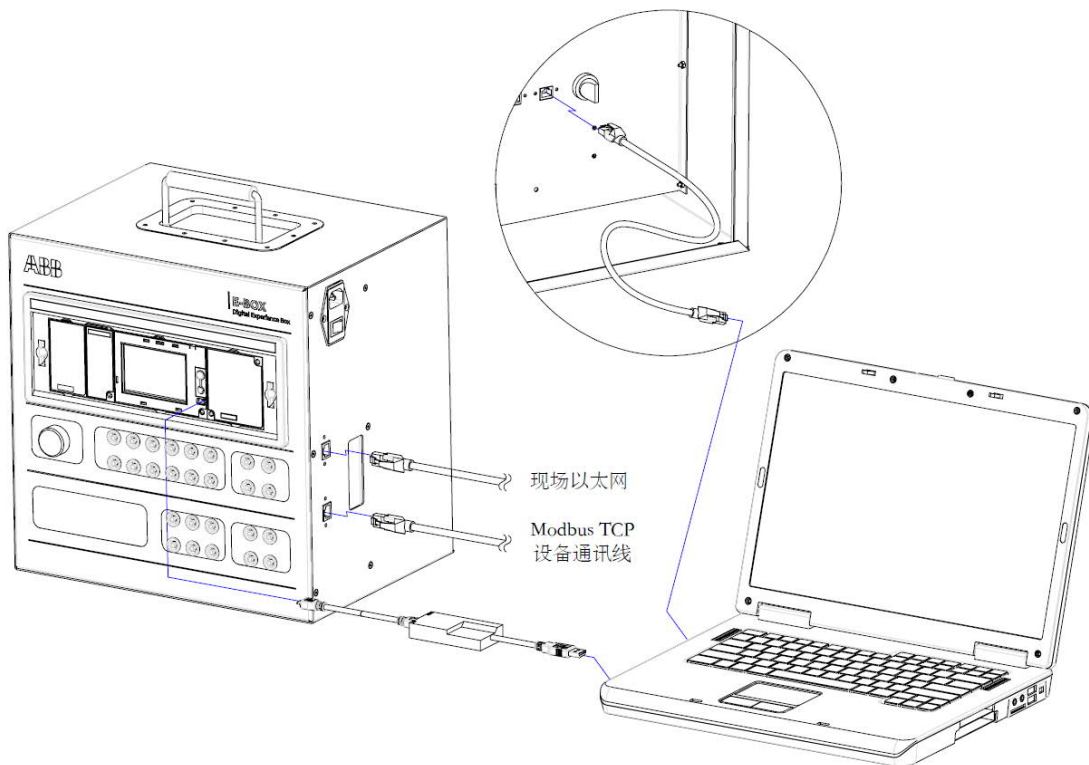
### 6.3. 使用 MODBUS TCP 外扩设备到 EAM 平台

E-box 保留了扩展外部设备的 MODBUS TCP 通信端口，可用于寻找外部 TCP 设备并将其添加到 EAM 平台中。

当使用内部 GSM 网关来添加设备到 EAM 时，保持 RJ1 和 RJ2 用普通网络线短接，将网络口连接到电脑，同时将 Ekip T&P 连接到 Ekip UP 前端 USB 端口上。



若需要通过以太网增加和上传数据到 EAM 网络时，需要接入至侧面的以太网口，连接 RJ2 到电脑上，同时将 Ekip T&P 连接到 Ekip UP 前端的 mini USB 接口上。



需要更多关于扫描和增加设备到 EAM 的信息，请参考 Ekip UP 使用手册 1SDH002003A1002 和 Ekip COM HUB 入门手册 1SDC200063B0204。



**重要：**扫描设备之前，需要保持电脑的 IP 和 Ekip COM HUB 的 IP 一致。