



QUICK START USER MANUAL

Zenith ZTS T-series

For ZTS(D) T-series automatic transfer switches, 30-1200 A, 200-480 Vac



This document is not intended to completely replace document 1SCC303039M0201, ZTS(D) T-series 30-1200 A full-length O&M, which is called out in some cases for further details. This quick start manual is intended to provide the basics of operation, maintenance, and installation for the installer and users.

Receiving, handling and storage

Read these safety instructions carefully before using this product!



Warning

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.



Danger

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

HAZARD OF EQUIPMENT OVERTURNING

When moving with a fork lift, do not remove the shipping packaging until the device is in its final location.

Failure to follow this instruction may result in personal injury or equipment damage.

Receiving and handling

Upon receipt, carefully inspect the transfer switch for damage that may have occurred during transit. If damage is evident, or there is visible indication of rough handling, immediately file a damage claim with the transportation company, and notify your local ABB sales office.

Do not remove the shipping packaging until ready to install the switch.

Storage

If the unit will not be placed into service immediately, store the transfer switch in its original package in a clean, dry location. To prevent condensation, maintain a uniform temperature. Store the unit in a heated building, allowing adequate air circulation and protection from dirt and moisture. Storing the unit outdoors could cause harmful condensation inside the transfer switch enclosure.

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment and follow safe electrical work practices.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Before performing visual inspections, tests, or maintenance on the equipment, disconnect all sources of electric power. Assume that all circuits are live unless they are completely de-energized, tested, grounded, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.
- Disconnect all sources of electric power before removing or making source side or load side connections to the transfer switch.
- Always use a properly rated voltage sensing device at all line and load connections to confirm transfer switch is disconnected from all live electrical sources.
- Turn off power supplying transfer switch before doing any other work on or inside switch.

Failure to follow these instructions could result in death or serious injury.

Quick Start User Manual

Automatic transfer switches,
Zenith ZTS(D) T-series ATS

| | |
|---|-----------|
| Introduction | 4 |
| Hazard Categories | 4 |
| Warranty | 5 |
| General overview | 6 |
| Zenith ZTS(D) T-series 30-1200 A features | 8 |
| Operation | 10 |
| Switching sequence / Automatic | 10 |
| Automatic configuration | 11 |
| Confirm Automatic Operation | 11 |
| Settings (Optional) | 12 |
| I/O Setting Instructions | 14 |
| Operating and locking | 15 |
| Manual handle operation | 16 |
| Return to Automatic mode, operating by HMI | 17 |
| LED functionality in HMI | 18 |
| Using Level 4 /touch) control Interface HMI | 20 |
| Electronic accessories | 21 |
| Troubleshooting | 22 |
| Alarms | 22 |
| Warnings | 24 |
| Technical data | 26 |
| Circuit diagrams | 29 |
| Maintenance | 31 |
| Panel installation | 32 |
| Basic Tools for Installation and Maintenance | 33 |
| Equipment Inspection and Storage | 33 |
| Lifting and Mounting the Panel | 34 |
| Mounting the automatic transfer switch | 35 |
| Mounting hole dimensions | 35 |
| Wire Connection | 36 |
| Final Equipment Inspection | 36 |
| Initial Energizing | 37 |
| Accessories | 38 |
| Auxiliary contact blocks | 38 |
| Auxiliary power supply and Ekip -modules | 40 |
| Replacement Parts | 41 |

Introduction

This manual describes the installation, basic operation, and maintenance of the Zenith ZTS(D) T-series (30-1200 A, 200-480 Vac) automatic transfer switches, manufactured by ABB.

Installation instructions for the transfer switch and available accessories can be found in the O&M Manual 1SCC303039M0201 on pages 9 and 10.

Hazard Categories

The following important highlighted information appears throughout this document to warn of potential hazards or to call attention to information that clarifies a procedure.

Carefully read all instructions and become familiar with the devices before trying to install, operate, service or maintain this equipment.

**Danger**

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

**Warning**

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

**Caution**

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. Failure to comply with these instructions may result in product damage.

**Notice**

It is used to notify of practices not related to personal injury. Failure to comply with these instructions may result in product damage.

Warranty

This document is based on information available at the time of its publication. While efforts have been made to ensure accuracy, the information contained herein does not cover all details or variations in hardware and software, nor does it provide for every possible contingency in connection with installation, operation, and maintenance. Features may be described herein that are not present in all hardware and software systems.

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Contact your local sales office if further information is required concerning any aspect of the automatic transfer switch operation or maintenance.

Warranty Period

The Warranty Period for ZTS(D) T-series transfer switch products is twenty-four (24) months from the date of shipment.

Notes: This warranty is valid only in the United States and for products sold and installed within seller-specified countries.

Replacement parts are warranted for a period of 90 days when installed by a factory or an authorized service station.

Contact Service team at: +1 800 637 1738 or epis.pqservice@abb.com for 24-hour support.

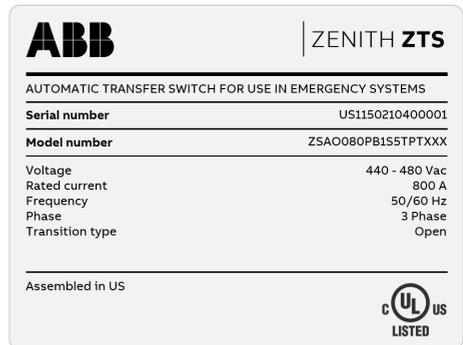


Fig. 1 Sample nameplate

Product Rating / Applicable Standards

For UL 1008 'withstand' and 'close on short circuit' ratings, refer to ABB publication number 1SCC303020C0201.

General overview

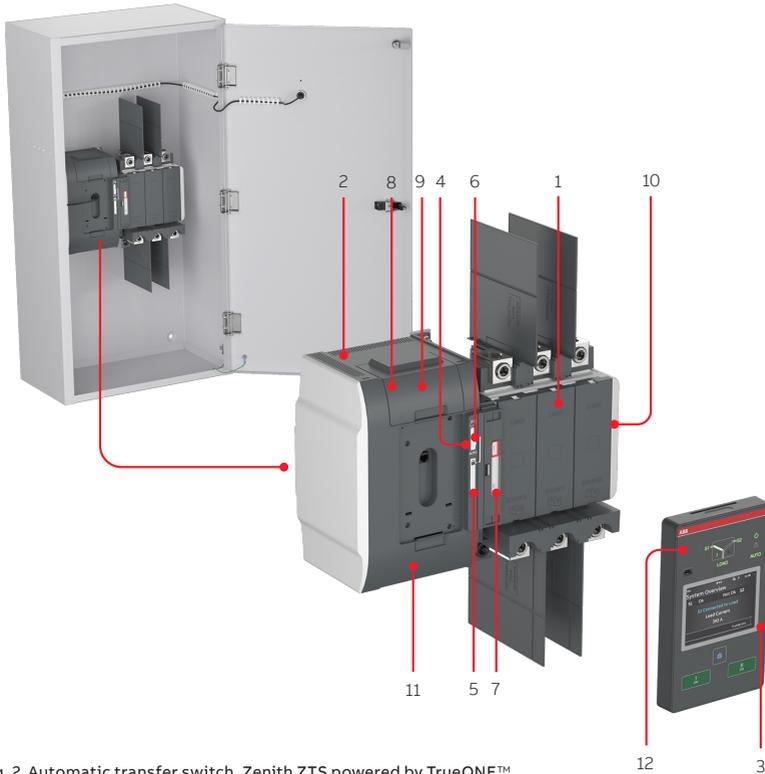


Fig. 2 Automatic transfer switch, Zenith ZTS powered by TrueONE™

- 1 Automatic transfer switch
- 2 Embedded ATS control unit and mechanism
- 3 Level 4 HMI unit, ZTS T-series color touchscreen LCD
- 4 Slide switch (Hand - Locking - AUTO) for selection of the operation mode
- 5 Padlocking the automatic transfer switch to prevent automatic and manual operation
- 6 Handle for manual operation
- 7 Position indication
- 8 Terminals for control circuit connections (behind the cover)
- 9 Place for connectivity modules (aux power supply, com and signaling)
- 10 Place for auxiliary contact block
- 11 Location of product identification label
- 12 Programming port, only for Ekip Programming module and Ekip Connect software

Operational types

In this table you can find the differences of the automatic transfer switch open and delayed transition operation types. Due to the different transition types, there are variances with HMI and on wiring of I/O contacts.

HMI

The HMI is the control interface (Human Machine Interface) of the ATS. Zenith ZTS T-series has a color touch screen LCD HMI with push buttons. The HMI is used for configuring parameters for automatic operation.

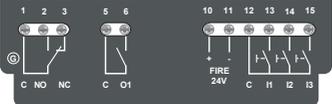
| Operation types, ZTS T-series ATS | | Ekip-modules suitable |
|---|---|--|
| Delayed transition, ZTSD | Open transition, ZTS | |
| <p>S1 I O II S2</p>  <p>Load</p> | <p>S1 I II S2</p>  <p>Load</p> | |
| ZTS T-series HMI (with touch screen) and connections of control circuit | | |
|  |  | <p>Suitable</p>  |
|  |  | |
|  |  | |

Table 1 The differences of level types / operation types and the suitability of Ekip-modules

Zenith ZTS(D) T-series 30-1200A features

| Feature comparison | ZTS(D) controls (Touch screen) |
|---|--------------------------------|
| Ampere sizes available | UL: 30-1200 A |
| Rated voltage | 200-480 Vac |
| Rated frequency | 50 / 60 Hz |
| Phase system | Single and Three |
| Number of poles | 3 and 4 |
| Neutral configuration | |
| Switched | Yes |
| Product type | |
| Open transition (I-II) | Yes |
| Delayed transition (I - O - II or II - O - I) | Yes |
| Voltage and frequency settings | |
| Pick up SOURCE 1 Voltage | 71-99 %, 101-119 % |
| Drop out SOURCE 1 Voltage | 70-98 %, 102-120 % |
| Pick up SOURCE 2 Voltage | 71-99 %, 101-119 % |
| Drop out SOURCE 2 Voltage | 70-98 %, 102-120 % |
| Pick up SOURCE 1 Frequency | 80.5-99.5 %, 100.5-119.5 % |
| Drop out SOURCE 1 Frequency | 80-99 %, 101-120 % |
| Pick up SOURCE 2 Frequency | 80.5-99.5 %, 100.5-119.5 % |
| Drop out SOURCE 2 Frequency | 80-99 %, 101-120 % |
| Time delay settings | |
| Override momentary SOURCE 1 Outage, sec | 0-60 |
| Transfer from SOURCE 1 to SOURCE 2, sec | 0-3600 |
| Override momentary SOURCE 2 Outage, sec | 0-60 |
| Transfer from SOURCE 2 to SOURCE 1, min | 0-120 |
| Generator stop delay, min | 0-60 |
| Center-OFF delay, sec | 0-300 |
| Pre-transfer delay S1 to S2, sec | 0-300 |
| Post-transfer delay S1 to S2 , sec | 0-300 |
| Pre-transfer delay S2 to S1, sec | 0-300 |
| Post-transfer delay S2 to S1, sec | 0-300 |
| Elevator Pre-signal delay S1 to S2, sec | 0-60 |
| Elevator Post-signal delay S1 to S2, sec | 0-60 |
| Elevator Pre-signal delay S2 to S1, sec | 0-60 |
| Elevator Post-signal delay S2 to S1, sec | 0-60 |
| Load shed delay, sec | 0-60 |
| Source failure detections | |
| No voltage | Yes |
| Undervoltage | Yes |
| Overvoltage | Yes |
| Phase missing | Yes |
| Voltage unbalance | Yes |

| Feature comparison | ZTS(D) controls (Touch screen) |
|--|---------------------------------------|
| Invalid frequency | Yes |
| Incorrect phase sequence | Yes |
| Features | |
| Controls | Touch + keys |
| LED indications for ATS, S1 and S2 status | Yes |
| Open transition - Standard digital inputs/outputs | 2 / 1 |
| Delayed transition - Standard digital inputs/outputs | 3 / 1 |
| Programmable digital inputs/outputs | Yes |
| Auto config (voltage, frequency, phase system) | Yes |
| Auto config (voltage frequency, phase system) | Yes |
| Source priority | SOURCE 1/2, No priority |
| Manual re-transfer | Yes |
| In-phase monitor | Yes |
| Genset exercising: on-load, off-load | Yes |
| In-built power meter module | Yes |
| Load shedding | Yes |
| Real time clock | Yes |
| Event log | Yes |
| Predictive maintenance | Yes |
| Harmonics measuring | Voltage, current |
| Field-mount accessories | |
| Auxiliary contacts for position indication | Yes |
| Digital input/output modules | Yes |
| 12-24 Vdc aux supply module for controller | Yes |
| Communication modules | Yes |
| Connectivity | |
| Modbus RS485 | Yes |
| Modbus/TCP | Yes |
| Profibus DP | Yes |
| ProfiNet | Yes |
| DeviceNet | Yes |
| Ethernet IP | Yes |
| Ekip Com Hub (monitoring via ABB Ability™: EDCS) | Yes |
| Enclosures | |
| Type 1, 3R, 4, 12, and 4X | Yes |
| For applications | |
| Mains - Mains | Yes |
| Mains - Generator ¹⁾ | Yes |

¹⁾ Contact ABB for applications with smaller than 20 KVA gensets.

Table 2 ATS features not limited to what is in the table above

Operation

Switching sequence / Automatic

SOURCE1 Priority (SOURCE2 = Generator)

The switching sequence can be summarized in the following steps:

1. An anomaly occurs on SOURCE 1
2. Override momentary S1 outage delay
3. Generator start
4. SOURCE 2 OK
5. Transfer from S1 to S2 delay
6. Pre-transfer signal on
7. Load shed signal on
8. Pre-transfer S1 to S2 delay
9. Load shed delay
10. Transfer switch (SOURCE 1) to position O
11. Center-off delay (only with Delayed transition I - O - II type)
12. Transfer switch (SOURCE 2) to position II
13. Post-transfer S1 to S2 delay
14. Pre-transfer signal off

The re-transfer sequence can be summarized in the following steps:

1. SOURCE 1 is restored
2. Transfer from S2 to S1 delay
3. Pre-transfer signal on
4. Pre-transfer S2 to S1 delay
5. Transfer switch (SOURCE 2) to position O
6. Center-off delay (only with Delayed transition I - O - II type)
7. Transfer switch (SOURCE 1) to position I
8. Load shed signal off
9. Generator stop delay
10. Post-transfer S2 to S1 delay
11. Pre-transfer signal off
12. Generator stop
13. SOURCE 2 off

SOURCE2 Priority (No generator)

The switching sequence can be summarized in the following steps:

1. An anomaly occurs on SOURCE 2
2. Override momentary S2 outage delay
3. Transfer from S2 to S1 delay
4. Pre-transfer signal on
5. Load shed signal on
6. Pre-transfer S2 to S1 delay
7. Load shed delay
8. Transfer switch (SOURCE 2) to position O
9. Center-off delay (only with Delayed transition I - O - II type)
10. Transfer switch (SOURCE 1) to position I
11. Post-transfer S2 to S1 delay
12. Pre-transfer signal off

The re-transfer sequence can be summarized in the following steps:

1. SOURCE 2 is restored
2. Transfer from S1 to S2 delay
3. Pre-transfer signal on
4. Pre-transfer S1 to S2 delay
5. Transfer switch (SOURCE 1) to position O
6. Center-off delay (only with Delayed transition I - O - II type)
7. Transfer switch (SOURCE 2) to position I
8. Load shed signal off
9. Post-transfer S1 to S2 delay
10. Pre-transfer signal off

Automatic configuration

Auto configure is the first step to take after the panel is initially energized. This function recognizes the electrical system, then automatically sets all the system parameters: system voltage, frequency, and phase sequence.

Follow the steps in the figure on the HMI to run auto configure. The ATS must have at least one source available to complete this step.

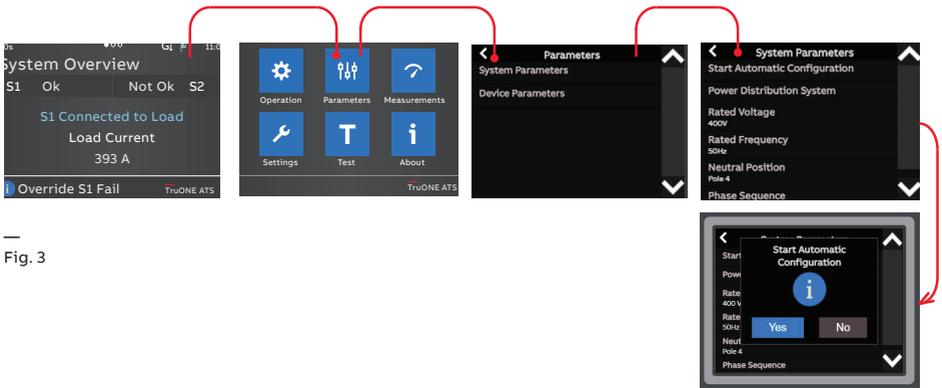


Fig. 3

Confirm Automatic Operation

To put your ATS into Auto mode, confirm the slide switch is in "AUTO" before the enclosure door is closed. This slide switch overrides the Auto/Manual mode set from the HMI. To place the ATS controller in AUTO mode through HMI screen, set "Automatic mode" to "ON" in the operations menu.

Confirm the ATS is in Auto mode by validating that the "AUTO" LED above and to the right of the LCD screen is solid green.



Fig. 4

Settings (Optional)

| Time delays | Default Value | Possible range |
|--|---------------------------------|-------------------|
| Override momentary outage (separate for S1 and S2) | 2 s | 0-60 s |
| Transfer from S1 to S2 (separate for S2 to S1) | 2 s | 0-3600 s |
| Center-off delay | 0 s | 0-300 s |
| Generator stop | 0 s | 0-60 min |
| Set points | | |
| Voltage and frequency drop-out | ±15% of nominal | ±20% of nominal |
| Voltage and frequency pick-up | ±14% of nominal | ±19.5% of nominal |
| In-phase Monitor | On | Off, On |
| Manual Retransfer | Off | Off, On |
| Commit Transfer | Off | Off, On |
| Application | S1-Transformer/ S2-Generator | See manual |

Table 3

Settings can be changed via the HMI as shown in Figure 5 and 6. See section 4 of the ZTS(D) O&M for further detail. A password is required to change parameters; the default password is 00001. Alternatively, settings can be changed with Ekip Connect 3 software using Ekip Programming module.

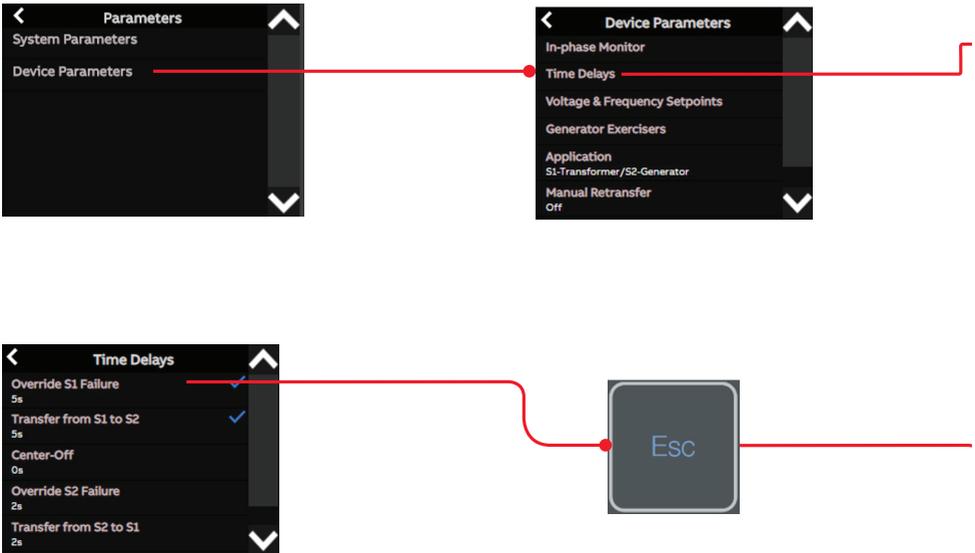


Fig. 5

If the standard I/O or any com modules such as Ekip 2k Signaling I/O must be programmed, these can be set in the same manner, by following the appropriate path below from the main menu.

Settings>Standard I/O Settings or Settings>Modules

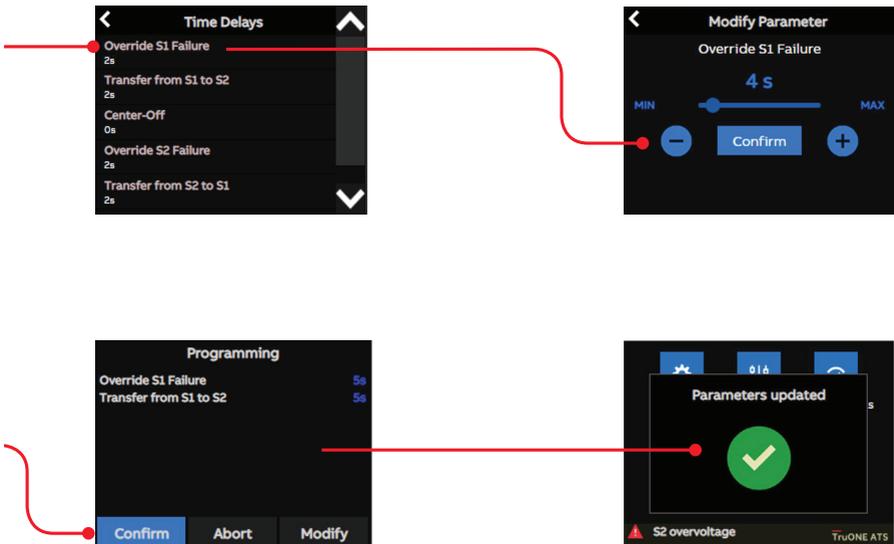
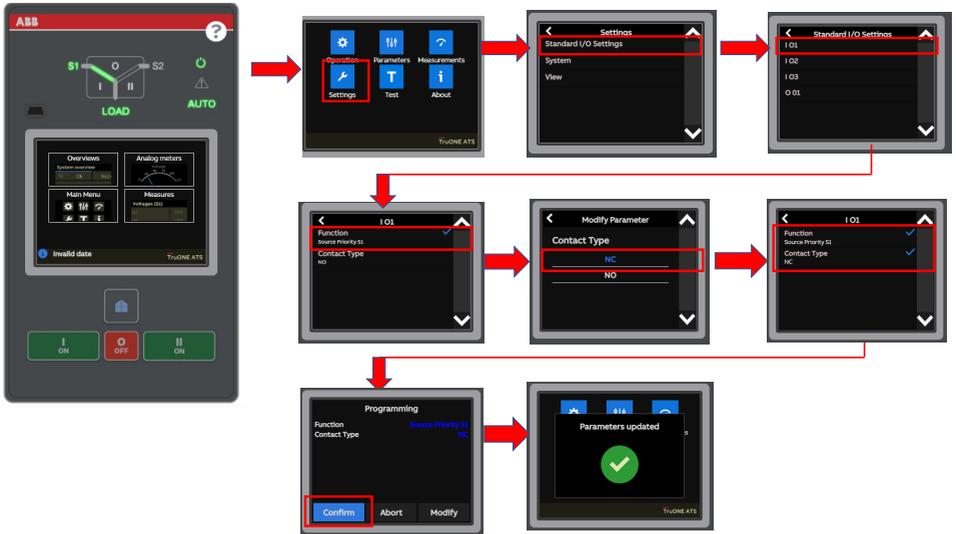


Fig. 6

I/O Setting Instructions



Operating and locking

The operation mode is selected by using the slide switch (Hand - Locking - AUTO) located on the front of the automatic transfer switch (ATS).

- **Hand**-position = **Manual mode**, enabling emergency manual operation using the handle. ATS functionality is disabled when in Hand position.
- **Lock**-position = **Locking mode**, padlocking the automatic transfer switch in a specific position to prevent automatic and manual operation.



Notice

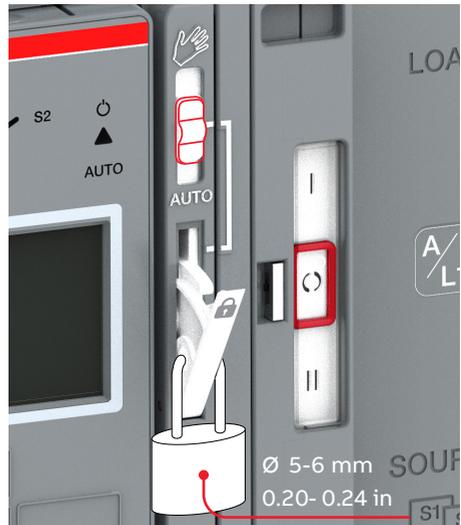
The handle has to be in its stored position (not in use), after which the slide switch will move to the Locking mode automatically and the switch is allowed to be padlocked. To set the operating handle back to its place, refer to the left most picture in Fig. 3.6.

- **AUTO**-position = **Automatic control mode enabled**, ATS is operable in Automatic mode or from the HMI manual control keys. When the slide switch is moved to the AUTO position, the ATS is functioning immediately in the automatic control mode.



Manual mode

Automatic mode



Locking mode

Fig. 7 Above the selection of the operation modes (Manual or Automatic) by the slide switch. Below padlocking the automatic transfer switch; The handle has to set standby slot (not in use), after that the slide switch will move to the Locking mode automatically and the switch is allowed to be padlocked.

Manual handle operation



Warning

Verify the condition of power source prior to manually transferring. Manual operation may result in out-of-phase transfer when both sources are energized.

To mount the handle in the operating position, turn the slide switch to the Manual mode (Hand), lift the handle from its place inside and place it to the operating position.

More information, see animation: Manual and automatic operation - TruONE™ ATS (<https://youtu.be/bosvSPVi2sM>).



Manual mode

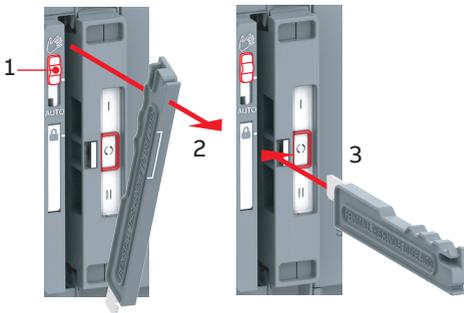
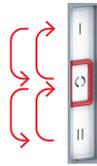


Fig. 8 Mounting of the handle in the operating position



ZTSD: I - O - II

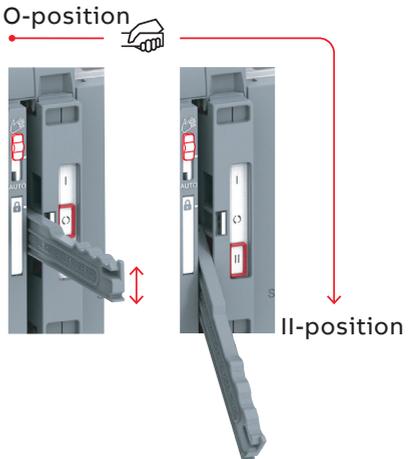
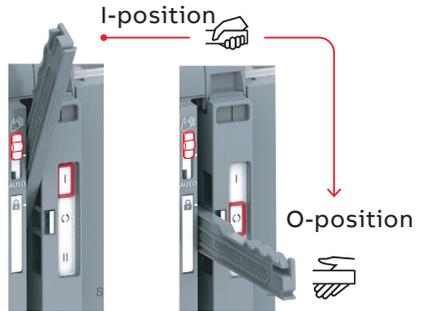


Fig. 9 Manual mode, operating by handle, delayed transition I - O - II. You have to stop and release (= take the hand off) the handle in O-position when moving from position I to II (or from position II to I)

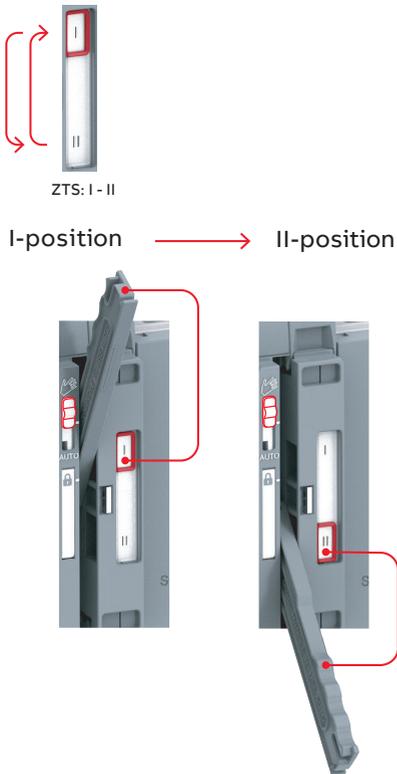


Fig. 10 Manual mode, operating by handle, open transition I - II

Return to Automatic mode, operating by HMI

When operating the automatic transfer switch by HMI, turn the slide switch to Automatic mode (AUTO). Remark! The handle has to be standby slot (not in use) before turning to automatic mode.



Notice

When the slide switch is moved to the AUTO position, the ATS will enter auto mode after a 3 second delay.

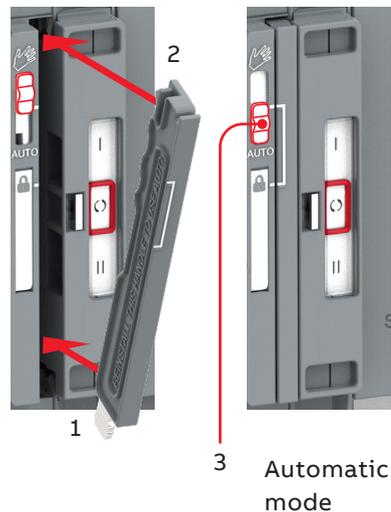
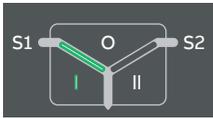


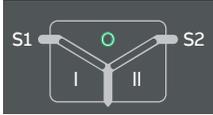
Fig. 11 The operating handle must set back to standby slot before moving to the automatic mode

I, II and O leds



ON, fixed light 

Switch position is indicated with fixed light in I, O or II led. Only one can be on simultaneously



Flash/1 s, 50 %/50 % 

Delay ongoing. Going to move away from the blinking status



Load led



ON 

Supply ok and connected to load

OFF 

Not connected to load

Auto led



ON, fixed light 

Switch is in automatic mode

Flash/1 s, 50 %/50 % 

Test on load

Flash/1 s, 90 %/10 % 

Test off load

Flash/1 s, 10 %/90 % 

If blinks simultaneously with Alarm led then 'Remote control to S1', 'Remote control to S2', 'Remote control to OFF' or 'Inhibit transfer' digital input is activated.

5 flashes/1 s, 50 %/50 % 

Autoconfig completed

Alarm led



OFF 

No alarms

ON, fixed light 

Handle attached, locked, other alarm

2 quick flashes/1s 

Control Alarm

5 flashes/1 s, 50 %/50 % 

Auto configuration ongoing

Flash/1 s, 50 %/50 % 

Control Retry

Flash/1 s, 10 %/90 % 

Auto mode off

Flash/1 s, 10 %/90 % 

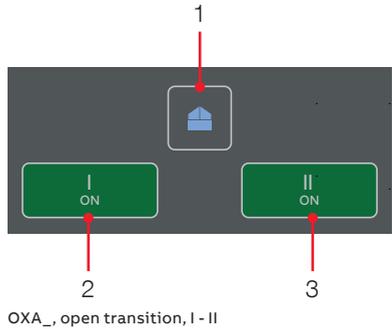
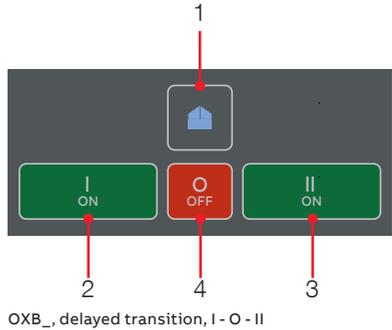
If blinks simultaneously with Alarm led then 'Remote control to S1', 'Remote control to S2', 'Remote control to OFF' or 'Inhibit transfer' digital input is activated. If Auto led is fixed light then manual retransfer is required.

Table 4 LED functionality

Using Level 4 (touch) control interface HMI

Keypad

- 1 **Home Button:** Opens up the root menu or brings user to the homepage if defined. While viewing a specific page, it can be defined as the home page by pressing the home button for 3 seconds. All pages, except for the menus, can be set as home page. Home page is automatically shown after inactivity.
- 2 **I ON:** Operate switch to I position.
- 3 **II ON:** Operate switch to II position.
- 4 **O OFF:** Operate switch to O position and disable automatic control mode (only in delayed transition I-O-II type).



Navigating menu

Menus and parameters- Refer detailed catalog.



1SCC303039M0201

Fig.13 Keypad in Level 4 HMI with touch screen

Electronic accessories



Warning

Hazardous voltage may be present within the panel when connecting electronic accessories. Remove all sources of power to the ATS panel before connecting Ekip modules.

Ekip Connect Software and Bluetooth and Programming -modules are suitable for all ZTS(D) 30-1200 A, 200-480 Vac automatic transfer switches, refer to chapters 5.1-5.3. in O&M Manual 1SCC303039M0201 for more details on:

- Ekip Connect -software
- Ekip Programming -module

Ekip Signalling and Com modules are suitable for all ZTS(D) 30-1200 A, 200-480 Vac automatic transfer switches. These modules are mounted with auxiliary power supply module, OXE1 (refer to page 36 for further details).

For details on usage of electronic accessories and Ekip connect software, refer detailed catalog.

Ekip-modules mounted with auxiliary power supply module are (see chapters 5.4-5.8 in O&M Manual 1SCC303039M0201).

- Ekip Signalling 2K-_
- Ekip Com modules
- Ekip Com Modbus RTU
- Ekip Com Profibus DP
- Ekip Com DeviceNet
- Ekip Com Modbus TCP
- Ekip Com Profinet
- Ekip Com EtherNet/IP
- Ekip Link

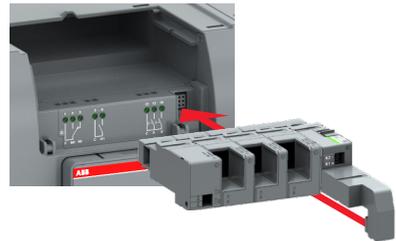


Fig. 14 Ekip Signalling, Com and Link -modules are mounted to automatic transfer switch OX_ with a auxiliary power supply module, OXE1

Troubleshooting



Warning

Any troubleshooting should be conducted by trained and authorized personnel only. Appropriate personal protective equipment (PPE) shall be used when troubleshooting the ATS panel. Hazardous voltage may be present. Disconnect all power sources before performing work inside the ATS panel. Failure to do so may result in serious injury or death.

Alarms



LCD



Touch

| Message | Fault | Action |
|---------------------------------------|---|---|
| Locked, Alarm LED on | Lock input activated | Unlock |
| Switch not in AUTO mode, Alarm LED on | Slide switch is in handle or lock position | Turn slide switch into the AUTO position |
| Phases crossed | Phase rotation of sources 1 and 2 are different | Connect the phases of both sources in the same order |
| S1 undervoltage | Voltage of source 1 is under the threshold level set in parameter "Drop-out voltage, lower threshold" | Check the correlation between power source and device configuration |
| S1 overvoltage | Voltage of source 1 is over the threshold level set in parameter "Drop-out voltage, upper threshold" | Check the correlation between power source and device configuration |
| S1 phase missing | One or two phases of source 1 are missing | Check the power source and connections |
| S1 unbalance | Phases of source 1 are not symmetric | Check the power source |
| S1 phase rotation | Phase rotation of source 1 is different from the value of parameter "Phase sequence" | Connect the phases according to the configuration |
| S1 invalid frequency | Frequency of source 1 is out of range set in parameters "Drop-out frequency, upper threshold" and "Drop-out frequency, lower threshold" | Check the correlation between power source and device configuration |
| S2 undervoltage | Voltage of source 2 is under the threshold level set in parameter "Drop-out voltage, lower threshold" | Check the correlation between power source and device configuration |
| S2 overvoltage | Voltage of source 2 is over the threshold level set in parameter "Drop-out voltage, upper threshold" | Check the correlation between power source and device configuration |
| S2 phase missing | One or two phases of source 2 are missing | Check the power source and connections |

Table 5 Alarms-list in level 3 and 4, LCD and touch control interfaces

| Message | Fault | Action |
|--------------------------------------|---|--|
| S2 unbalance | Phases of source 2 are not symmetric | Check the power source |
| S2 phase rotation | Phase rotation of source 2 is different from the value of parameter "Phase sequence" | Connect the phases according to the configuration |
| S2 invalid frequency | Frequency of source 2 is out of range set in parameters "Drop-out frequency, upper threshold" and "Drop-out frequency, lower threshold" | Check the correlation between power source and device configuration |
| Frequency Difference | Frequency difference of voltage sources is greater than 3 Hz while in-phase monitor is on | Alarm is active and transfer operations disabled as long as the frequency difference is above the accepted level |
| High current alarm | Measured current is higher than ten times the nominal value | Alarm is active and transfer operations disabled as long as the high current status remains |
| Open I failure, Alarm LED blinking | Switch transfer from position I to O or II failed | Reset alarm by pressing Auto button or via menu page Operation / Alarm Reset |
| Close I failure, Alarm LED blinking | Switch transfer to position I failed | Reset alarm by pressing Auto button or via menu page Operation / Alarm Reset |
| Open II failure, Alarm LED blinking | Switch transfer from position II to O or I failed | Reset alarm by pressing Auto button or via menu page Operation / Alarm Reset |
| Close II failure, Alarm LED blinking | Switch transfer to position II failed | Reset alarm by pressing Auto button or via menu page Operation / Alarm Reset |
| Switch position alarm, Alarm LED on | More than one switch position indication inputs are activated | Switch service needed |
| Pole temperature alarm | Measured pole temperature is too high | Switch service needed |
| Contact wear alarm | Switch contact wear is near the limit that requires maintenance | Switch service needed |
| Ekip Com Hub Alarm | Ekip Com Hub failure | Check configuration |
| HMI Not Compatible | Firmware versions of HMI and device are not compatible to be used together | Check current versions and update compatible versions |
| Local bus | Communication between HMI and switch controller is off | Check connection |
| Ethernet disconnected | Ethernet module not connected | Check connection |
| Fire Fighting | Fire fighting input activated | Alarm is active and disables transfer operations as long as the input is active |
| Control Voltage Failure | Control voltage dropped during switch control | Check power source |
| Control Voltage Low | Switch control voltage is below the minimum | Check power source |
| Configuration Error | Invalid configuration | Check parameter values |
| IEC 61850 Error | IEC 61850 failure | Check configuration file |
| Ekip Com Hub Alarm | Ekip Com Hub failure | Check configuration |
| HMI Not Compatible | Firmware versions of HMI and device are not compatible to be used together | Check current versions and update compatible versions |

Table 6 Alarms-list in level 3 and 4, LCD and touch control interfaces

Warnings



LCD



Touch

| Message | Reason |
|--------------------------|--|
| S1 and S2 not in sync | Voltage sources are not synchronized |
| Voltage Not Calibrated | Calibration data in power module is invalid or unavailable |
| Current Not Calibrated | Calibration data in current measurement module is invalid or unavailable |
| Pole temperature warning | Measured pole temperature is near the alarm level |
| Control Retry | Failed transfer sequence retry activated |
| Auto Control Disabled | Device is in manual operating mode |
| Local Bus | Module heartbeat error. Check connection. Can be cleared using "Alarm Reset". |
| Configuration | Configuration session ports are open |
| Clock capacitor charging | Real time clock is not yet operational, date & time setting is disabled as long as this warning is active. Clock capacitor is charged from source voltage (not AUX) and takes about 10 minutes |

Table 7 Warnings-list in level 3 and 4, LCD and touch control interfaces



LCD



Touch

| Message | Description |
|----------------------------|-----------------------------------|
| Invalid Date | Date not set |
| Test on Load | Test on load sequence active |
| Test off Load | Test off load sequence active |
| Alarm/Product Availability | Digital output function activated |
| In Position I | Digital output function activated |
| In Position O | Digital output function activated |
| In Position II | Digital output function activated |
| Pre-transfer Signal 1 | Digital output function activated |
| Pre-transfer Signal 2 | Digital output function activated |
| Pre-transfer Signal 3 | Digital output function activated |
| Pre-transfer Signal 4 | Digital output function activated |
| Source 1 Available | Digital output function activated |
| Source 2 Available | Digital output function activated |
| Load Shed | Digital output function activated |
| Emergency Stop | Digital input function activated |
| Remote Test on Load | Digital input function activated |
| Remote Test off Load | Digital input function activated |
| Inhibit ATS | Digital input function activated |
| Manual Retransfer | Digital input function activated |
| Priority S1 | Digital input function activated |
| Priority S2 | Digital input function activated |
| Inhibit Transfer | Digital input function activated |
| Bypass Running Delays | Digital input function activated |
| Remote Control to S1 | Digital input function activated |
| Remote Control to Off | Digital input function activated |
| Remote Control to S2 | Digital input function activated |
| Alarm Reset | Digital input function activated |
| Manual-Auto Mode | Digital input function activated |

Table 8 Info statements in level 3 and 4, LCD and touch control interfaces

Technical data

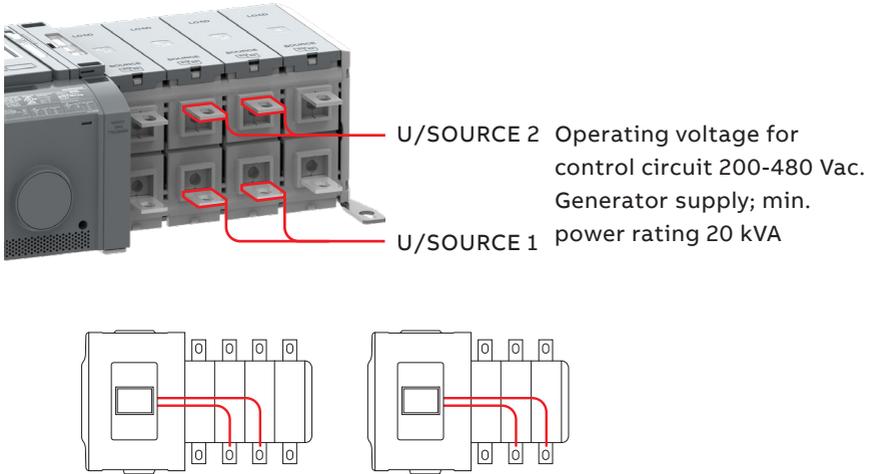
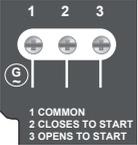
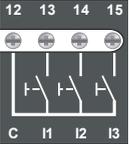


Fig. 15 Power supply for control and power switching circuits

| Automatic transfer switch, power circuit | | Value | |
|--|--|---------------|-------------------------|
| Rated operational voltage | | 200-480 Vac | |
| Rated frequency | | 50 / 60 Hz | |
| Rated impulse withstand voltage | | 12 / 8 kV | |
| Operating times | | See Table 7.3 | |
| Automatic transfer switch, control circuit | | Value | Remark |
| Voltage supply | | 200-480 Vac | Integrated, see Fig. 15 |
| Operating voltage range | | ±20 % | |
| Voltage measurement accuracy | | 1 % | |
| Rated frequency | | 50 / 60 Hz | |
| Operating frequency range | | ±20 % | |
| Frequency measurement accuracy | | 0.5 % | |
| Rated impulse withstand voltage | | 6 kV | |

| Automatic transfer switch, I/O contacts | | Cabling | Rating / Remark |
|--|--|--|--|
| Generator start/stop | Cable size: | 0.5...2.5 mm ² 24...14(12) AWG | Stripping length; 6,5 mm, 0,255" |
|  | Common, voltage supply | 1 | 5 A@250 Vac (AC-1), 5 A@30 Vdc |
| | Generator start/stop NO | 2 | |
| | Generator start/stop NC | 3 | |
| Output relay features | Cable size: | 0.5...2.5 mm ² 24...14(12) AWG | |
| Common, voltage supply | | 5 | 5 A@250 Vac (AC-1), 5 A@30 Vdc |
|  | Programmable output (default; Alarm/Product available) | 6 | |
| Fire Fighting applications | Cable size: | 0.5...2.5 mm ² 24...14(12) AWG | Only in ZTSD-types, delayed transition, I – O – II or II – O – I |
|  | Fire fighting input 24 Vdc (+) | 10 | SELV |
| | Fire fighting input 24 Vdc (-) | 11 | Transfers to O/OFF position, locks the logic and signals alarm |
| Input contact features | Cable size: | 0.5...2.5 mm ² 24...14(12) AWG | Do not connect to any power supply |
| Common input | | 12 | 24 Vdc 5 mA |
|  | Level 4 | | Level 4 = HMI with touch screen |
| | Programmable input (default; Emergency stop) | 13 | |
| | Programmable input (default; Remote test on load) | 14 | |
| | Programmable input (default; Remote test off load) | 15 | Only in ZTSD-types, delayed transition, I – O – II or II – O – I |

| AC15 | | AC12 | | | AC13 | |
|--------|--------|--------|--------|-------|--------|-------|
| Ue/[V] | Ie/[A] | Ue/[V] | Ie/[A] | P/[W] | Ie/[A] | P/[W] |
| 230 | 6 | 24 | 10 | 240 | 2 | 50 |
| 400 | 4 | 72 | 4 | 290 | 0.8 | 60 |
| 415 | 4 | 125 | 2 | 250 | 0.55 | 70 |
| 690 | 2 | 250 | 0.55 | 140 | 0.27 | |
| | | 440 | 0.1 | 44 | | |

Table 10 Technical data for auxiliary contacts according to IEC 60947-5-1, for OA1G_, OA3G_

Recommended Operating / Storage Temperature

Do not store the automatic transfer switch in corrosive environments above LC1 (sea salt mist) and G1 as per ANSI/ ISA-S71.04-1985. Failure to comply with these instructions may result in product damage. Store the automatic transfer switch and related accessories in a clean, dry location in their original packaging.

| Environmental | Value |
|--|---------------|
| Environments category | E |
| EMC environment | A and B |
| Operating temperature (without derating) | -20... +40 °C |
| Operating temperature (with derating) | -25... +70 °C |
| Transportation and storage temperature | -40... +70 °C |
| Altitude (without derating) | Up to 2000 m |

Table 11 General technical data of automatic transfer switch

Circuit diagrams

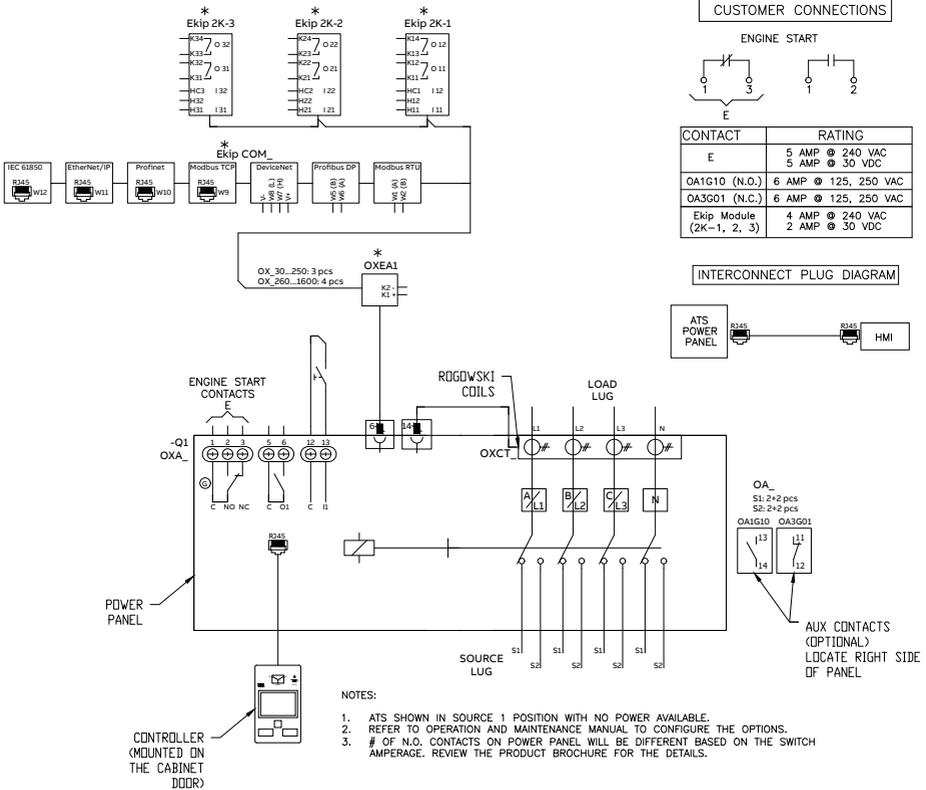


Fig.16 ZTS, open transition circuit diagram

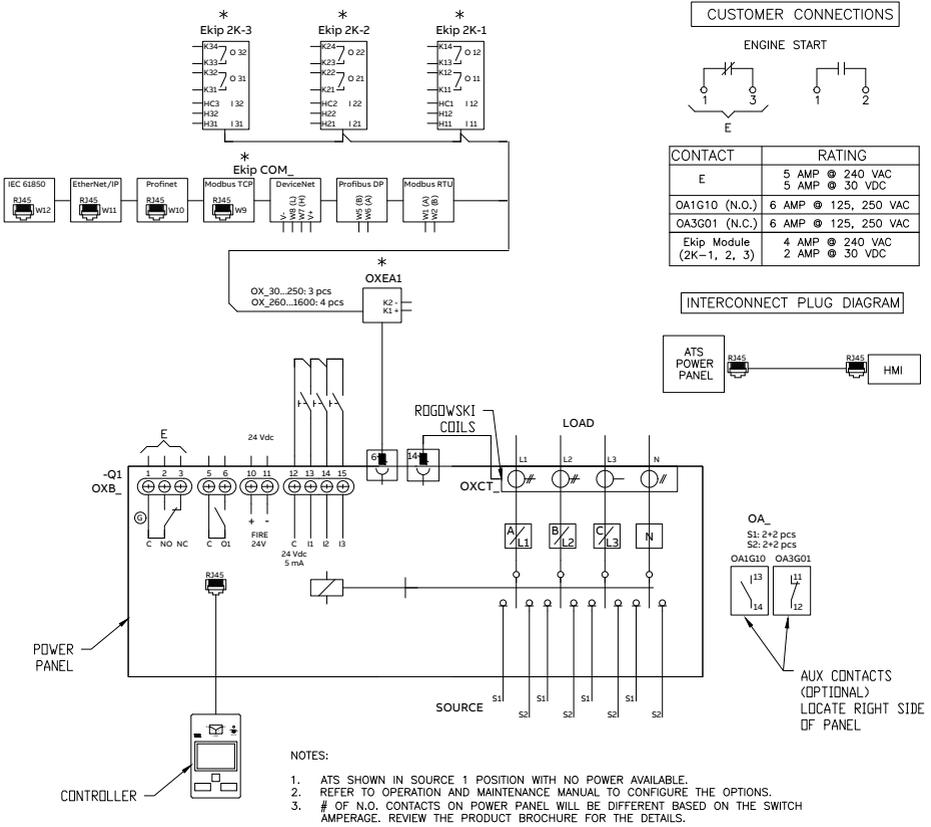


Fig. 17 ZTSD, delayed transition circuit diagram

Maintenance



Warning

Any maintenance should be conducted by trained and authorized personnel only. Appropriate personal protective equipment (PPE) shall be used when performing maintenance on the ATS panel. Hazardous voltage may be present. Disconnect all power sources before performing work inside the ATS panel. Failure to do so may result in serious injury or death.

Maintenance Principle

The Zenith ZTS(D) T-series 30-1200 A, 200-480 Vac automatic transfer switches, powered by TruONE™, are designed so that the contacts last their designed lifetime without any routine maintenance needs. If there are abnormal conditions such as a fault or overload without adequate protection, or extreme environment conditions, a failure of ATS components may occur. Fortunately, all critical modules, including complete mechanism with electronics (controller, power module, and solenoid mechanism), HMI, and accessories are easily replaceable. Refer to page 40 for replacement parts.

On the other hand, when the contacts have seen an event, or have met the end of their lifetime, the whole switch should be replaced – which can be done easily by replacing the complete TruONE™ power panel within the enclosure.

In the case you suspect a failure may be due to manufacturer defect and covered under warranty, see page 5.

Refer to page 25 technical data for ATS contact endurance and note that the number of operations can be viewed in the information menu from the HMI.

Routine Inspection

ABB recommends a routine (such as annual) inspection to, e.g., check electrical termination temperatures, ensure unit is clean, check voltage levels, test transfers, # of operations, etc. to ensure everything is in proper working order.

Recommended annual inspection includes:

- Review event log
- Check number of operations and other switch status figures
- Visual inspection both inside and outside of enclosure for damage or debris
- Test transfer of load
- Observe voltage levels of both sources within expected range
- Cable lug torque verification

Panel installation

Before mounting the product, please, check the product identification from the product identification label, which is located on the front panel under the control interface unit (HMI). This label indicates the product model (type number), some important technical data information, minimum enclosure size, suitable wire information, etc.



Notice

Final inspection of the equipment should be performed prior to energizing the automatic transfer.

Remove any dirt or debris that may have collected during shipment or installation. NEVER use compressed air. Doing so could drive dirt or other foreign objects into electrical or mechanical components, which could cause damage. Use an industrial-quality vacuum cleaner to remove any dirt or foreign objects.

Be certain all cable connections are correct and that the phase rotation of both sources match.

Inspect the engine start connections and verify the correct connection of all control wires.

Check all programmable set points and adjust as necessary. In addition, adjust any optional accessories as required.

Be certain that the actual lug torque values are in keeping with the requirements outlined in the instruction book to ensure the integrity of power connections.

Check to be sure that all covers and barriers are properly installed and fastened.

If any damage is found or suspected, file a claim as soon as possible with the carrier, and notify the nearest ABB Zenith representative, or call 1-800-637-1738.

Basic Tools for Installation and Maintenance

| Tool | Task |
|---------------------------------------|--|
| 1/4" to 1/2" Allen head socket driver | Power cable connection |
| Torque wrench | Torqueing of the lugs and other hardware as required. Range of device to be 50 - 500 in-lbs (5-57 N-m) |
| Torque screwdriver | Torqueing of control wire terminations, auxiliary contact input terminals. 5 - 25 in-lbs (0.5 - 2.8 N-m) |
| Wire cutters/wire crimpers | Auxiliary contacts wire installation, Options installation |
| Voltmeter | Trouble shooting tool for measuring incoming voltage, frequency, continuity and control signal transmission. |
| Controller default password 00001 | Changing parameters within the controller |

Table 12 Required tools for common installation and maintenance tasks

Equipment Inspection and Storage



Warning

When performing a hi-pot or dielectric test on the power section of the ATS panel, DISCONNECT the complete electronics, controller, and mechanism section of the ATS from the power section to avoid potential damage to the electronics.

Once you have received the transfer switch, inspect it for any damage. This includes damage to the enclosure, power panel, control panel and wiring harness. If any damage is found or suspected, file a claim as soon as possible with the carrier and notify the nearest ABB Zenith representative.

Before installation, if it is necessary, store the transfer switch in a clean dry place, protected from dirt and water. Provide ample air circulation and heat, if necessary, to prevent condensation.

See table 10 for recommended storage and ambient operating temperatures.

Lifting and Mounting the Panel



Danger

Hazardous Voltage can Cause Severe Injury or Death

Turn OFF all power before installation, adjustment, or removal of transfer switch or any of its components.



Warning

Due to hazardous voltages and currents, ABB recommends that an ABB Certified technician or a qualified electrician perform the installation & maintenance of the switch.



Danger

Hazardous Voltage can Cause Severe Injury or Death

Automatic Transfer Switch Equipment must be electrically grounded. Failure to do so may result in malfunction of the switch and possible damage to surrounding equipment.



Warning

Before drilling conduit entry holes or any accessory mounting holes, cover and protect the switch and control panel to prevent dirt and metal fragments from entering the mechanical and electrical components.

Lifting, Mounting and Installation

The safe operation of your switch at all times is paramount to ABB. Please recognize that hazardous voltages and currents can exist during normal operation, and any maintenance on the transfer switch must be performed utilizing appropriate safety measures. Installation, adjustment, maintenance or removal of the switch must only be carried out by qualified personnel and with all power to the switch turned off. It is recommended that only qualified electricians be allowed to install or provide maintenance on the switch.

Prior to installation, store the transfer switch in a clean dry location, protected from dirt and water. Provide ample air circulation and heat if necessary to prevent condensation. See table 10 for recommended storage and ambient operating temperatures.

ABB Zenith automatic transfer switches are packaged as per the standard packaging regulatory standards requirement suitable for domestic and international shipment through all modes of transportation (air, sea and road). Once you unpack the units, please make sure all the components are received as per the BOM. For any missing items, contact your local ABB Zenith service representative.

Lifting guidelines

Adequate lifting means must be used to mount the transfer switch into place. The recommended method for moving the ATS, up to 1200 A, is with lifting strap and lifting equipment rated for the equipment weight.

Mounting the automatic transfer switch

Mounting hole dimensions

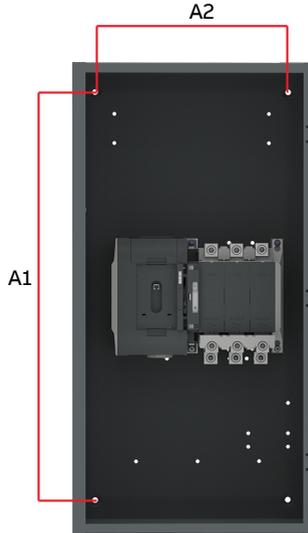


Fig. 18 Automatic transfer switches, Mounting hole dimensions, refer to Table 9.2 for A1 and A2 values

Enclosure mounting dimensions

| Model | ATS Rating (A) | Type 1, in (mm) | | | Type 3R/4/4X/12, in (mm) | |
|------------|----------------|-----------------|-------------|--------------|---------------------------|------------|
| | | Poles | Height (A1) | Width (A2) | Height (A1) | Width (A2) |
| ZTS | 30 - 200 | 2 | 28.0 (711) | 20.0 (508) | 33.3 (845) | 18.0 (457) |
| | | 3 | 28.0 (711) | 20.0 (508) | 33.3 (845) | 18.0 (457) |
| | | 4 | 28.0 (711) | 20.0 (508) | 33.3 (845) | 18.0 (457) |
| | 260 | 2 | 42.0 (1067) | 20.0 (508) | 47.25 (1200) | 18.0 (457) |
| | | 3 | 42.0 (1067) | 20.0 (508) | 47.25 (1200) | 18.0 (457) |
| | | 4 | 42.0 (1067) | 20.0 (508) | 47.25 (1200) | 18.0 (457) |
| ZTSD | 400 | 2 | 42.0 (1067) | 20.0 (508) | 47.25 (1200) | 18.0 (457) |
| | | 3 | 42.0 (1067) | 20.0 (508) | 47.25 (1200) | 18.0 (457) |
| | | 4 | 50.0 (1168) | 24.0 (610) | 55.25 (1302) ¹ | 22.0 (559) |
| | 600 | 2 | 50.0 (1168) | 24.0 (610) | 55.25 (1302) ¹ | 22.0 (559) |
| | | 3 | 50.0 (1168) | 24.0 (610) | 55.25 (1302) ¹ | 22.0 (559) |
| | | 4 | 50.0 (1168) | 24.0 (610) | 55.25 (1302) ¹ | 22.0 (559) |
| 800 - 1200 | 3 | 66.0 (1676) | 35.0 (889) | 71.25 (1810) | 34.0 (864) | |
| | 4 | 66.0 (1676) | 35.0 (889) | 71.25 (1810) | 34.0 (864) | |

¹ 4X enclosures add 0.05 inches to dimensions

Table 13 Zenith ZTS(D) panel mounting dimensions

Wire Connection



Notice
Lugs come pre-installed and torqued

AL/CU UL Listed Solderless Screw-Type Terminals for External Power Connections

| Model | ATS Rating (A) | Source/Load | Lug Type | Wire Range | Cables per pole | Cables - Tightening Torque ¹ , lb-in (N-m) |
|-------------|----------------|-----------------|-----------|--|-----------------|---|
| ZTS ZTSD | 30 - 60 | Source 1 | OZXA-24 | 14 - 2/0 AWG | 1 | 50/5.7 |
| | | Source 2 / Load | OZXA-100 | 12 - 2/0 AWG | 1 | 132/15.0 |
| | 100 - 200 | Source 1 | OZXA-25 | 6 AWG - 300 MCM | 1 | 275 / 31.1 |
| | | Source 2 / Load | OZXA-200 | 4 AWG - 300 MCM | 1 | 200 / 22.6 |
| | 260 - 400 | Source 1 | OZXA-412L | 1x4 AWG - 600 MCM or 2 x 1/0 AWG - 250 MCM | 1/2 | 500 / 56.5 |
| | | Source 2 / Load | OZXA-412 | 1x 4 AWG - 600 MCM or 2 x 1/0 AWG - 250 MCM | 1/2 | 500 / 56.5 |
| | 600 | Source 1 | OZXA-800L | 2 AWG - 600 MCM | 2 | 500/56.5 |
| | | Source 2 / Load | OZXA-800E | 2 AWG - 600 MCM | 2 | 500/56.5 |
| | 800 - 1200 | Source 1 | OZXA-1200 | 2 AWG - 600 MCM | 4 | 500/56.5 |
| | | Source 2 | OZXA-800S | 2 AWG - 600 MCM | 4 | 500/56.5 |
| | | Load | OZXA-1200 | 2 AWG - 600 MCM | 4 | 500/56.5 |

¹Do not exceed this value - may cause damage to switch, voiding warranty

Table 14 Power Cable Torque Requirements

Final Equipment Inspection

Prior to energizing the transfer switch:

1. Remove any debris incurred, with a vacuum, due to shipment or installation.
2. Verify that all cabled connections are correct and that phase rotation of both sources match.
3. Check engine start connections.
4. Verify the correct connection of all control wires.
5. Check settings of all timers and adjust as necessary.
6. Adjust any optional accessories as required.
7. Check the lug torque values of the power connections.
8. Make sure that all covers and barriers are installed and properly fastened.

Each ABB Zenith transfer switch is factory wired and tested. A complete information package is furnished with each switch which includes:

- Sequence of operation.
- Description and operation of all accessories supplied.
- Power panel connection diagram and schematic.
- Description and identification of all customer field connections.

Installation of ABB Zenith transfer switches includes:

- Mounting the transfer switch cabinet.
- Connection of Source 1, Source 2, and Load cables or bus bars.
- Connection of external control circuits as required.

Initial Energizing

Before proceeding, refer to the information package supplied with the ATS and read and understand the information on all accessories provided, including this complete document.

Before energizing the panel

1. Confirm that installation has been performed by a qualified person and in accordance with NFPA 70 (NEC).



Notice

This installation should be properly operated and maintained in accordance with the safety practices of NFPA 70E.

2. Confirm rating label matches the installed application. Rating label is located inside the panel enclosure.
3. Confirm that cables are connected properly and torqued according to the ATS labeling.
4. Verify that the enclosure ground connection is properly terminated.
5. Confirm that control wiring for engine start is properly terminated to the engine start contact (located in Figure 2, number 8). Additionally, connect all applicable digital I/O, communications, and auxiliary contact wiring.

6. Flip slide switch (Figure 2, number 4) to AUTO.
7. Ensure that all objects and debris are removed from enclosure, and enclosure is closed and latched.

Energizing the panel

1. Close Source 1 circuit breaker.

NOTE: The HMI should illuminate if line voltage is present and S1 LED should light up.

2. Verify the phase to phase voltages at the Source 1 terminals.
3. Initiate auto configure from HMI default screen: Main Menu > Parameters > System Parameters > Start Automatic Configuration and allow a few seconds for system parameters to set"
4. Close the Source 2 circuit breaker.
5. Start the generator engine.

NOTE: If generator voltage is present at Source 2 terminals, S2 LED should light up.

6. Verify phase rotation of S1 matches that of S2.

NOTE: The ATS will not allow transfer if phase rotation does not match.

7. Shut down the generator engine.

Accessories



Warning

Any troubleshooting should be conducted by trained and authorized personnel only. Appropriate personal protective equipment (PPE) shall be used when troubleshooting the ATS panel. Hazardous voltage may be present. Disconnect all power sources before performing work inside the ATS panel. Failure to do so may result in serious injury or death.

More information, see animation: Installation of accessories - TruONE™ ATS (<https://youtu.be/qV2KolV38GY>).



Auxiliary contact blocks

Refer to Figure 15 for auxiliary contact ratings.

| Position | OA1G10 | OA3G01 |
|-------------------------------|--------|--------|
| SOURCE 1 (S1), max 2+2 | | |
| I | | |
| O | | |
| II | | |
| SOURCE 2 (S2), max 2+2 | | |
| I | | |
| O | | |
| II | | |

Table 15 Contact positions

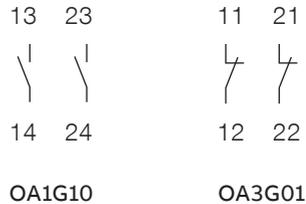


Fig. 19 Labels for contact numbering

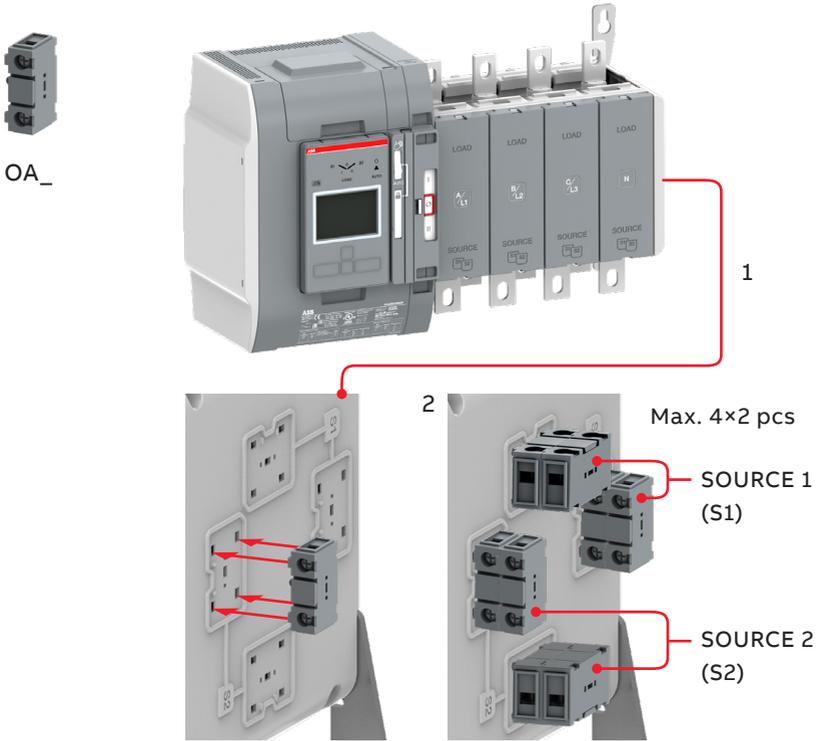


Fig. 20 Mounting of the auxiliary contact blocks, type OA_

Auxiliary power supply and Ekip -modules

ZTS(D) 30-1200 A, 200-480 Vac Automatic transfer switches can be equipped with Ekip-modules. Ekip-modules are mounted with a auxiliary power supply module, OXEA1. Suitable Ekip-modules are: Ekip link, signalling and connectivity modules. For more information, see manual 1SCC303039M0201 Chapter 5, Electronic accessories.

The maximum number of Ekip-modules varies by panel ampacity :

- 30-200 A: 3 Ekip modules
- 260-400 A: 4 Ekip modules



Fig. 21. Mounting of the auxiliary power supply module OXEA1 and Ekip -modules

Replacement Parts

ZTS series replacement parts

| Category | Application/Description | Order code |
|--|---|------------------------------------|
| HMI | Open transition (ZTS 30-1200 A, 200-480 Vac) | OXAHMI-L4 |
| | Delayed transition (ZTSD 30-1200 A, 200-480 Vac) | OXBHMI-L4 |
| | ETHERNET - CAT 5e CABLE - 7FT | OXCAT5E-7FT (PS-9862) |
| | ETHERNET - CAT 5e CABLE - 10FT | OXCAT5E-10FT (PS-9863) |
| Manual handle | Open transition and delayed transition (ZTS(D) 30-1200 A, 200-480 Vac) | OXHANDLE-1600 |
| | Open transition (ZTS, 200-480 Vac) | |
| Complete ¹ mechanism with electronics | 30-260 Amps | OXAMECH-2-L4 |
| | 400-600 Amps | OXAMECH-3-L4 |
| | 800-1200 Amps | OXAMECH-4-L4 |
| | Delayed transition (ZTSD, 200-480 Vac) | |
| | 30-260 Amps | OXBMECH-2-L4 |
| | 400-600 Amps | OXBMECH-3-L4 |
| | 800-1200 Amps | OXBMECH-4-L4 |
| | Phase barrier | 30-1200 Amps, 3 pole |
| 30-1200 Amps, 4 pole | | OXEB1600/6 |
| ETHERNET - CAT 5e CABLE - 7FT | | OXCAT5E-7FT (PS-9862) |
| ETHERNET - CAT 5e CABLE - 10FT | | OXCAT5E-10FT (PS-9863) |
| Ekip Programming | | ZEAEKPPGM |
| Window Kit | | Window Kit NEMA 4/4X/12 - No Meter |
| | Window Kit NEMA 4/4X/12 - With Meter | OXWINDOWKIT (PS-9931) |
| | HMI protective cover, IP54 | OXEC21 |
| | Cover kit | OXCOVERKIT |
| Rogowski coils | Rogowski 30-260A, 3P | OXSENSOR-2-3P |
| | Rogowski 30-260A, 4P | OXSENSOR-2-4P |
| | Rogowski 400-600A, 3P | OXSENSOR-3-3P |
| | Rogowski 400-600A, 4P | OXSENSOR-3-4P |
| | Rogowski 800-1200A, 3P | OXSENSOR-4-3P |
| | Rogowski 800-1200A, 4P | OXSENSOR-4-4P |
| COM Accessories | Ekip Com Modbus RTU-OX | ZEAMOD485 |
| | Ekip Com Modbus TCP-OX | ZEAMODTCP |
| | Ekip Com Profibus | ZEAPRFIBUS |
| | Ekip Com Profinet | ZEAPRFINET |
| | Ekip Com EtherNet / IP | ZEAEHRNT |
| | Ekip Com Hub | ZEAEKIPHUB |
| | Ekip Com DeviceNet | ZEAEVICNET |
| Ekip Programming | ZEAEKPPGM | |

Continued on the next page

| ZTS series replacement parts (continued) | | | | |
|---|--------------------------------|----------------------------|-----------------|------------------|
| Category | Application/Description | Order code | | |
| AUX Contacts | Ekip Signalling 2K-1-OX | 2K-1-OX | | |
| | Ekip Signalling 2K-2-OX | 2K-2-OX | | |
| | Ekip Signalling 2K-3-OX | 2K-3-OX | | |
| | Aux contact NO | OA1G10 | | |
| | Aux contact NC | OA3G01 | | |
| Suitable for UL switches | No. of Poles | Lug Kit Application | | |
| | | Source S2 | Load | Source S1 |
| 30 - 60 | 2 | 1 X OZXA-100/4P | | OZXA-24/2P |
| | 3 | 1 X OZXA-100 | | OZXA-24/3P |
| | 4 | 2 X OZXA-100/4P | | OZXA-24/4P |
| 100 - 200 | 2 | 1 X OZXA-200/4 | | OZXA-25/2P |
| | 3 | 1 X OZXA-200 | | OZXA-25/3P |
| | 4 | 2 x OZXA-200/4 | | OZXA-25/4P |
| 260 - 400 | 2 | 1 X OZXA-412/4 | | OZXA-412L/2P |
| | 3 | 1 X OZXA-412 | | OZXA-412L/3P |
| | 4 | 2 X OZXA-412/4 | | OZXA-412L/4P |
| 600 | 3 | 1 X OZXA-800E | | OZXA-800L/3 |
| | 4 | 2 x OZXA-800E/4P | | OZXA-800L/4 |
| 800 - 1200 | 3 | OZXA-800S | OZXA-1200 | |
| | 4 | 2 X OZXA-800S/4P | 2 X OZXA-1200/4 | |

¹Includes the tested, field replaceable module complete with operating mechanism, power module, and controller

Table 16 Replacement parts, available in Empower

**Consult factory for lug application.
For other accessories refer to the manual
1SXU523001C0201.**



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