Low voltage electrical distribution

EasyPact SPS

Circuit breakers and switch-disconnectors
800 to 1600 A

User manual
03/2013
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### EasyPact SPS 12F

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<td>Rated current (x 100 A)</td>
<td></td>
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<tr>
<td>Performance level</td>
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<td>Suitability for isolation</td>
<td></td>
</tr>
<tr>
<td>Type of device:</td>
<td></td>
</tr>
<tr>
<td>Circuit breaker or switch-disconnector</td>
<td></td>
</tr>
<tr>
<td>Rated insulation level</td>
<td></td>
</tr>
<tr>
<td>Impulse withstand voltage</td>
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<tr>
<td>Icu - ultimate breaking capacity</td>
<td></td>
</tr>
<tr>
<td>Rated short-time withstand current</td>
<td></td>
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<tr>
<td>Rated operational voltage</td>
<td></td>
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<tr>
<td>Ics - rated service breaking capacity</td>
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<tr>
<td>Rated insulation level</td>
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<tr>
<td>IEC / EN 60947-2</td>
<td>50/60 Hz</td>
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<tr>
<td>Frequency</td>
<td></td>
</tr>
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<td>Standards</td>
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**Type of Device:**
circuit breaker or switch-disconnector

**Frequency:**
50/60 Hz

**Standards:**
IEC / EN 60947-2

**Rated current (x 100 A):**

<table>
<thead>
<tr>
<th>Current</th>
<th>A</th>
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<tbody>
<tr>
<td>Icu</td>
<td>50</td>
</tr>
<tr>
<td>Icw (kA/1s)</td>
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</table>

**Rated insulation level:**
1000 V

**Suitability for isolation:**
12 kV

**Type of device:**
circuit breaker or switch-disconnector

**Frequency:**
50/60 Hz

**Standards:**
IEC / EN 60947-2
EasyPact circuit breakers are available in drawout and fixed versions. The drawout version is mounted on a chassis and the fixed version is installed using fixing brackets.

**Drawout version**

**Fixed version**
Chassis

Carriage switch terminals
ON/OFF indication contact terminals
Control auxiliary terminals
Arc-chute cover

Terminals for control-unit and fault-trip indication contacts
Carriage switch terminals

Carrying grip

Door interlock

Drawout grip

Auxiliary terminal shield

Locking by keylocks
Locking by padlocks

"Connected", "test" or "disconnected" position indicator

Crank socket

Position release button

Crank storage

Disconnecting-contact cluster

Shutter locking blocks

Safety shutters
Drawout circuit breaker / switch-disconnector

- XF closing release
- MX opening release
- MN under voltage release
- Terminals for control unit, fault indication contacts, control auxiliaries and auxiliary contacts
- SDE "fault-trip" indication contact
- Carrying grip
- Side plate for drawout device
- Control unit*
- Arc chute
- OF "ON/OFF" indication contacts
- PF "ready to close" contact
- Operating-mechanism charging handle
- MCH gear motor for electrical charging of the operating mechanism
- Keylock for locking in open position
- Closing pushbutton
- Opening pushbutton
- MN under voltage release

* Switch disconnector is without control unit
**Components**

**Fixed circuit breaker / switch-disconnector**

- XF closing release
- MX opening release
- MN under voltage release
- Terminals for control unit and fault indication contacts
- SDE "fault-trip" indication contact
- Carrying grip
- Side plate for fixed device
- Closing pushbutton
- Opening pushbutton
- Control unit*

**Front**

- Trip indication button used to reset before closing
- Rating plate
- Indicator for position of the main contacts
- Locking by padlock, lead-seal cover or screws for pushbuttons
- "Springs charged" and "Ready to close" indicator

* Switch disconnector is without control unit
Understanding the controls and indications

Circuit breaker open and discharged

Circuit breaker closed and discharged

Circuit breaker open, charged and not "ready to close"

Circuit breaker closed, charged and not "ready to close"

Circuit breaker open, charged and "ready to close"
The charge status is indicated as follows.

The springs in the circuit breaker operating mechanism must be charged to store the energy required to close the main contacts. The springs may be charged manually using the charging handle or automatically by the optional MCH gear motor.

Manual charging.
Pull the handle down six times until you hear a "clack".

Automatic charging.
If the MCH gear motor is installed, the spring is automatically recharged after each closing.
Closing the circuit breaker

**Closing conditions**
Closing (i.e. turning the circuit ON) is possible only if the circuit breaker is “ready to close”. The prerequisites are the following:
- device open (OFF)
- springs charged
- no opening order present.

The circuit breaker will not close unless it is “ready to close” when the order is given.

**Closing the circuit breaker**

*Locally (mechanical)*
Press the mechanical ON pushbutton.

*Remotely*
When connected to a remote control panel, the XF closing release can be used to close the circuit breaker remotely.

**Anti-pumping function**
The purpose of the mechanical anti-pumping function is to ensure that a circuit breaker receiving simultaneous opening and closing orders does not open and close indefinitely.
If there is a continuous closing order, after opening the circuit breaker remains open until the closing order is discontinued. A new closing order is required to close the circuit breaker. A new order is not required if the closing release is wired in series with the PF “ready to close” contact.
Opening the circuit breaker

Locally
Press the OFF pushbutton.

Remotely
Use one of the following solutions:
- one MX opening release
- one MN undervoltage release
- one MN undervoltage release with a delay unit.

When connected to a remote control panel, these releases can be used to open the circuit breaker remotely.
Using EasyPact SPS

Reseting after a fault trip

The circuit breaker signals a fault trip by:
- a mechanical indicator on the front
- one SDE "fault-trip" indication contacts.

Locally
If the circuit breaker is not equipped with the automatic reset option, reset it manually.
Locking the controls
Disabling circuit-breaker local closing and opening

Pushbutton locking using a padlock (shackle diameter 5 to 8 mm), a lead seal or screws.

Locking
Close the covers.

Unlocking
Remove the padlock, lead seal or screws.

Insert the padlock shackle, lead seal or screws.

Lift the covers and swing them down.

The pushbuttons are no longer locked.
Locking the controls with a keylock

Locking
Open the circuit breaker.  
Turn the key.  
Remove the key.

Check
The closing control is inoperative.

Unlocking
Insert the key.  
Turn the key.  
The key cannot be removed.

Two types of keylocks are available

RONIS  
PROFALUX
Identifying the circuit breaker positions

The indicator on the front signals the position of the circuit breaker in the chassis.

- "connected" position
- "test" position
- "disconnected" position

Dimensions:
- 10.9 mm
- 32.2 mm
Using the EasyPact SPS drawout chassis

Racking

Prerequisites
To connect and disconnect EasyPact, the crank must be used. The locking systems and padlocks all inhibit use of the crank.

Withdrawing the circuit breaker from the "connected" to "test" position, then to "disconnected" position

1. The circuit breaker is in "connected" position.
2. The circuit breaker is in "connected" position.
3. The circuit breaker is in "test" position. Remove the crank or continue to "disconnected" position.
4. The circuit breaker is in "test" position.
5. The circuit breaker is in "test" position.
6. The circuit breaker is in "test" position.
7. The circuit breaker is in "test" position.
8. The circuit breaker is in "disconnected" position.
9. The circuit breaker is in "disconnected" position.

These operations require that all chassis-locking functions be disabled (see page 19).
Using the EasyPact SPS drawout chassis

For complete information on EasyPact handling and mounting, see the installation manual(s).

Before mounting the circuit breaker, make sure it matches the chassis.

### Removing the rails

Press the release tabs and pull the rails out.

Press the release tabs to push the rails in.

### Inserting EasyPact

Position the circuit breaker on the rails. Check that it rests on all four supports.

Open the circuit breaker (in any case, it opens automatically during connection).

Push the circuit breaker into the chassis, taking care not to push on the control unit.
Racking the circuit breaker from the "disconnected" to "test" position, then to "connected" position

The device is in "disconnected" position.

The device is in "test" position. Remove the crank or continue to "connected" position.

The device is in "connected" position.
The locking device is installed on the left or right-hand side of the chassis.

- When the circuit breaker is in "connected" or "test" position, the latch is lowered and the door is locked.
- When the circuit breaker is in "disconnected" position, the latch is raised and the door is unlocked.

Disabling door opening
Close the door. Put the EasyPact in "test" or "connected" position. The door is locked.

Enabling door opening
Put the EasyPact in "disconnected" position. The door is unlocked.
Using the EasyPact drawout chassis

Combination of locking systems
To disable connection of the circuit breaker in "disconnected" position in the chassis, use as needed:
- one to three padlocks
- one keylock
- a combination of the two locking systems.

Disabling connection when the circuit breaker is in "disconnected" position, using one to three padlocks (maximum shackle diameter 5 to 8 mm)

**Locking**

1. Circuit breaker in "disconnected" position.
2. Pull out the tab.
3. Insert the shackle (max. diameter 5 to 8 mm) of the padlock(s).
4. The crank cannot be inserted.

**Unlocking**

1. Remove the padlock(s).
2. Release the tab.
3. The crank can be inserted.

Padlocks and keylocks may be used together. Padlocks are not supplied.

If specified when ordering the chassis, this locking function may be adapted to operate in all positions ("connected", "test" and "disconnected"), instead of in "disconnected" position alone.
Using the EasyPact drawout chassis

Padlocks and keylocks may be used together. Padlocks are not supplied.

Disabling connection when the circuit breaker is in "disconnected" position, using one or two keylocks.

**Locking**
Circuit breaker in "disconnected" position.

1. Turn the key(s).

2. The crank cannot be inserted.

3. Remove the key(s).

4. The crank cannot be inserted.

**Unlocking**
Insert the key(s).

1. Turn the key(s).

2. The crank can be inserted.

3. The crank can be inserted.

Two types of keylocks are available

- **RONIS**
- **PROFALUX**
Using the EasyPact drawout chassis

Locking the safety shutters
Padlocking inside the chassis

Four locking possibilities: using one or two padlocks (maximum shackle diameter 5 to 8 mm) for each shutter

- Top and bottom shutters not locked.
- Top shutter not locked. Bottom shutter locked.
- Top shutter locked. Bottom shutter not locked.
- Top and bottom shutters locked.

Padlocks are not supplied.
Discovering Microprocessor based ET Trip System

All EasyPact SPS Air Circuit Breakers are equipped with microprocessor based ET Trip System. Microprocessor based ET Trip Systems are designed to protect power circuits and connected loads.

Microprocessor based ET2.0 Trip System: basic protection

- Long time + Instantaneous

Microprocessor based ET6G Trip System: selective + ground-fault protection

- Long time + Short time + Instantaneous
- Ground-fault protection
Identifying Microprocessor based ET Trip System Designations

### Microprocessor based ET Trip System description
1. top fastener
2. bottom fastener
3. protective cover
4. cover opening point
5. lead-seal fixture for protective cover
6. long-time rating plug
7. screw for long-time rating plug
8. connection with circuit breaker
9. long-time trip indicator light
10. short-time or instantaneous trip indicator light
11. self-protection indicator light
12. reset button for battery status check and trip indicator LED
13. ground-fault trip indicator light

### Adjustment dials
14. long-time current setting \( I_r \)
15. long-time tripping delay \( t_r \)
16. short-time pickup \( I_{sd} \)
17. short-time tripping delay \( t_{sd} \)
18. instantaneous pick-up \( I_i \)
19. LED indicating an overload-alarm
20. ground-fault pick-up \( I_g \)
21. ground-fault tripping delay \( t_g \)

### Test
22. test button for ground-fault
23. test connector
Overview of functions
Current protection

Protection settings
Depending on the type of installation, it is possible to set the tripping curve of your Microprocessor based ET Trip System using the parameters presented below.

Microprocessor based ET2.0 Trip System
1. current setting Ir (long time)
2. tripping delay tr (long time) for 6 x Ir
3. pick-up lsd (instantaneous)

Microprocessor based ET6G Trip System
1. current setting Ir (long time)
2. tripping delay tr (long time) for 6 x Ir
3. pick-up lsd (short time)
4. tripping delay tsd (short time)
5. pick-up li (instantaneous)

Long-time protection
The long-time protection function protects cables (phases and neutral) against overloads. This function is based on true rms measurements.

Thermal memory
The thermal memory continuously accounts for the amount of heat in the cables, both before and after tripping, whatever the value of the current (presence of an overload or not). The thermal memory optimises the long-time protection function of the circuit breaker by taking into account the temperature rise in the cables. The thermal memory assumes a cable cooling time of approximately 20 minutes.

Long-time current setting Ir and standard tripping delay tr

<table>
<thead>
<tr>
<th>Microprocessor based ET Trip System</th>
<th>2.0 and 6G</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>current setting</strong></td>
<td><strong>Ir = In (*) x …</strong></td>
</tr>
<tr>
<td></td>
<td>0.4</td>
</tr>
<tr>
<td><strong>tripping between 1.05 and 1.20 Ir</strong></td>
<td></td>
</tr>
<tr>
<td><strong>time setting</strong></td>
<td><strong>Accuracy</strong></td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>time delay (s)</strong></td>
<td><strong>tr at 1.5 x Ir</strong></td>
</tr>
<tr>
<td></td>
<td>0 to - 20%</td>
</tr>
<tr>
<td></td>
<td>0 to - 20%</td>
</tr>
<tr>
<td>(*) In: circuit breaker rating</td>
<td></td>
</tr>
<tr>
<td>(1) 0 to - 40%</td>
<td></td>
</tr>
<tr>
<td>(2) 0 to - 60%</td>
<td></td>
</tr>
</tbody>
</table>

Overload LED

This LED signals that the long-time current setting Ir has been overrun.
Overview of functions
Current protection

Short-time protection
1. The short-time protection function protects the distribution system against impedant short-circuits.
2. The short-time tripping delay can be used to ensure discrimination with a downstream circuit breaker.
3. The I²t ON and I²t OFF options enhance discrimination with downstream protection devices.
4. Use of I²t curves with short-time protection:
   a. I²t OFF selected: the protection function implements a constant time curve
   b. I²t ON selected: the protection function implements an I²t inverse-time curve up to 10 Ir. Above 10 Ir, the time curve is constant.

Instantaneous protection
The instantaneous-protection function protects the distribution system against solid short-circuits. Contrary to the short-time protection function, the tripping delay for instantaneous protection is not adjustable. The tripping order is sent to the circuit breaker as soon as current exceeds the set value, with a fixed time delay of 20 milliseconds.

Instants: pick-up Isd and tripping delay tsd

Ground-fault protection on ET6G Trip System

A ground fault in the protection conductors can provoke local temperature rise at the site of the fault or in the conductors.

The purpose of the ground-fault protection function is to eliminate this type of fault.

Ground-fault protection in 3P+N system is activated by installing an external sensor (CT) in the neutral conductor and connecting to Microprocessor-based ET Trip System.

Protection of the fourth pole on four-pole circuit breakers (Refer page 29)

Neutral protection

The cross-sectional area of the neutral conductor is equal to that of the phase conductors.
1. The long-time current setting Ir for the neutral is equal to the setting value
2. The short-time pick-up Isd for the neutral is equal to the setting value
3. The instantaneous pick-ups Isd and li for the neutral are equal to the setting value.

Neutral protection for three-pole devices
Neutral protection is not available on three-pole devices.

Neutral: pick-up Ig and tripping delay tg

The pick-up and tripping-delay values can be set independently.

Ground-fault pick-up Ig and tripping delay tg

The pick-up and tripping-delay values can be set independently.
Setting procedure

Using the adjustment dials

Open the protective cover.
Select the desired setting.
Close the protective cover and, if necessary, install a lead seal to protect the settings.

Fault indications

Signals tripping due to an overrun of the long-time current setting Ir.
Signals tripping due to an overrun of the short-time pick-up Isd or the instantaneous pick-up Isd / Ii.
Signals tripping due to an overrun of the ground-fault pick-up Ig
Signals tripping due to the auto-protection, Ap function of the Microprocessor based ET Trip System

The auto-protection function (excessive temperature or short-circuit higher than circuit-breaker capacity) opens the circuit breaker and turns on the Ap LED.

Caution.
If the circuit breaker remains closed and the Ap LED remains on, contact the Schneider after-sales support department.

Caution.
The battery maintains the fault indications. If there are no indications, check the battery.
Setting the Microprocessor based ET2.0 Trip System

The rating of the circuit breaker in this example is 1000 A.

See pages 24 and 25 for information on the available settings.

Set the threshold values

\[
\begin{align*}
    \text{Ir} &= 0.7 \times \text{ln} = 700 \text{ A} \\
    \text{Isd} &= 3 \times \text{Ir} = 2100 \text{ A}
\end{align*}
\]

Set the tripping delay

\[
\text{tr} = 1 \text{ second}
\]
Setting Microprocessor Based ET Trip System

The rating of the circuit breaker in this example is 1000 A.

See pages 24 and 25 for information on the available settings.

**Set the threshold values**

- \( I_n = 1000 \text{ A} \)
- \( I_r = 0.7 \times I_n = 700 \text{ A} \)
- \( I_{is} = 3 \times I_n = 3000 \text{ A} \)
- \( I_{sd} = 2 \times I_r = 1400 \text{ A} \)
- \( I_g = 300 \text{ A} \)

**Set the tripping delay**

- \( t_r = 1 \text{ s} \)
- \( t_{sd} = 0.2 \text{ s} \)
- \( t_{tg} = 0.2 \text{ s} \)
Setting
Microprocessor based
ET Trip System

Selecting the type of neutral protection

On four-pole circuit breakers, it is possible to select the type of neutral protection for the fourth pole using the three-position dial on the circuit breaker:

1. Neutral unprotected (4P 3D);
2. Neutral protection at 0.5 In (3D + N/2);
3. Neutral protection at In (4P 4D).

The factory default setting is 3D + N/2.

Caution!
With the 4P 3D setting, the current in the neutral must not exceed the rated current of the circuit breaker.

Testing the Microprocessor based ET Trip System

See the user manual for the portable test kit.

To test the Microprocessor based ET Trip System, connect the portable test kit via the test connector.

Caution!
Fault and status indications

Resetting the fault indications and checking battery status

The procedure for closing the circuit breaker following a fault trip is presented in the circuit-breaker user manual.
Applicable only on ET6G Trip System

Resetting the fault indications
1. determine why the circuit breaker tripped.
The fault indication is maintained until it is reset on the control unit.
a. press the fault-trip reset button.
b. check the parameter settings of the control unit.

Checking the battery
Press the battery-test button (same as the fault-trip reset button) to check the battery status by the luminance of trip indicator light.

If trip indicators became dim or no luminance, the battery should be changed.

Changing the control-unit battery (only ET6G)
1. Remove the battery cover.
2. Remove the battery.
3. Insert a new battery. Check the polarity.
4. Put the cover back in place. Press the battery-test button to check the new battery.

If the battery needs to be changed, order a new battery with the Schneider catalogue number 33593.
1. lithium battery
2. 1.2 AA, 3.6 V, 850 mA/h
3. SAFT LS3 SONNENSCHEN TEL-S
Testing the ground-fault functions

Applicable only on ET6G Trip System

Charge and close the circuit breaker. Using a screwdriver, press the test button for ground-fault protection. The circuit breaker should open.

If the circuit breaker does not open, contact the Schneider after-sales support department.
Technical appendix

Tripping curves

Long-time and instantaneous protection
(Microprocessor based ET2.0 Trip System)

\[ \frac{I}{I_r} = 10^{0.667 \cdot \log \left( \frac{t}{t_r} \right)} \]

- \( t_r = 0.5 \text{ s} \) to 24 s
- \( I_{sd} = 1.5 \text{ to } 10 \times I_r \)

\( I_r = 0.4 \text{ to } 1 \times I_n \)
Long-time, short-time and instantaneous protection
(Microprocessor based ET6G Trip System)

$\text{tr} = 0.4 \ldots 1 \times \text{In}$
$\text{Isd} = 1.5 \ldots 10 \times \text{Ir}$
$\text{Ir} = 0.4 \ldots 1 \times \text{In}$

Ground-fault protection
(Microprocessor based ET6G Trip System)

$I_g = \ldots J \times \text{ln}$ (1)
1200 A max.
Thermal memory

The thermal memory is a means to simulate temperature rise and cooling caused by changes in the flow of current in the conductors.

These changes may be caused by:
1. repetitive motor starting;
2. loads fluctuating near the protection settings;
3. repeated circuit-breaker closing on a fault.

Microprocessor based ET Trip System without a thermal memory (contrary to bimetal strip thermal protection) do not react to the above types of overloads because they do not last long enough to cause tripping. However, each overload produces a temperature rise and the cumulative effect can lead to dangerous overheating.

Microprocessor based ET Trip System with a thermal memory record the temperature rise caused by each overload. Even very short overloads produce a temperature rise that is stored in the memory. This information stored in the thermal memory reduces the tripping time.

Microprocessor based ET Trip System and thermal memory

All Microprocessor based ET Trip System are equipped as standard with a thermal memory.

1. for all protection functions, prior to tripping, the temperature-rise and cooling time constants are equal and depend on the tripping delay in question:
   a. if the tripping delay is short, the time constant is low;
   b. if the tripping delay is long, the time constant is high.

2. for long-time protection, following tripping, the cooling curve is simulated by the Microprocessor based ET Trip System. Closing of the circuit breaker prior to the end of the time constant (approximately 20 minutes) reduces the tripping time indicated in the tripping curves.

Short-time protection and intermittent faults

For the short-time protection function, intermittent currents that do not provoke tripping are stored in the Microprocessor based ET Trip system memory. This information is equivalent to the long-time thermal memory and reduces the tripping delay for the short-time protection.

Following a trip, the short-time trip tripping delay is reduced to the value of the minimum setting for 20 seconds.

Ground-fault protection and intermittent faults

The ground-fault protection implements the same function as the short-time protection.
**Identifying the electrical auxiliaries**

**Identification of the connection terminals**

**Layout of terminal blocks**

**Key:**
- Only for ET6G
- SDE, OF1, OF2 supplied as standard and OF3, OF4 optional

---

**Table:**

<table>
<thead>
<tr>
<th>UC1</th>
<th>UC2</th>
<th>SDE</th>
<th>MX</th>
<th>MN</th>
<th>XF</th>
<th>PF</th>
<th>MCH</th>
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<tbody>
<tr>
<td>Z5</td>
<td>Z4</td>
<td>T3</td>
<td>T4</td>
<td>82</td>
<td>C3</td>
<td>A3</td>
<td>252</td>
</tr>
<tr>
<td>Z3</td>
<td>Z2</td>
<td>T1</td>
<td>T2</td>
<td>81</td>
<td>C1</td>
<td>D1</td>
<td>251</td>
</tr>
</tbody>
</table>

**OF1, OF2, OF3, OF4:**
- 44 34 24 14
- 42 32 22 12
- 41 31 21 11

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*Released for Manufacturing*

Printed on 2018/04/12
The ON/OFF indication contacts signal the status of the device main contacts.

The carriage switches indicate the "connected", "test" and "disconnected" positions.

Chassis
For information on the separation distance of the main circuits in the "test" and "disconnected" positions, see page 14.
Identifying the electrical auxiliaries

Electrical diagrams
Fixed and drawout devices

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in normal position.

### Power

- **UC1**
  - Z1-Z5 zone selective interlocking;
  - Z1 = ZSI OUT SOURCE
  - Z2 = ZSI OUT; Z3 = ZSI IN SOURCE
  - Z4 = ZSI IN ST (short time)
  - Z5 = ZSI IN GF (earth fault)

- **UC2**
  - T1, T2, T3, T4 = external neutral;

### Control unit

- **Remote operation**
  - SDE: Fault-trip indication contact (supplied as standard)
  - MN: Undervoltage release
  - MX: Shunt release
  - XF: Closing release
  - PF: "Ready to close" contact
  - MCH: Gear motor

Note: Z1...Z5 & T1..T4 are available only in ET6G trip system

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2.0: Basic Protection
6G: 2.0 + Isd + Ig

Released for Manufacturing
Printed on 2018/04/12
Indication contacts

(*) 440/480 V AC gear motor for charging
(380 V motor + additional resistor)

Chassis contacts

Contact identification

OF4, OF3, OF2, OF1, supplied as standard
Interconnected connections (only one wire per connection point)

Key:
- Drawout device only
- SDE, OF1, OF2, supplied as standard
- Interconnected connections (only one wire per connection point)
ET Trip System

ET trip system

- Standard equipment, one per device
- Part numbers
  (long-time rating plug and connectors not included, see below):
  ET 2.0: MVS15514
  ET 6G: 67479
  Part numbers for connectors for ET6G
  □ for fixed device: 47065
  □ for drawout device: 47066

- Depending on the model, control units offer in addition:
  □ fault indications
  □ Earth-fault protection

Long-time rating plugs

- Standard equipment, one per control unit
- Part numbers for setting options:
  □ standard 0.4 to 1 x Ir setting: 64888

- The plugs determine the setting range for the long-time protection.
Indication contacts

ON/OFF indication contacts (OF)
- Standard equipment, 2 OF per device
- Part numbers:
  - standard: 47076
  - Part numbers for connectors:
    - for fixed device: 47074
    - for drawout device: 33098
- OF contacts indicate the position of the main contacts
- They trip when the minimum isolation distance between the main contacts is reached.
- 4 changeover contacts
- Breaking capacity at $\cos \varphi = 0.3$ (AC12 / DC12 as per 60947-5-1)
- standard, minimum current 10 mA / 24 V

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Breaking Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAC 240/380</td>
<td>6 A (rms)</td>
</tr>
<tr>
<td>480</td>
<td>6 A (rms)</td>
</tr>
<tr>
<td>V DC 24/48</td>
<td>2.5</td>
</tr>
<tr>
<td>125</td>
<td>0.5</td>
</tr>
<tr>
<td>250</td>
<td>0.3</td>
</tr>
</tbody>
</table>

"Fault-trip" indication contact (SDE)
- Standard equipment on circuit breakers, one SDE contact per device
- Not available for switch-disconnector versions.
- Changeover contact
- Breaking capacity at $\cos \varphi = 0.3$ (AC12 / DC12 as per 60947-5-1)
- standard, minimum current 10 mA / 24 V

<table>
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<tr>
<th>Voltage</th>
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</tr>
</thead>
<tbody>
<tr>
<td>VAC 240/380</td>
<td>5 A (rms)</td>
</tr>
<tr>
<td>480</td>
<td>5 A (rms)</td>
</tr>
<tr>
<td>V DC 24/48</td>
<td>3 A</td>
</tr>
<tr>
<td>125</td>
<td>0.3 A</td>
</tr>
<tr>
<td>250</td>
<td>0.15 A</td>
</tr>
</tbody>
</table>

"Ready to close" contact (PF)
- Optional equipment, one PF contact per device
- Part numbers (connectors not included, see below):
  - standard: 47080
  - Part numbers for connectors:
    - for fixed device: 47074
    - for drawout device: 33098
- The contact indicates that the device may be closed because all the following are valid:
  - circuit breaker is open
  - spring mechanism is charged
  - a maintained closing order is not present
  - a maintained opening order is not present.
- Changeover contact
- Breaking capacity at $\cos \varphi = 0.3$ (AC12 / DC12 as per 60947-5-1)
- standard, minimum current 10 mA / 24 V

<table>
<thead>
<tr>
<th>Voltage</th>
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<tr>
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<td>3 A</td>
</tr>
<tr>
<td>125</td>
<td>0.3 A</td>
</tr>
<tr>
<td>250</td>
<td>0.15 A</td>
</tr>
</tbody>
</table>
Discovering EasyPact SPS accessories

Auxiliaries for remote operation

Gear motor (MCH)
- Optional equipment, one MCH gear motor per device
- Part numbers (connectors not included, see below):
  - AC 50 / 60 Hz:
    - 48: 33186
    - 100/130: 33176
    - 200/240: 33177
    - 277/415: 33179
    - 440/480 +Resistor: 33179 + 33193
  - DC:
    - 24/30: 33185
    - 48/60: 33186
    - 100/125: 33187
    - 200/250: 33188
  - Part numbers for connectors:
    - for fixed device: 47074
    - for drawout device: 33098
- The gear motor automatically charges the spring mechanism.

Closing release XF
- Optional equipment, XF release per device
- The function (XF) is determined by where the coil is installed
  - Part numbers (connectors not included, see below)
    - V AC 50/60 Hz, V DC:
      - standard version: 24AC 24/30DC: 33659
      - 48AC 48/60DC: 33660
      - 100/130 AC/DC: MVS15511
      - 200/250 AC/DC: MVS15512
      - 380/480 AC: MVS15513
  - Part numbers for connectors:
    - for fixed device: 47074
    - for drawout device: 33098
- The XF release instantaneously closes the circuit breaker when energised, if the device is "ready to close".

Opening releases MX
- Optional equipment, 1 MX release per device
- The function (MX) is determined by where the coil is installed
  - Part numbers (connectors not included, see below)
    - V AC 50/60 Hz, V DC:
      - standard version: 24AC 24/30DC: 33659
      - 48AC 48/60DC: 33660
      - 100/130 AC/DC: MVS15511
      - 200/250 AC/DC: MVS15512
      - 380/480 AC: MVS15513
  - Part numbers for connectors:
    - for fixed device: 47074
    - for drawout device: 33098
- The MX release instantaneously opens the circuit breaker when energised

Power supply:
- V AC 50/60 Hz: 48/60 100/130 - 200/240 - 277 400/440/480
- V DC: 24/30 - 48/60 100/125 - 200/250
- Operating threshold: 0.85 to 1.1 Un
- Consumption:
  - 180 VA or W
  - Inrush current:
    - 2 to 3 In for 0.1 second
  - Charging time: 3 seconds max.
  - Operating rate:
    - maximum 3 cycles per minute.

- V AC 50 / 60 Hz:
  - 48 - 100/130 - 200/250 - 240/277 - 380/480
  - V DC: 24/30 - 48/60 - 100/130 - 200/250
- Operating threshold:
  - XF: 0.85 to 1.1 Un
- Consumption:
  - pick-up: 200 VA or W (80 ms)
  - hold: 4.5 VA or W
- Circuit-breaker response time at Un:
  - XF: 55 ms ± 10.

- V AC 50 / 60 Hz:
  - 24 48 - 100/130 - 200/250 - 240/277 - 380/480
  - V DC: 24/30 - 48/60 - 100/130 - 200/250
- Operating threshold:
  - MX: 0.7 to 1.1 Un
- Consumption:
  - pick-up: 200 VA or W (80 ms)
  - hold: 4.5 VA or W
- Circuit-breaker response time at Un:
  - MX: 50 ms ± 10.
Discovering EasyPact SPS accessories

**Instantaneous undervoltage releases (MN)**
- Optional equipment, 1 MN per device.
- Part numbers (connectors not included, see below)
  - V AC 50/60 Hz, V DC:
    - 24AC 24/30DC: 33668
    - 48AC 48/60DC: 33669
    - 100/130AC/DC: 33670
    - 200/250AC/DC: 33671
    - 380/480 AC: 33673
- Part numbers for connectors:
  - for fixed device: 47074
  - for drawout device: 33098
- The MN release instantly opens the circuit breaker when its supply voltage drops.
- Power supply:
  - V AC 50/60 Hz: 24/48 100/130 - 200/250 240/277 - 380/480
  - V DC: 24/30 - 48/60 100/130 - 200/250
- Operating threshold:
  - opening: 0.35 to 0.7 Un
  - closing: 0.85 Un
- Consumption:
  - pick-up: 200 VA or W (80 ms)
  - hold: 4.5 VA or W
- Circuit-breaker response time at Un: 40 ms ± 10.

**Delay unit for MN releases**
- Optional equipment, 1 MN with delay unit per device
- Delay-unit part numbers
  - V AC 50/60 Hz, V DC:
    - non adjustable:
      - 100/130 AC/DC: 33684
      - 200/250 AC/DC: 33685
    - adjustable:
      - 48/60 AC/DC: 33680
      - 100/130 AC/DC: 33681
      - 200/250 AC/DC: 33682
      - 380/480 AC/DC: 33683
- The unit delays operation of the MN release to eliminate circuit-breaker nuisance tripping during short voltage dips.
- The unit is wired in series with the MN and must be installed outside the circuit breaker.
- Power supply V AC 50/60 Hz, V DC:
  - non adjustable:
    - 100/130 - 200/250
  - adjustable:
    - 48/60 - 100/130 200/250 - 380/480
- Operating threshold:
  - opening: 0.35 to 0.7 Un
  - closing: 0.85 Un
- Consumption:
  - pick-up: 200 VA or W (80 ms)
  - hold: 4.5 VA or W
- Circuit-breaker response time at Un:
  - non adjustable: 0.25 second
  - adjustable: 0.5 - 0.9 - 1.5 - 3 seconds.
Wiring of control auxiliaries

Under pick-up conditions, the level of consumption is approximately 150 to 200 VA. Consequently, for low supply voltages (24, 48 V), cables must not exceed a maximum length determined by the supply voltage and the cross-section of the cables.

Indicative values for maximum cable lengths (in meters)

<table>
<thead>
<tr>
<th></th>
<th>24 V</th>
<th>48 V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.5 mm² 1.5 mm²</td>
<td>2.5 mm² 1.5 mm²</td>
</tr>
<tr>
<td>MN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 %</td>
<td>58</td>
<td>280</td>
</tr>
<tr>
<td>source voltage</td>
<td>36</td>
<td>165</td>
</tr>
<tr>
<td>85 %</td>
<td>16</td>
<td>75</td>
</tr>
<tr>
<td>source voltage</td>
<td>10</td>
<td>45</td>
</tr>
<tr>
<td>MX-XF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 %</td>
<td>115</td>
<td>550</td>
</tr>
<tr>
<td>source voltage</td>
<td>70</td>
<td>330</td>
</tr>
<tr>
<td>85 %</td>
<td>75</td>
<td>350</td>
</tr>
<tr>
<td>source voltage</td>
<td>44</td>
<td>210</td>
</tr>
</tbody>
</table>

*Note:* The indicated length is that for each of the two supply wires.
Discovering EasyPact SPS accessories

Device mechanical accessories

Escutcheon (CDP)
- Optional equipment, one CDP per device
- Part numbers:
  - for fixed device: 33718
  - for drawout device: 33857.
- The CDP increases the degree of protection to IP 40 and IK 07 (fixed and drawout devices).

Transparent cover (CCP)
- Optional equipment, one CCP per device equipped with a CDP
- Part number: 33859 (for drawout devices).
- Mounted with a CDP, the CCP increase the degree of protection to IP 54 and IK 10 (fixed and drawout devices).

Blanking plate (OP)
- Optional equipment, one OP per device
- Part number: 33858.
- Used with the escutcheon, this option closes off the door cut-out of a cubicle not yet equipped with a device. It may be used with the escutcheon for both fixed and drawout devices.
Discovering EasyPact SPS accessories

Device mechanical accessories

**Transparent cover for pushbutton locking using a padlock, lead seal or screws**
- Optional equipment, one locking cover per device
- Part number: 33897
- The transparent cover blocks access (together or separately) to the pushbuttons used to open and close the device
- Locking requires a padlock, a lead seal or two screws.

**Device OFF position locking kit for keylocks**
- Optional equipment: one locking kit (without keylock) per device
- Part numbers:
  - for Profalux: MVS31117
  - for Ronis: MVS31113
- Optional equipment, one locking system per device.
- The kit inhibits local or remote closing of the device
- Mounted on the chassis and accessible with the door closed, this system locks the circuit breaker in "disconnected" position using one or two keylocks.

**Keylocks required for the device OFF position**
- One or two keylocks per locking kit
- Part numbers:
  - Profalux: 1 keylock: 42888
  - 2locks+1key: 42878
  - Ronis: 1lock+1key: 41940
  - 2locks+1key: 41950
Discovering EasyPact SPS accessories

Chassis accessories

**Safety shutters**
- Optional equipment
- Part numbers (set of shutters for top and bottom) drawout, front/rear connection:
  - 3 poles: 33765
  - 4 poles: 33766
- Mounted on the chassis, the safety shutters automatically block access to the disconnecting contact cluster when the device is in the "disconnected" or "test" positions.
- IP 20 for chassis connections
- IP 40 for the disconnecting contact cluster.

If specified when ordering the chassis, this locking function may be adapted to operate in all positions ("connected", "test" and "disconnected"), instead of in "disconnected" position alone.

**Circuit breaker locking in "disconnected" position**
- Optional equipment, one locking system per device
- Part numbers (keylocks not included):
  - for Profalux keylocks: 33769
  - for Ronis keylocks: 33770
- Mounted on the chassis and accessible with the door closed, this system locks the circuit breaker in "disconnected" position using one or two keylocks.

**Keylocks required with the "disconnected" position locking system**
- One keylock per locking system
- Part numbers:
  - Profalux: 1keylock: 42888
    2locks+1key: 42878
  - Ronis: 1keylock: 41940
    2locks+1key: 41950
- Mounted on the chassis and accessible with the door closed, this system locks the circuit breaker in "disconnected" position using one or two keylocks.
### Door interlock
- Optional equipment, one door interlock per chassis
- Part number: 33172
- This device inhibits opening of the cubicle door when the circuit breaker is in "connected" or "test" position.
- It may be mounted on the left or right-hand side of the chassis.

### Auxiliary terminal shield (CB)
- Optional equipment, one CB shield per chassis
- Part numbers:
  - 3 poles: 33763
  - 4 poles: 33764
- The shield prevents access to the terminal block of the electrical auxiliaries.

### "Connected", "disconnected" and "test" position carriage switches (CE, CD, CT)
- Optional equipment, one to three carriage switches
- Standard configuration, 0 to 1 CE, 0 to 1 CD, 0 to 1 CT
- Part numbers:
  - Standard: 33170
- The carriage switches indicate the three positions:
  - CE: connected position
  - CD: disconnected position (when the minimum isolation distance between the main contacts and the auxiliary contacts is reached)
  - CT: test position.
- Changeover contact
- Breaking capacity at \( \cos \varphi = 0.3 \) (AC12 / DC12 as per 60947-5-1)
- Standard, minimum current 10 mA / 24 V

<table>
<thead>
<tr>
<th>V AC</th>
<th>8 A (rms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>240</td>
<td></td>
</tr>
<tr>
<td>380</td>
<td>8 A (rms)</td>
</tr>
<tr>
<td>480</td>
<td>8 A (rms)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>V DC</th>
<th>2.5 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>24/48</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>0.8 A</td>
</tr>
<tr>
<td>250</td>
<td>0.3 A</td>
</tr>
</tbody>
</table>
Inspecting and testing before use

These operations must be carried out in particular before using a EasyPact device for the first time.

Initial tests
Procedure

A general check of the circuit breaker takes only a few minutes and avoids any risk of mistakes due to errors or negligence.

A general check must be carried out:
- prior to initial use
- following an extended period during which the circuit breaker is not used.

A check must be carried out with the entire switchboard de-energised.

In switchboards with compartments, only those compartments that may be accessed by the operators must be de-energised.

Electrical tests
Insulation and dielectric-withstand tests must be carried out immediately after delivery of the switchboard. These tests are precisely defined by international standards and must be directed and carried out by a qualified expert.

Prior to running the tests, it is absolutely necessary to:
- disconnect all the electrical auxiliaries of the circuit breaker (MCH, MX, XF, MN)
- remove the long-time rating plug on the 2.0, 6G control units.

Switchboard inspection
Check that the circuit breakers are installed in a clean environment, free of any installation scrap or items (tools, electrical wires, broken parts or shreds, metal objects, etc.).

Conformity with the installation diagram
Check that the devices conform with the installation diagram:
- breaking capacities indicated on the rating plates
- identification of the control unit (type, rating)
- presence of any optional functions (remote ON/OFF with motor mechanism, auxiliaries, measurement and indication modules, etc.)
- protection settings (long time, short time, instantaneous, earth fault)
- identification of the protected circuit marked on the front of each circuit breaker.

Condition of connections and auxiliaries
Check device mounting in the switchboard and the tightness of power connections.
Check that all auxiliaries and accessories are correctly installed:
- electrical auxiliaries
- terminal blocks
- connections of auxiliary circuits.

Operation
Check the mechanical operation of the circuit breakers:
- opening of contacts
- closing of contacts.

Check on the control unit
Identify the control unit of each circuit breaker Please refer page no. 22
Note the fault
Faults are signalled locally and remotely by the indicators and auxiliary contacts installed on circuit breakers (depending on each configuration). See page 11 in this manual and the user manual of the control unit for information on the fault indications available with your circuit breaker.

Identify the cause of tripping
A circuit must never be reclosed (locally or remotely) before the cause of the fault has been identified and cleared.
A fault may have a number of causes:
- depending on the type of control unit, fault diagnostics are available. See the user manual for the control unit.
- depending on the type of fault and the criticality of the loads, a number of precautionary measures must be taken, in particular the insulation and dielectric tests on a part of or the entire installation. These checks and test must be directed and carried out by qualified personnel.

Inspect the circuit breaker following a short-circuit
- Check the arc chutes (see page 51)
- Check the contacts (see page 51)
- Check the tightness of connections (see the device installation manual)
- Check the disconnecting-contact clusters (see page 51).

Reset the circuit breaker
The circuit breaker can be reset locally or remotely. See page 11 in this manual for information on how the circuit breaker can be reset.
Recommended program for devices used under normal operating conditions:
Ambient temperature: -5 °C / +70 °C
Normal atmosphere

### Periodic inspections required

<table>
<thead>
<tr>
<th>Interval</th>
<th>Operation</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each year</td>
<td>■ Open and close the device locally and remotely, successively using the various auxiliaries</td>
<td>□ see pages 9 and 10&lt;br&gt; ■ Test the operating sequences</td>
</tr>
<tr>
<td>Every two years</td>
<td>■ Check the arc chutes&lt;br&gt; ■ Check the main contacts&lt;br&gt; ■ Check the tightness of connections</td>
<td>□ see page 51&lt;br&gt; ■ see page 51&lt;br&gt; □ see the device installation manual</td>
</tr>
</tbody>
</table>

### Parts requiring replacement, depending on the number of operating cycles

The following parts must be replaced periodically to lengthen the service life of the device (maximum number of operating cycles).

<table>
<thead>
<tr>
<th>Part</th>
<th>Intervening entity</th>
<th>Description or procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arc chutes</td>
<td>User</td>
<td>□ see page 51</td>
</tr>
<tr>
<td>Main contacts</td>
<td>Inspection: user</td>
<td>□ see page 51</td>
</tr>
<tr>
<td>MCH gear motor</td>
<td>User</td>
<td>□ see page 8</td>
</tr>
<tr>
<td>Mechanical interlocks</td>
<td>User</td>
<td>□ see page 51</td>
</tr>
<tr>
<td>Connecting-rod springs</td>
<td>Schneider After Sales Support</td>
<td>□ see pages 9 and 10</td>
</tr>
<tr>
<td>MX/MN/XF</td>
<td>User</td>
<td>□ see pages 9 and 10</td>
</tr>
</tbody>
</table>

Part replacement must be programmed on the basis of the data below, listing the service life of the various parts in numbers of O/C cycles at the rated current.

### Number of O/C cycles at the rated current

<table>
<thead>
<tr>
<th>Type of circuit breaker</th>
<th>Maximum service life</th>
<th>Service life of various parts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arc chutes, main contacts&lt;br&gt; Connecting-rod springs, MCH, interlocking systems</td>
<td>MX / XF / MN releases</td>
</tr>
<tr>
<td>SPS08 to 16 Type F</td>
<td>12500</td>
<td>440 V: 6000 12500 12500</td>
</tr>
</tbody>
</table>
Before undertaking any maintenance work, de-energise the installation and fit locks or warnings in compliance with all applicable safety standards.

**Arc chutes**
- Remove the fixing screws

![Image of arc chute removal](image1)

- Check the arc chutes:
  - chamber intact
  - separators not corroded.

If necessary, replace the arc chutes.

![Image of arc chute refitting](image2)

- Refit the arc chutes and secure with a tightening torque of 1.5 Nm.

**Wear of main contacts**
- Remove the arc chutes
- Visually check the contacts.

If necessary, contact Schneider After-sales support.

**Disconnecting-contact clusters**
- Grease the contacts using the grease listed on page 52, supplied by Schneider Electric
- Check the contacts as follows:
  - open the circuit breaker
  - de-energise the busbars
  - disconnect the circuit breaker
  - remove the circuit breaker
  - check the contact fingers (no sign of copper should be visible).

Replace any worn clusters.
Maintaining EasyPact SPS performance

Ordering replacement parts

**Electrical accessories**

The electrical accessories that may require replacement are the following:

- MCH gear motor
- MX opening release(s)
- XF closing release
- MN undervoltage release.

See pages 41 and 42 in the "Auxiliaries for remote operation" section for their characteristics and part numbers.

**Arc chutes**

- Part numbers
  - (1 arc chute):
    - type F: 47095
  - One chute per pole.

**Front**

- Part number: MVS31114
  - 1 per 3- or 4-pole device.

**Charging handle**

- Part number (1 handle):
  - 47092
  - 1 per device.

**Crank**

- Part number (1 crank):
  - 47098
  - 1 per device.

**Support for MX / XF / MN releases**

- Part number: 47093
  - 1 per device.

**Disconnecting-contact clusters**

- Part number (1 cluster):
  - 64906

**Grease for disconnecting-contact clusters**

- Part number (1 can):
  - 33160
# Troubleshooting and solutions

<table>
<thead>
<tr>
<th>Problem</th>
<th>Probable causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker cannot be closed locally or remotely</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ Circuit breaker padlocked or keylocked in the &quot;open&quot; position</td>
<td>□ disable the locking function</td>
</tr>
<tr>
<td></td>
<td>■ Circuit breaker interlocked mechanically in a source changeover system</td>
<td>□ check the position of the other circuit breaker in the changeover system</td>
</tr>
<tr>
<td></td>
<td>■ Circuit breaker not completely connected</td>
<td>□ modify the situation to release the interlock</td>
</tr>
<tr>
<td></td>
<td>■ The reset button signalling a fault trip has not been reset</td>
<td>□ terminate racking in (connection) of the circuit breaker</td>
</tr>
<tr>
<td></td>
<td>■ Stored energy mechanism not charged</td>
<td>□ clear the fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ push the reset button on the front of the circuit breaker</td>
</tr>
<tr>
<td></td>
<td>■ MX opening shunt release permanently supplied with power</td>
<td>□ charge the mechanism manually</td>
</tr>
<tr>
<td></td>
<td>■ MN undervoltage release not supplied with power</td>
<td>□ if it is equipped with a an MCH gear motor, check the supply of power to the motor. If the problem persists, replace the gear motor (MCH)</td>
</tr>
<tr>
<td></td>
<td>■ XF closing release continuously supplied with power, but circuit breaker not &quot;ready to close&quot; (XF not wired in series with PF contact)</td>
<td>□ there is an opening order. Determine the origin of the order. The order must be cancelled before the circuit breaker can be closed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ check the voltage and the supply circuit (U &gt; 0.85 Un).</td>
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□ Opening order not executed by the MN undervoltage release | □ check the voltage and the supply circuit (0.7 - 1.1 Un).  
If the problem persists, replace the MX release  
□ drop in voltage insufficient or residual voltage (> 0.35 Un) across the terminals of the undervoltage release. If the problem persists, replace the MN release |
| Circuit breaker cannot be opened locally | □ Operating mechanism malfunction or welded contacts | □ contact a Schneider service centre |
| Circuit breaker cannot be reset locally but not remotely | □ Insufficient supply voltage for the MCH gear motor | □ check the voltage and the supply circuit (0.7 - 1.1 Un).  
If the problem persists, replace the MCH |
| Nuisance tripping of the circuit breaker with activation of the reset button signalling a fault trip | □ Reset button not pushed-in completely | □ push the reset button in completely |
| Impossible to insert the crank in connected, test or disconnected position | □ A padlock or keylock is present on the chassis or a door interlock is present | □ disable the locking function |
| Impossible to turn the crank | □ The reset button has not been pressed | □ press the reset button |
| Circuit breaker cannot be removed from chassis | □ Circuit breaker not in disconnected position  
□ The rails are not completely out | □ turn the crank until the circuit breaker is in disconnected position and the reset button out  
□ pull the rails all the way out |
| Circuit breaker cannot be connected (racked in) | □ Cradle/circuit breaker mismatch protection  
□ The safety shutters are locked  
□ The disconnecting-contact clusters are incorrectly positioned  
□ Cradle locked in disconnected position  
□ The reset button has not been pressed, preventing rotation of the crank  
□ The circuit breaker has not been sufficiently inserted in the cradle | □ check that the cradle corresponds with the circuit breaker  
□ remove the lock(s)  
□ reposition the clusters  
□ disable the cradle locking function  
□ press the reset button  
□ insert the circuit breaker completely so that it is engaged in the racking mechanism |
| Circuit breaker cannot be locked in disconnected position | □ The circuit breaker is not in the right position  
□ The crank is still in the cradle | □ check the circuit breaker position by making sure the reset button is out  
□ remove the crank and store it |
| Circuit breaker cannot be locked in connected, test or disconnected position | □ Check that locking in any position is enabled  
□ The circuit breaker is not in the right position  
□ The crank is still in the cradle | □ contact a Schneider Electric service centre  
□ check the circuit breaker position by making sure the reset button is out  
□ remove the crank and store it |
Checking EasyPact SPS operating conditions

Environmental conditions

Ambient temperature
EasyPact SPS devices can operate under the following temperature conditions:
- the electrical and mechanical characteristics are stipulated for an ambient temperature of -5 °C to +70 °C
- circuit-breaker closing is guaranteed down to -35 °C
- the control unit can be stored in an ambient temperature of -25 °C to +85 °C

Extreme atmospheric conditions
EasyPact SPS devices have successfully passed the tests defined by the following standards for extreme atmospheric conditions:
- IEC 68-2-1: dry cold at -55 °C
- IEC 68-2-2: dry heat at +85 °C
- IEC 68-2-30: damp heat (temperature +55 °C, relative humidity 95 %)
- IEC 68-2-52 level 2: salt mist.

EasyPact SPS devices can operate in the industrial environments defined by standard IEC 60947 (pollution degree up to 4).

It is nonetheless advised to check that the devices are installed in suitably cooled switchboards without excessive dust.

Vibrations
EasyPact SPS devices resist electromagnetic or mechanical vibrations.
Tests are carried out in compliance with standard IEC 68-2-6 for the levels required by merchant-marine inspection organisations (Veritas, Lloyd’s, etc.):
- 2 to 13.2 Hz: amplitude ±1 mm
- 13.2 to 100 Hz: constant acceleration 0.7 g.

Excessive vibration may cause tripping, breaks in connections or damage to mechanical parts.
Altitude
Easypace SPS devices are designed for operation at altitudes under 2000 metres. At altitudes higher than 2000 metres, the modifications in the ambient air (electrical resistance, cooling capacity) lower the following characteristics.

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<th>Dielectric withstand voltage (V)</th>
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<th>Rated operational voltage (V)</th>
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<tr>
<td>2000</td>
<td>3500</td>
<td>1000</td>
<td>440</td>
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<tr>
<td>3000</td>
<td>3150</td>
<td>900</td>
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Electromagnetic disturbances
Easypace SPS devices are protected against:
- Overvoltages caused by devices that generate electromagnetic disturbances
- Overvoltages caused by an atmospheric disturbance or by a distribution-system outage (e.g. failure of a lighting system)
- Devices emitting radio waves (radios, walkie-talkies, radar, etc.)
- Electrostatic discharges produced by users.

Easypace SPS devices have successfully passed the electromagnetic-compatibility tests (EMC) defined by the following international standards:
- IEC 60947-2, appendix F

The above tests guarantee that:
- No nuisance tripping occurs
- Tripping times are respected.

Cleaning
- Non-metallic parts:
  - Never use solvent, soap or any other cleaning product. Clean with a dry cloth only
- Metal parts:
  - Clean with a dry cloth whenever possible. If solvent, soap or any other cleaning product must be used, make sure that it does not come into contact with non-metallic parts.