

Micro Application Example



service & SUPPORT

Automatic System Transfer
with LOGO! and SENTRON circuit-breaker

SIEMENS

Micro Automation Set 29

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Preface

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The sets help you to obtain answers with regard to required products and the question of how they function when combined.

However, depending on the system requirements, a variety of other components (e.g. other CPUs, power supplies, etc.) can be used to implement the functionality on which this set is based. For these components, please refer to the corresponding SIEMENS A&D catalogs.

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1 Application Areas and Usage

1.1 Automation Task

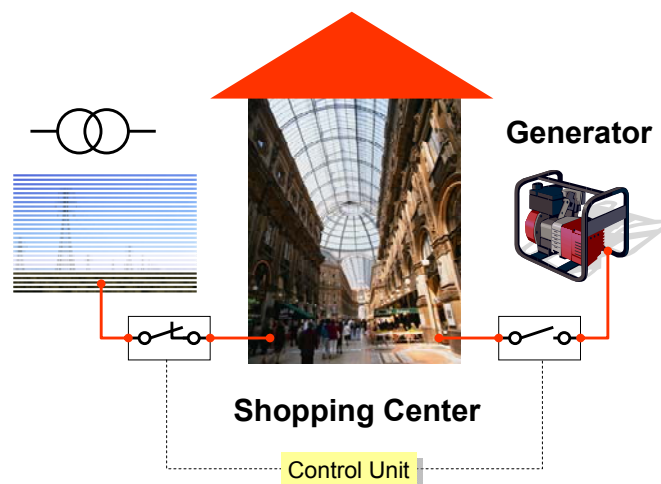
A shopping center shall, in case of a power cut, be provided with emergency lighting and other devices, which are important for maintaining the infrastructure, by means of a generator.

A monitoring sensor shall monitor the availability of the network. If it detects a power cut, a control unit shall cause the power system circuit-breaker to disconnect the main power system of the shopping center from the public net and at the same time request power from the generator. The control unit shall be informed of the availability of the generator power via a further monitoring sensor. After the completed disconnection from the public net, the emergency power system of the shopping center shall be connected with the generator.

This state shall be maintained until the first monitoring sensor signals that the power from the public net is available again. Then the control unit shall disconnect the circuit-breaker, responsible for the emergency power supply, from the emergency power system of the shopping center. After the successful disconnection, the control unit shall switch on the network circuit-breaker in order to supply the shopping center with power from the public net again. As soon as this process has been completed, the control unit shall signal to the generator to terminate operation.

In order to ensure a high availability of the generator it must be possible to test its functioning once every month.

Figure 1-1



1.2 Automation solution – Set 29

One compact circuit-breaker each of type VL 160N connects the shopping center with the public net or the emergency power system respectively.

Using the SIRIUS monitoring relays, the availability of the 3 phases of the public net and the emergency power system are monitored.

The LOGO! logic module disconnects the circuit-breaker from the public net if the SIRIUS monitoring relay detects a phase error or a failure and requests the generator to be switched on.

If the availability of the generator power system is confirmed via the SIRIUS monitoring relay, the LOGO! logic module connects the circuit-breaker to the generator power system.

If the SIRIUS monitoring relay signals that the public net is available again, the LOGO! logic module transfers back to the public net and switches the generator off.

For maintenance purposes it can be switched to manual mode. The circuit-breaker can be switched either to the public net or the generator power system and be switched on and off by means of the direct button.

1.2.1 Block diagram

2 solutions are offered.

Version 1:

Operation via external switches and push buttons. Ideal with the new LOGO! text display unit as an additional display.

- Project: see table 5-1; no.1

Version 2:

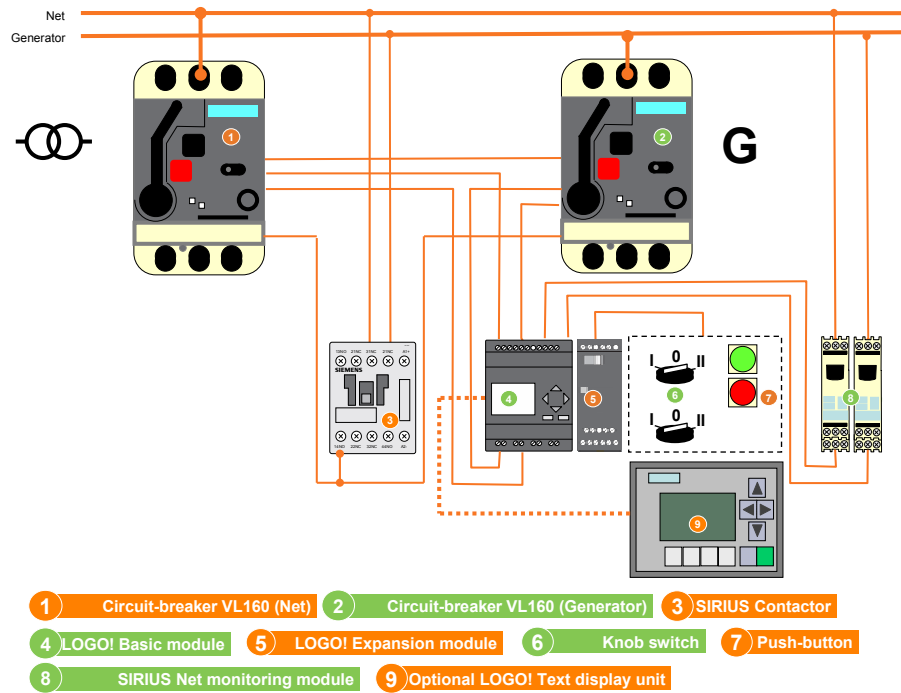
Operation merely via the new LOGO! text display

- Project: table 5-1; no.2

Operating via external switches and push buttons

The figure shows the block diagram with external switches and push buttons.

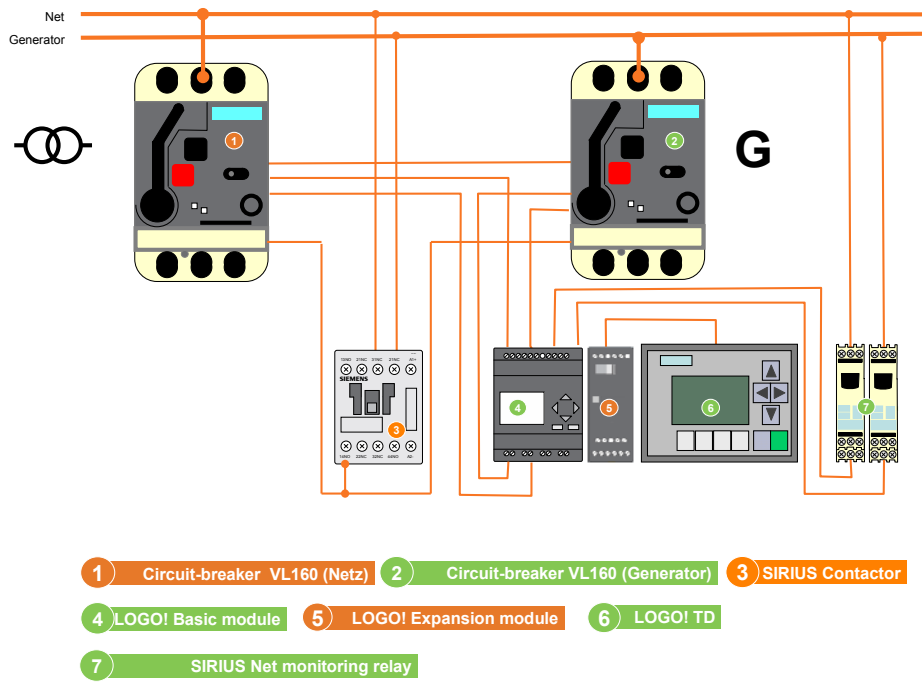
Figure 1-2



Operating via the new LOGO! text display

The figure shows the block diagram with the LOGO! text display unit.

Figure 1-3



1.3 Application areas

Industry

- Production lines for continuous production
- Engine rooms for ships
- Important additional equipment for thermal power plants

Infrastructure

- Docks and railroad systems
- Airport lighting

Building technologies

- Operating theaters in hospitals
- Computer rooms (banks, insurance companies, etc.)
- Lighting systems for shopping centers
- Public buildings

1.4 Benefits

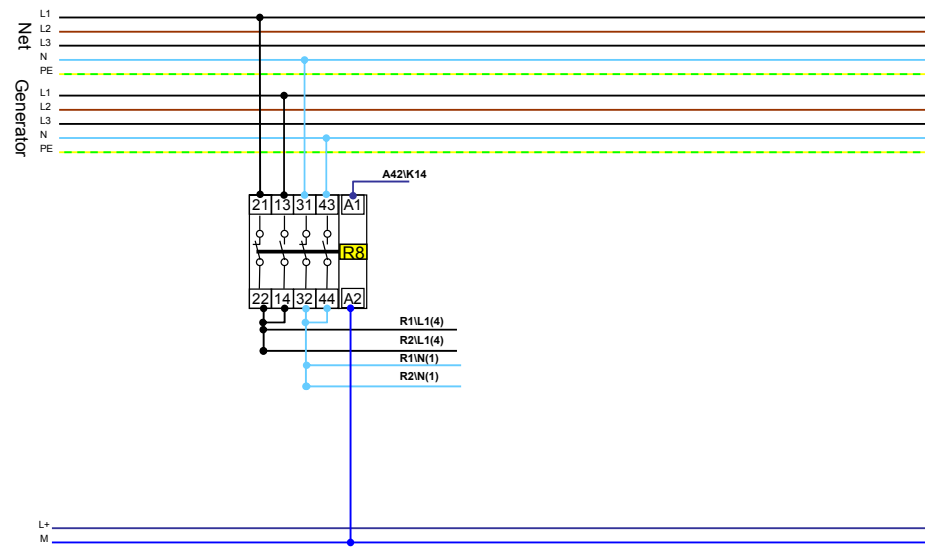
- Network monitoring is safely and reliably handled by the SIRIUS monitoring relay 3UG4
- The system transfer process is controlled cost-effectively by the LOGO! logic module
- The high transfer requirement is realized by SENTRON motorized compact circuit-breakers.
- The automatic system transfer ensures a safe power supply during power failure
- Cost reduction – due to automatic system transfer during power failure and the automatic reset upon a restored network, the service personnel need not interfere
- Preselectable power management
- Load shedding during system transfer to the emergency power system

2 Wiring Diagrams

2.1 Wiring diagram: 230V power supply

The actuator motors of the circuit-breakers are feed via change-over contactor “R8” by the currently available power system. This ensures that both circuit-breakers can be controlled even during power failure.

Figure 2-1

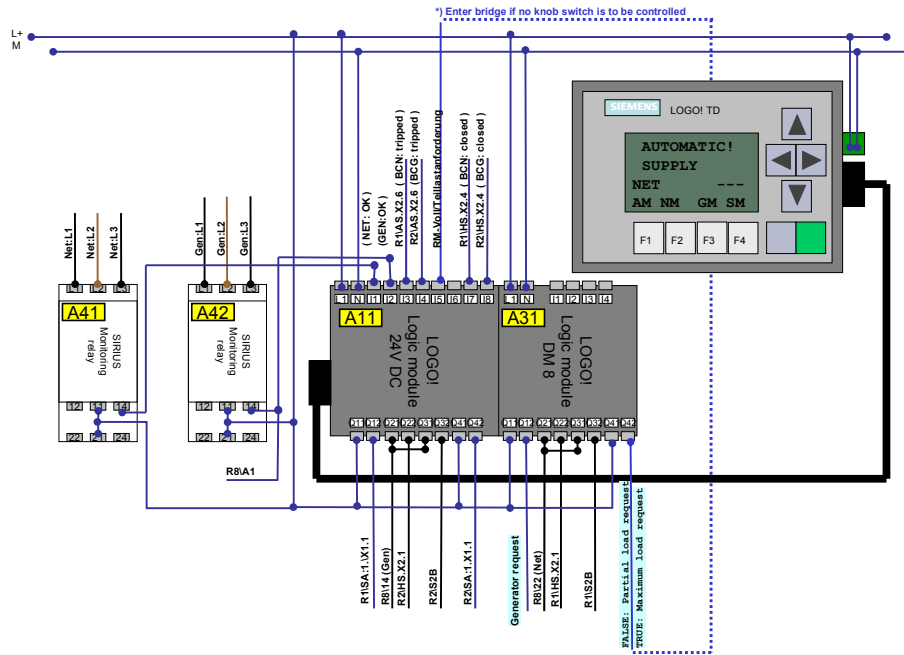


Change-over contactor “R8” connects phase “L1” as well as neutral conductor “N”, depending on the availability of the generator, between public net and generator power system. As soon as the generator power system is available, the relay transfers from the public net to the generator power system.

2.2.2 Operation via the new LOGO! text display unit

When operating merely via the new LOGO! text display unit there will be no installation expenditure for the external switches and push buttons.

Figure 2-3



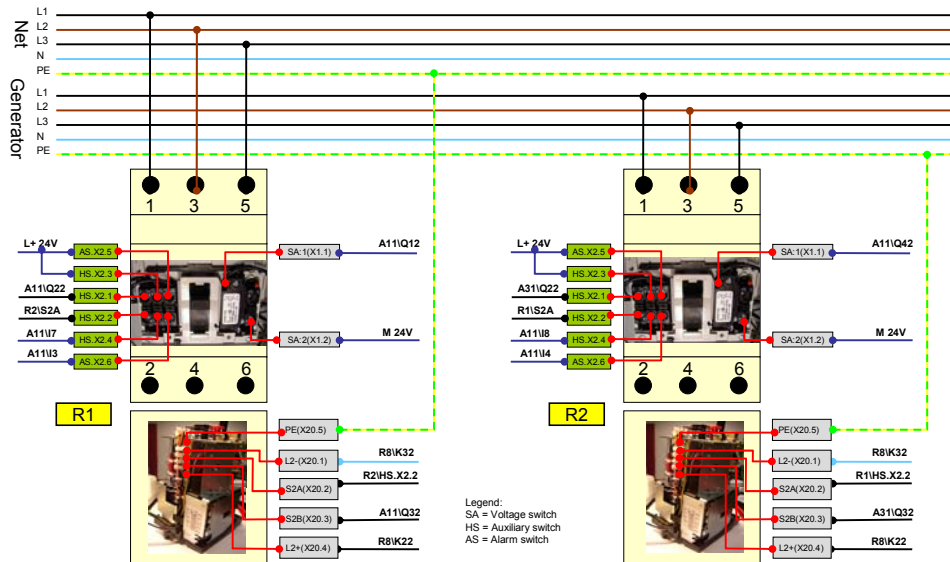
2.3 Wiring diagram: Circuit-breaker

The actuator motors of the circuit-breakers are feed via change-over contactor "R8" by the currently available power system. This ensures that both circuit-breakers can be controlled even during power failure.

Note

The following diagram illustrates a 3-pole circuit-breaker. At constant control functionality it can be replaced by a 4-pole circuit-breaker (it switches 3 phases + neutral conductor).

Figure 2-4



The circuit-breakers are switched by the LOGO! logic module. In order to prevent both circuit-breakers from switching on simultaneous, the digital switch-on command was looped to circuit-breaker "R1" ("R2") via an auxiliary contact of circuit-breaker "R2" ("R1").

3 Hardware and Software Components

3.1 System transfer

Products

Table 3-1

Component	Qty.	MLFB / Order number	Note
LOGO! logic module (12/24RC)	1	6ED1052-1MD00-0BA6	Component: A11
LOGO! DM8 24R expansion module	1	6ED1055-1HB00-0BA0	Component: A31
SENTRON circuit-breaker VL 160N	2	3VL2705-1DC33-8CD1	Component: R1 Component: R2
Alternative option: SENTRON circuit-breaker VL 160N	2	3VL2705-1EJ43-8CD1	Switches 3 phases + neutral conductor
SENTRON motorized operating mechanism with spring energy store	2	3VL9300-3MQ00	
SENTRON, shunt release	2	3VL94001SC00	
SIRIUS monitoring relay 3UG4	2	3UG4617-1CR20	Component: A41 Component: A42
SIRIUS contactor relay	1	3RH1122-1BB40	Component: R8
RC element	1	3RT1916-1CB00	

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Operation via switches and push buttons

Table 3-2

Component	Qty.	MLFB / Order number	Note
Knob switch round, I-0-II	2	3SB3210-2DA11	Component: S1/S2
Push button green, 1NO	1	3SB3202-0AA41	Component: S3
Pushbutton red, 1NO	1	3SB3203-0AA21	Component: S4

Operation via the new LOGO! text display unit or optional

Table 3-3

Component	Qty.	MLFB / Order number	Note
LOGO! TD	1	6ED1057-1AA00-0BA0	Component:

Accessories

Table 3-4

Component	Qty.	MLFB / Order number	Note
LOGO! PC – CABLE	1	6ED1057-1AA00-0BA0	

Configuration software/tools

Table 3-5

Component	Qty.	MLFB / Order number	Note
LOGO! SOFT COMFORT V6.0 SINGLE LICENSE	1	6ED1058-0BA01-0YA0	

Accessories for “Live Demo”

Table 3-6

Component	Qty.	MLFB / Order number	Note
Automatic circuit-breaker	2	5SX2316-5	<ul style="list-style-type: none"> • 3-pole • 16A
Light for connection to AC 230V	2		

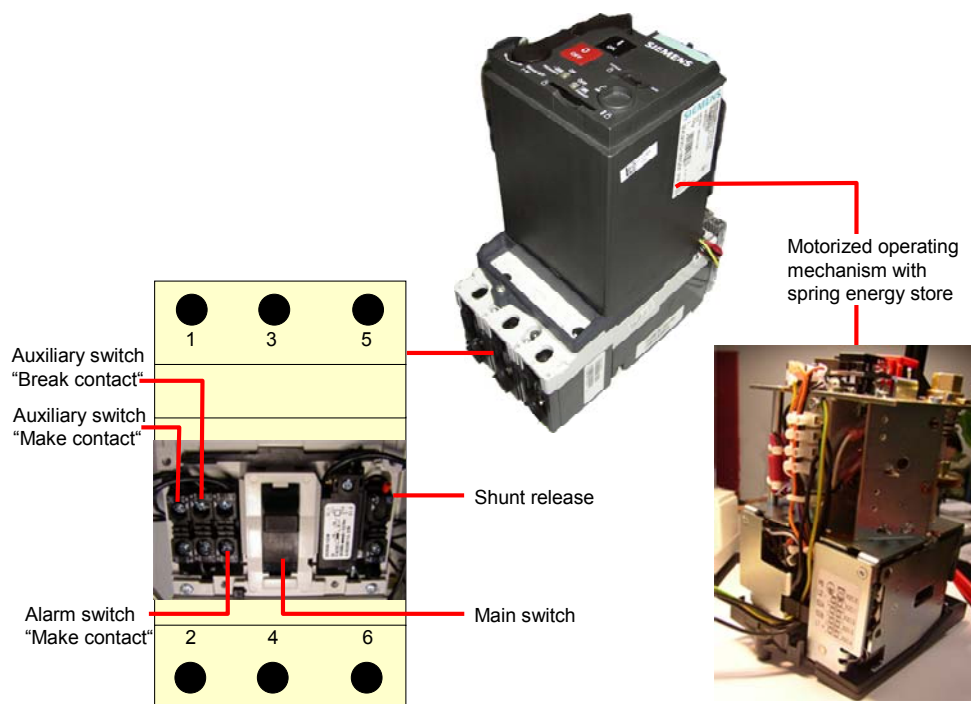
4 Function Principle

4.1 Motorized circuit-breaker

Overview

The circuit-breaker consists of a 3-phase switch which connects the power system with the consumers.

Figure 4-1



In this case, the circuit-breaker consists of the following components:

Table 4-1

No.	Component	Note
1.	Circuit-breaker unit	
2.	Motorized operating mechanism with spring energy store	The motorized operating mechanism with spring energy store is mounted on the circuit-breaker and has the task to open and close it. The motorized operating mechanism works in manual as well as automatic mode. You can set the mode via a slide on the motorized operating mechanism
3.	Shunt release	This auxiliary module is placed in the right installation slot of the circuit-breaker. The relay of the shunt release can, for example, be controlled via the LOGO! module. If the current flow of the shunt release is interrupted, this activates the trigger mechanism of the circuit-breaker and brings it to the "triggered" position
4.	Auxiliary switch	The application contains a break contact and a make contact element. The position of the auxiliary switch represents the status of the circuit-breaker. <ul style="list-style-type: none"> The make contact status signals the Logo! logic module the current position of the circuit-breaker The break contact is used for locking, in order to guarantee, that both circuit-breakers cannot be switched on simultaneously
5.	Alarm switch	This mounting set consists of a make contact element. This alarm switch signals the LOGO! logic module in the closed state that the circuit-breaker has taken on the "triggered" position.

The 3 statuses of the circuit-breaker

The circuit-breaker can assume up to three 3 switch positions

Table 4-2

No.	Switch position	
1.	Closed	In this switch position the contacts of the circuit-breakers are closed. The consumers are connected to the power system and the electricity can flow.
2.	Open	In this switch position the contacts of the circuit-breakers are open. The consumers are connected to the power system and the electricity can flow.
3.	Tripped	In this switch position the contacts of the circuit-breakers are open. The switch position "tripped" is achieved via a mechanism which is either operated directly at the circuit-breaker or via an optional module (e.g. shunt release). After the circuit-breaker has been brought to the "tripped" position, it cannot be closed again immediately. To close the circuit-breaker again it must first be opened. This shall prevent the circuit-breaker from switching back on in case of a fault (e.g. short-circuit in the consumer power system) without the fault having been removed.

4.2 SIRIUS monitoring relay

Monitoring relay 3UG4617 monitors the following states:

- Phase sequence
- Phase failure of one of the phases
- Falling below and exceeding a set voltage
- Exceeding a set asymmetry value
- Difference between the largest and the smallest phase voltage in relation to the largest phase voltage $(U_{x-y \text{ max}} - U_{x-y \text{ min}}) / U_{x-y \text{ max}}$, in a three-phase power system.

If the correct phase sequence is connected to terminals L1-L2-L3, relay A41 or A42 picks up. This is indicated by a relay icon in the display. If the phase sequence is wrong it does not pick up. No fault display appears on the screen, there will only be no relay icon !

If the monitored voltage (U_{x-y}) is larger than the set lower voltage value (U_l) and smaller than the set upper voltage value (U_x), i.e. it is within the voltage limits, and the network voltage asymmetry (Asy) is smaller than the set value, relay A41 or A42 (contact 11-12-14) picks up approx. 50ms after the reaction of A41 or A42. The display at 3UG4617 shows the current phase-to-phase voltage between L1 and L2.

The following network errors are displayed as diagnosis message with blinking icons on the display:

- Phase failure (3UG4618 or failure of the N-conductor). Symmetrical (all three phase/star voltages simultaneously)
- Asymmetrically (only one phase/star voltage) falling short of or exceeding of the voltage value set in the menu. Exceeding the asymmetry which was set in the menu.

During a phase failure the relay A41 or A42 drops out. For the error cases:

- Falling short of voltage value
- Exceeding voltage value
- Asymmetrical exceeding

relay A41 or A42 drops out after the set error delay time (Del).

4.3 Overview of the operating functions

4.3.1 Operating via external switches and push buttons

External switches and push buttons

Figure 4-2

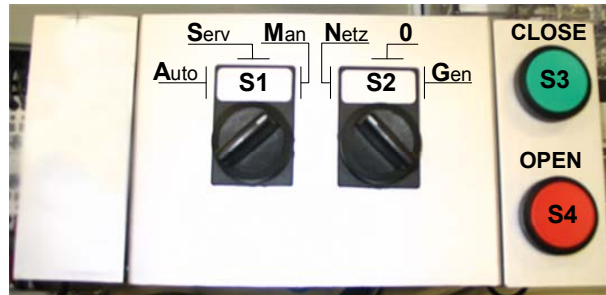


Table 4-3

No.	Switch	Function
1.	S1	Mode switch: For selecting the "Automatic", "Service" and "Manual" mode
2.	S2	Selection circuit-breaker: for selecting the circuit-breaker
3.	S3	Push button for manual closing of the selected circuit-breaker in operating mode: MANUAL
4.	S4	Push button for manual opening of the selected circuit-breaker in operating mode: MANUAL

LOGO!

Table 4-4

No.	Button	Function
1.	ESC	Escape button
2.	OK	Acknowledge button
3.	▲	Cursor up: scroll forward
4.	◀	Cursor left: scroll left
5.	▶	Cursor right: scroll right
6.	▼	Cursor down: scroll back
7.	ESC + ▲	Softkey button
8.	ESC + ▶	Softkey button
9.	ESC + ◀	Softkey button
10.	ESC + ▼	Softkey button

Optional LOGO! Textdisplay

Table 4-5

No.	Key	Function
1.	F1	No function
2.	F2	No function
3.	F3	No function
4.	F4	No function
5.	ESC	Escape button
6.	OK	Acknowledge button
7.	▲	Cursor up: scroll forward
8.	◀	Cursor left: scroll left
9.	▶	Cursor right: scroll right
10.	▼	Cursor down: scroll back
11.	ESC + ▲	Softkey button
12.	ESC + ▶	Softkey button
13.	ESC + ◀	Softkey button
14.	ESC + ▼	Softkey button

4.3.2 Operation via the new LOGO! text display

LOGO! text display unit

Figure 4-3



Table 4-6

No.	Key	Function
1.	F1	AM: For selecting the "Automatic" mode
2.	F2	NM: For selecting the "NET:Manual" mode
3.	F3	GM: For selecting the "GEN:Manual" mode
4.	F4	RM: For selecting the "REQ:Manual" mode (manual requesting of Generator & Load shedding)
5.	ESC	Escape button
6.	OK	Acknowledge button
7.	▲	Cursor up: scroll forward
8.	◀	Cursor left: scroll left
9.	▶	Cursor right: scroll right
10.	▼	Cursor down: scroll back
11.	ESC + ▲	Softkey button
12.	ESC + ▶	Softkey button
13.	ESC + ◀	Softkey button
14.	ESC + ▼	Softkey button

LOGO!

Table 4-7

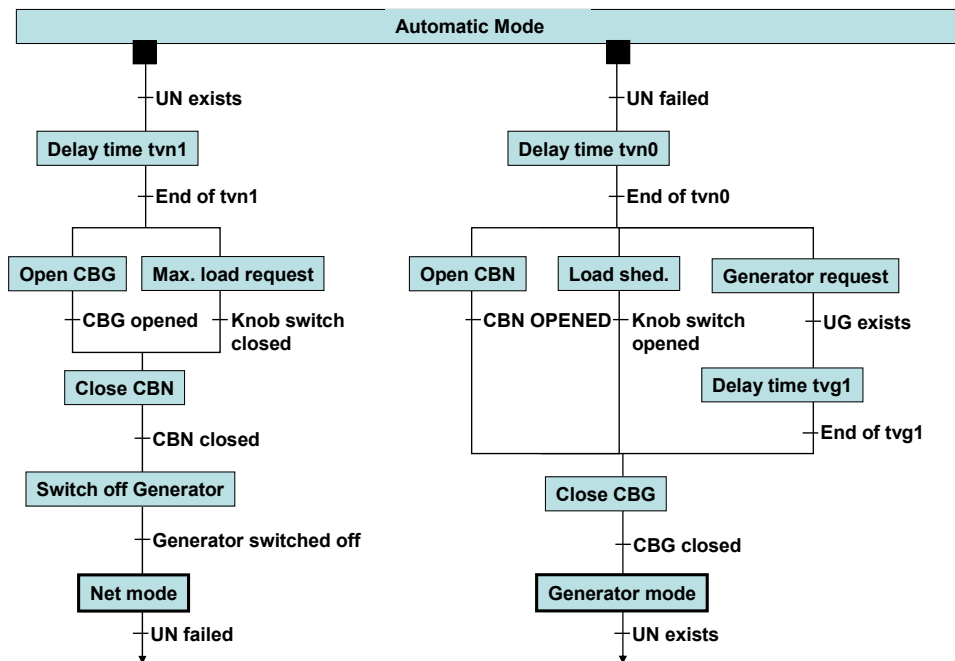
No.	Key	Function
1.	ESC	Escape button
2.	OK	Acknowledge button
3.	▲	Cursor up: scroll forward
4.	◀	Cursor left: scroll left
5.	▶	Cursor right: scroll right
6.	▼	Cursor down: scroll back
7.	ESC + ▲	Softkey button
8.	ESC + ▶	Softkey button
9.	ESC + ◀	Softkey button
10.	ESC + ▼	Softkey button

4.4 Operating modes

4.4.1 Automatic mode

The status diagram shows the behavior of the control program in automatic mode.

Figure 4-4



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Table 4-8


Term	Explanation
UN	Mains Net voltage
UG	Generator voltage
CBN	Circuit-breaker NET
CBG	Circuit-breaker GEN
tvn1	Delay time "Net voltage exists"
tvn0	Delay time "Net voltage failed"
tvG1	Delay time "Generator voltage exists"

Note The interlocking switches of both circuit-breakers must be in "auto" position

Operating via external switches and push buttons

- Mode switch “S1”: “Automatic”
- Selection circuit-breaker “S2”: “0”

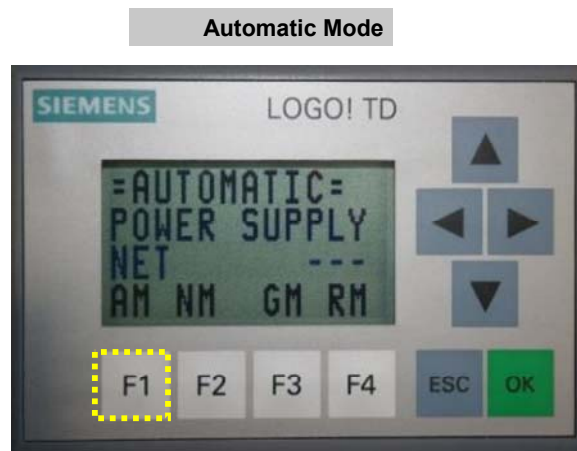
Figure 4-5

Function	Mode	Select circuit-breaker	Button
Automatic mode	Automatic  Manual		

Operation via the new LOGO! text display unit

- “F1”: “Automatic Mode” (AM) must have been pressed

Figure 4-6



Switching over to the generator power system

Power system transfer to the generator system is initiated when the SIRIUS monitoring relay “A41” reports a failure of the public net to the LOGO! logic module “A11” for at least 3 seconds. It switches the network circuit-breaker “R1” to “triggered” and interrupts the connection between the load and the

public net. Parallel a request is sent to the generator as digital signal or load shedding is requested respectively.

When the SIRIUS monitoring relay "A42" reports the availability of the generator power system to the LOGO! logic module "A11", this causes a status change at the generator circuit-breaker "R2" from "tipped" to "open" (motor charges the spring energy store).

Subsequently this circuit-breaker "R2" is closed (spring energy store is released). This makes a connection between the generator power system and the partial load to be buffered (load, such as elevators, emergency lighting, etc..)

When detecting undervoltage and short-circuit, the error state adopted. This is signaled by the output of a respective error message at the display.

Switching back to the public net

Switching back to the public power supply net is initiated when the SIRIUS monitoring relay "A4" reports a return of the public net to the LOGO! logic module "A6" for at least 10 seconds. This switches the generator circuit-breaker "R2" to "triggered" and interrupts the connection between the partial load and the generator power system. After a successful disconnection the LOGO! logic module "A11" causes a status change at the net circuit-breaker "R1" from "tipped" to "open" (motor charges the spring energy store). Subsequently this circuit-breaker "R1" is closed (spring energy store is released). This reconnects the public net and the load.

Further functions

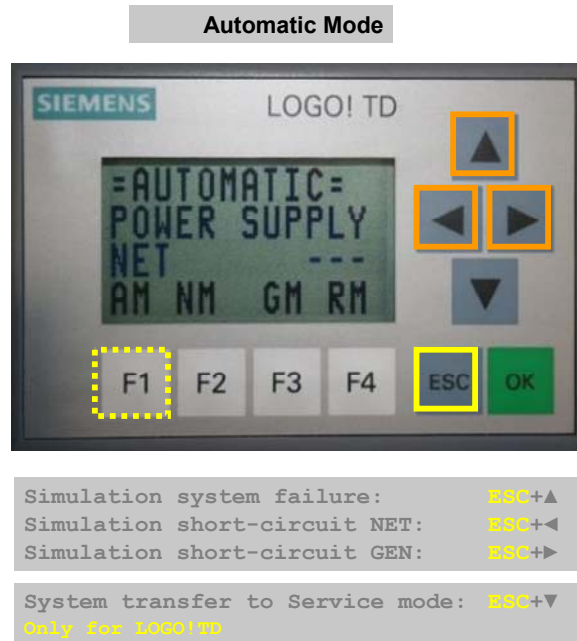
In "Automatic" mode the following functions can be simulated on the LOGO! or the LOGO" text display unit.

- Network failure
- Short-circuit at circuit-breaker NET
- Short-circuit at circuit-breaker GEN

Note These functions can be deactivated individually if they are not desired. In the program you exchange the respective softkey button against a LOW condition.

Note Instead of softkey buttons you can also use push buttons. In the program you exchange the respective softkey button against a free input.

Figure 4-7



A network failure, hence the automatic system transfer, can be simulated by pressing the **ESC + ▲** buttons. In the simulation phase POWER_TEST appears on the LOGO! instead of POWER_SUPPLY.

A short circuit at circuit-breaker NET can be simulated by pressing the **ESC + ◀** buttons. LOGO! generates a fault message. It must be acknowledged by pressing **OK**.

A short circuit at circuit-breaker GEN can be simulated by pressing the **ESC + ▶** buttons. Die LOGO! generiert eine Störmeldung. Diese muss durch die Taste **OK** quittiert werden.

4.4.2 Manual operation

Circuit-breaker

For maintenance purposes both circuit-breakers can be opened and closed manually. The following conditions must be fulfilled for this.

Note The interlocking switches of both circuit-breakers must be in “auto” position

Operating via external switches and push buttons

- Mode switch “S1”: “Manual”
- Selection circuit-breaker “S2”: “Public net” or “Generator”

Figure 4-8

Function	Mode	Select circuit-breaker	Button
Manual: No selection	Service Automatic S1 Manual	Public net 0 S2 Generator	
Manual: “Switch on” public net	Service Automatic S1 Manual	Public net 0 S2 Generator	S3
Manual: “Switch off” public net	Service Automatic S1 Manual	Public net 0 S2 Generator	S4
Manual: “Switch on” generator net	Service Automatic S1 Manual	Public net 0 S2 Generator	S3
Manual: “Switch off” generator net	Service Automatic S1 Manual	Public net 0 S2 Generator	S4

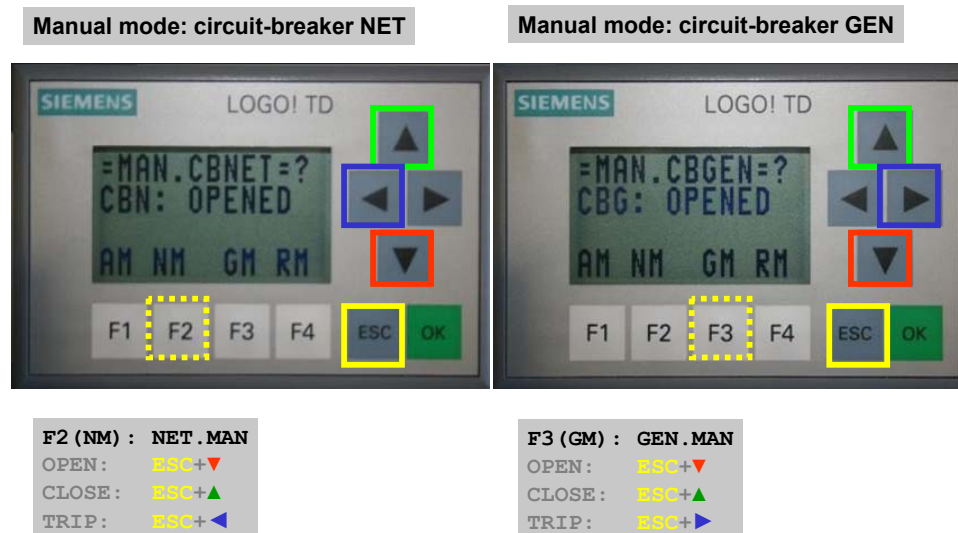
Opening the selected circuit-breaker and charging the spring energy store occurs after pressing the red push button “S4”.

Closing the circuit-breaker occurs after pressing the green push button “S3”, if the spring of the motor was previously charged. If the spring was not previously charged, the circuit-breaker remains in “triggered” mode, i.e. no connection is made between load and voltage source.

Operation via the new LOGO! text display unit

- “F2”: “MAN:NET” (MN) must have been pressed
- “F3”: “MAN:GEN” (MG) must have been pressed

Figure 4-9



Opening the selected circuit-breaker and charging the spring energy store occurs after pressing the **ESC+▼** buttons.

Closing the circuit-breaker occurs after pressing the **ESC+▲** buttons, if the spring of the motor was previously charged. If the spring was not previously charged, the circuit-breaker remains in “triggered” mode, i.e. no connection is made between load and voltage source.

Note The simulation of the short-circuit can be deactivated if it is not desired. In the program you exchange the softkey button against a LOW condition.

Note Instead of softkey buttons you can also use push buttons. In the program you exchange the respective softkey button against a free input.

A short circuit at the circuit-breaker can be simulated by pressing the **ESC** + **◀▶** buttons. LOGO! generates a fault. This must be acknowledged by pressing **OK**.

Auxiliary contacts

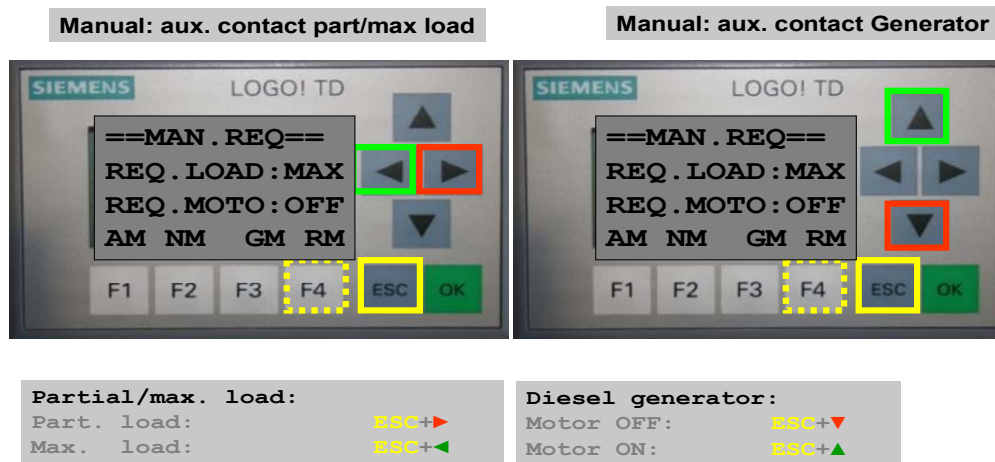
2 auxiliary contacts are managed by LOGO!.

- Auxiliary contact for partial/maximum load request
- Auxiliary contact for diesel generator request

Note Manual operation of the auxiliary contacts is possible via the new LOGO! text display unit, however, not via external switches and push buttons.

Note "F4": "REQ_MAN" (RM) must have been pressed

Figure 4-10



Auxiliary contact for partial/maximum load request

The auxiliary contact is used for realizing the load shed. Load shedding refers to the need to limit the load at the generator to a minimum, as opposed to operation at the public net. Such a partial load includes, for example, emergency lighting, elevators and other emergency systems.

- Maximum load request is performed manually by pressing the **ESC+◀** buttons. **Q8:TRUE**
- Partial load request is performed manually by pressing the **ESC+◀** buttons. **Q8:FALSE**

The feedback of the request at the LOGO! occurs at input I5.

Note

If no load shedding is planned, the feedback of the load shedding must be realized via a bridge.

Bridge: Output Q8(request) – Input I5(feedback)

Auxiliary contact for generator request

The generator is used, in case of a power cut, to provide power to emergency lighting and other devices important for maintaining the infrastructure.

- The generator is requested manually by pressing the **ESC+▲** buttons. **Q5:TRUE**
- The generator is cancelled manually by pressing the **ESC+▼** buttons. **Q5:FALSE**


4.4.3 Service operation

In Service mode the control unit is “shut down”, i.e. the logic module does not perform any changes to the control outputs. The following condition must fulfilled for this.

Operating via external switches and push buttons

- Mode switch “S1”: “Service”

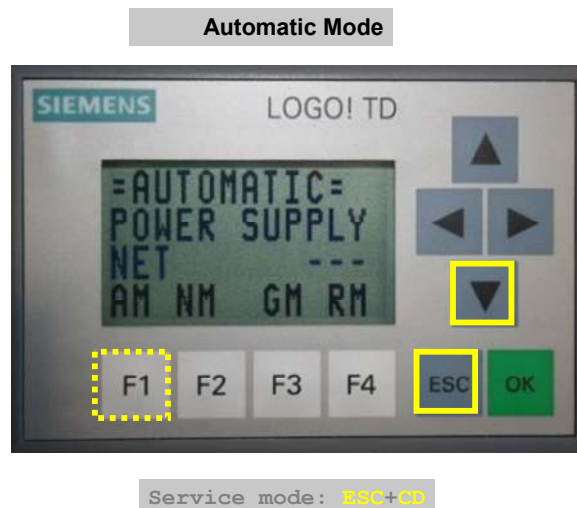
Figure 4-11

Function	Mode	Select circuit-breaker	Button
Service mode	Automatic  Manual		

Operation via the new LOGO! text display unit

- In “Automatic” mode via the buttons ESC+CD

Figure 4-12

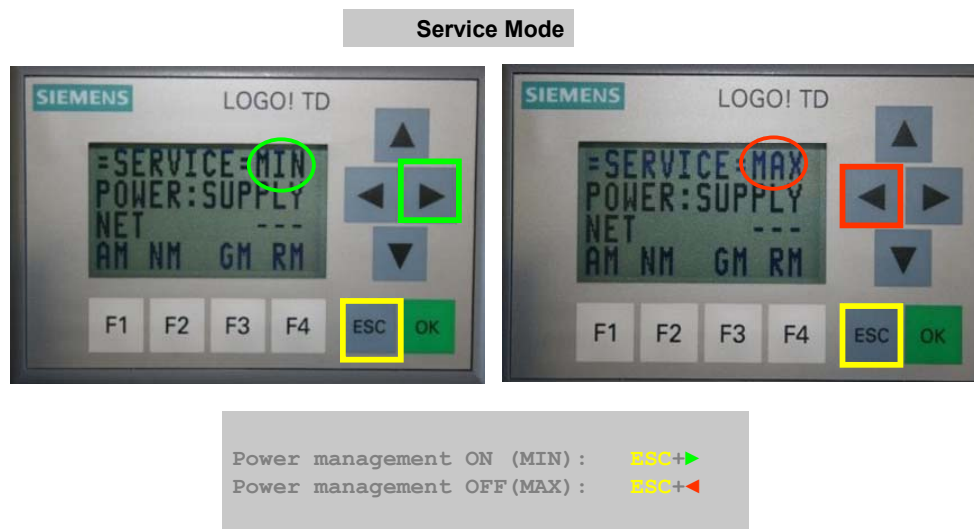


4.4.4 Power management

In "Service" mode the "Power management" function can be controlled.

Note Power management can be deactivated if it is not required. In the program you exchange the softkey button against a LOW condition.

Figure 4-13



Power management: ON

Pressing the **ESC+▶** buttons (LOGO! as well as LOGO!TD) activates the power management ("MIN" displayed). Auxiliary contact for partial/maximum load request remains open **Q8:FALSE**

Power management: OFF

Pressing the **ESC+◀** buttons (LOGO! as well as LOGO!TD) deactivates the power management ("MAX" displayed).

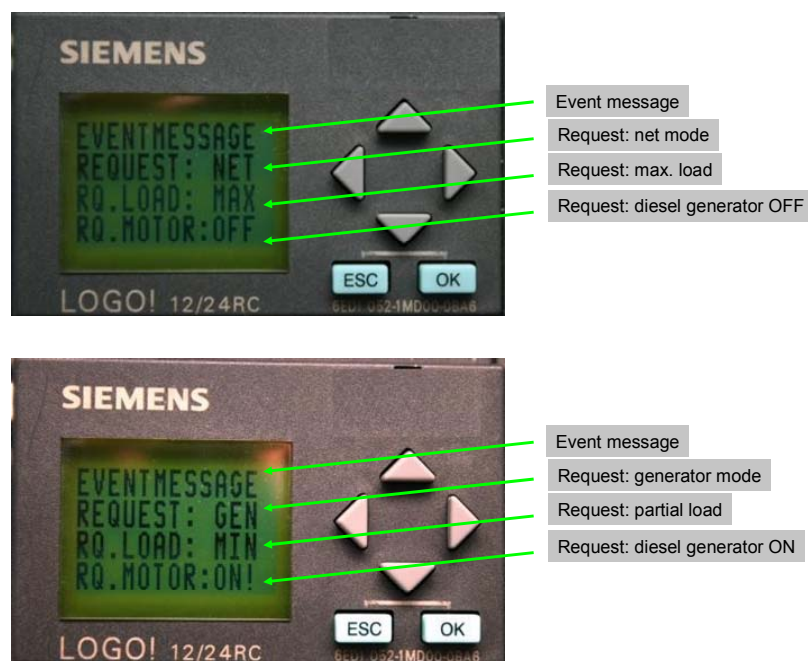
4.5 Event and fault messages

It is differentiated between event and fault messages.

4.5.1 Event messages

Event messages are messages which need not be acknowledged. The most important event message is "Request NET" and "Request Generator" with the according requests for load and diesel generator.

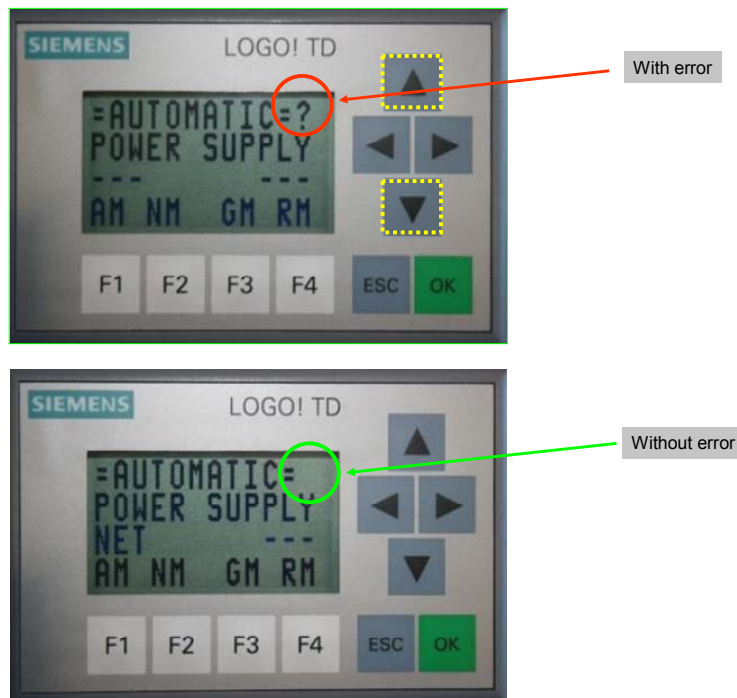
Figure 4-14



4.5.2 Fault messages

Fault messages require acknowledgement. A pending fault is indicated on the display by the “?” icon

Figure 4-15



First the fault must be removed before the acknowledgement is successful. The acknowledgement occurs via the **OK** button. Buttons **ESC+▲** and **ESC+▼** are used for scrolling. The acknowledgement can be made in LOGO!, as well as on the LOGO! test display unit.

4.6 Auxiliary contacts


Note The LOGO! program offers auxiliary contacts You can use these auxiliary contacts, for example, for indicator lights. They then require a further 8DM expansion module or the existing 8DM expansion module must be exchanged against the 16DM expansion module.

Table 4-9

Output	Symbol	TRUE	FALSE
Q09	EM:NoFault	No error pending	Error pending
Q10	EM:NetSupply	Net power supply active	Net power supply inactive
Q11	EM:GenSupply	Generator power supply active	Generator power supply inactive
Q12	EM:Energy-management	Power management active	Power management inactive

4.7 Controls of the circuit-breaker

For the function test of the circuit-breaker it can also be controlled directly via the control elements.

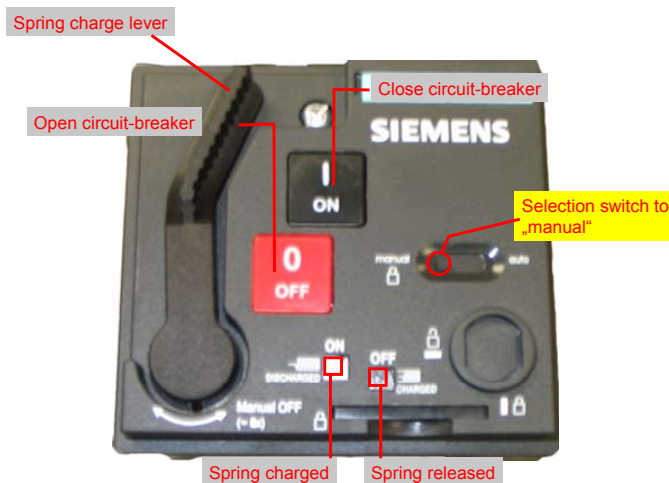

DANGER

The circuit-breakers are not interlocked between each other. Simultaneously connecting the load with both networks leads to a short-circuit!

The following conditions must fulfilled for this.

- To ensure that the LOGO! logic module does not perform any changes of the control outputs during direct operation, the “Service” mode must be preselected
- Set interlocking switch of the circuit-breaker to “manual”

Figure 4-16



Pressing the black “OFF” button causes the circuit-breaker to open and the spring energy store to charge.

Pressing the red “ON” button causes the circuit-breaker to close if the spring had previously been charged. At released spring energy store, the circuit-breaker remains in the “triggered” state.

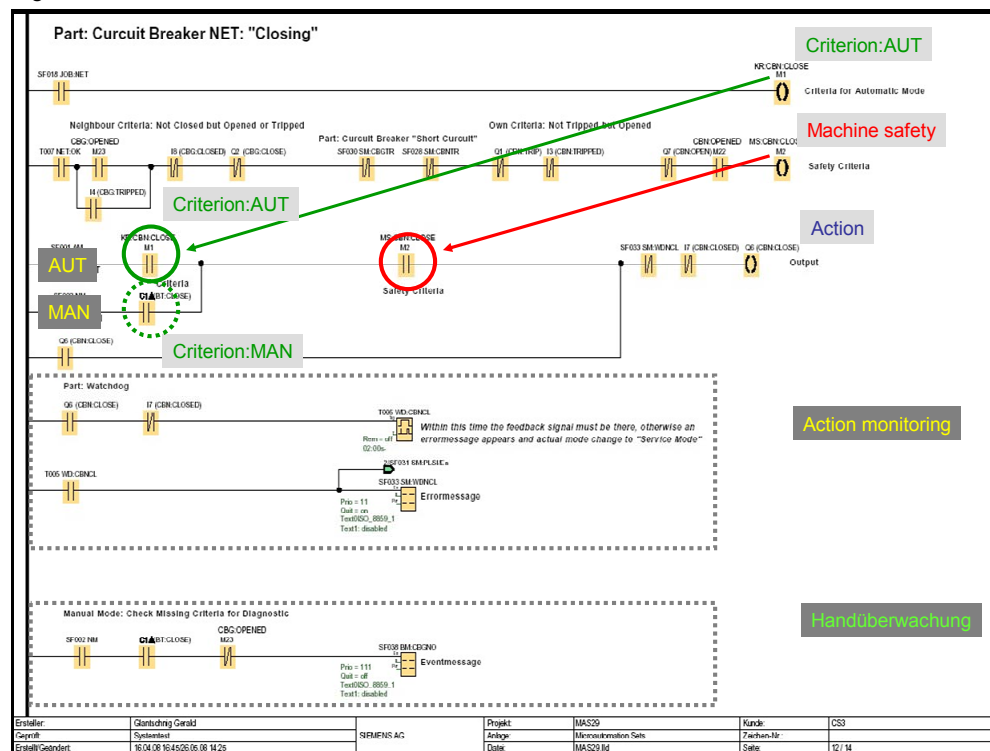
Note After terminating the service mode, the interlocking switch of the circuit-breaker must be switched back to “auto”

4.8 Software concept

The software is divided into segments (e.g. mode, fault and devices to be controlled). The individual segments are similar. One segment (e.g. close circuit-breaker) normally consists of five sections.

- Criteria (Automatic)
- Machine safety
- Action
- Action monitoring
- Manual monitoring

Figure 4-17



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Set29_DocTech_V2d0_en.doc

4.8.1 Criteria (Automatic)

Here all conditions are stored which apply for the automatic operation (e.g network failure).

4.8.2 Machine safety

Here all conditions are stored which apply for safety (e.g no fault, the other circuit-breaker is opened). The machine safety is independent of the operation.

4.8.3 Action

An action is performed if apart from the machine safety for

- “AUTOMATIC” mode the criteria for automatic
- “MANUAL” mode the criteria for manual

is fulfilled

4.8.4 Action monitoring

A started action is monitored. If within the monitoring time the position to be moved to is not reached, the LOGO! generates a fault. This fault cancels the started action. The cause of the fault is shown at the display and must be removed before being able to acknowledge with the “OK” button.

4.8.5 Manual monitoring

Indicates which conditions are missing in manual mode.

5 Configuration of the Startup Software

5.1 Preliminary remarks

For the startup we offer you software examples with test code and test parameters as a download. The software examples support you during the first steps and tests with your Micro Automation Sets. They enable quick testing of hardware and software interfaces between the products described in the Micro Automation Sets.

The software examples are always assigned to the components used in the set and show their basic interaction. However, they are not real applications in the sense of technological problem solving with definable properties.

5.2 Download of the startup code

The software examples are available on the HTML page from which you downloaded this document.

Table 5-1

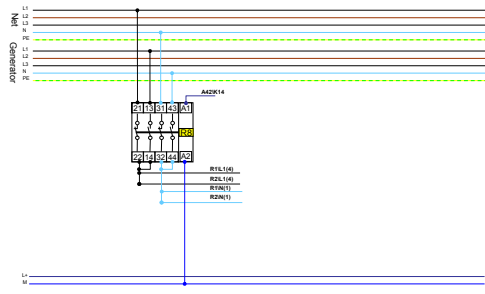
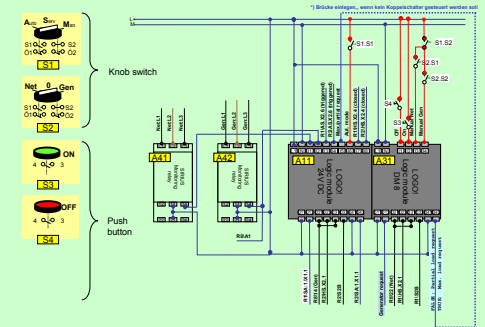
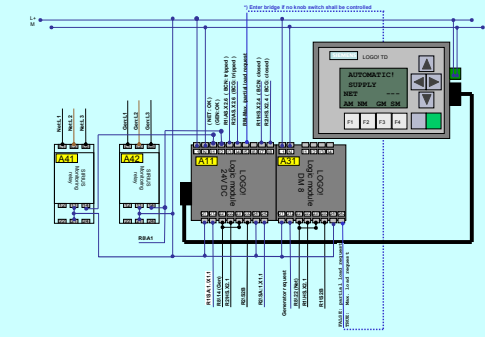
No.	File name	Contents
1.	MAS29_VL_BT_V2D0.lsc	LOGO! Soft Comfort project file for the system transfer with external knob switch and push button.
2.	MAS29_VL_TD_V2D0.lsc	LOGO! Soft Comfort project file for system transfer with LOGO! text display unit

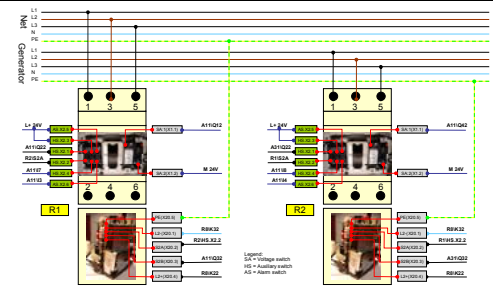
5.3 Configuring components

Note It is assumed here that the necessary software has been installed on your computer and that you are familiar with handling the software.

5.3.1 Installing and wiring the hardware

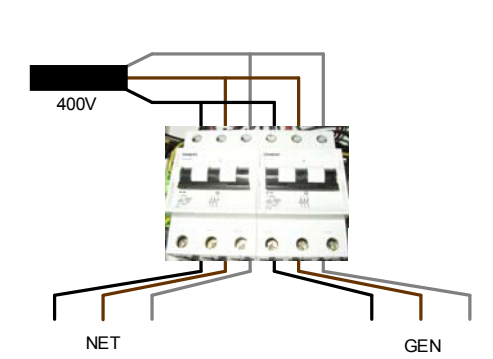
Table 5-2

No.	Instruction	Comment
1.	Install the individual components on a switch board	
2.	Install cable ducts suitable for the wiring	
3.	Wire the set as described in chapter 2.	
4.	For details on wiring the change-over contactor please refer to chapter 2.1.	 <p>Chapter 2.1</p>
5.	<p>Operating via external switches and push buttons: Wiring of LOGO! Basic with expansion module DM8 and digital monitoring relay is described in chapter 2.2.1</p>	 <p>Chapter 2.2.1</p>
6.	<p>Operation via the new LOGO! text display unit: Wiring of LOGO! Basic with expansion module DM8 and digital monitoring relay is described in chapter 2.2.2</p>	 <p>Chapter 2.2.2</p>

No.	Instruction	Comment
7.	For details on wiring plan of the circuit-breakers please refer to chapter 2.3.	 <p>Chapter 2.3</p>

5.3.2 Network supply and generator supply


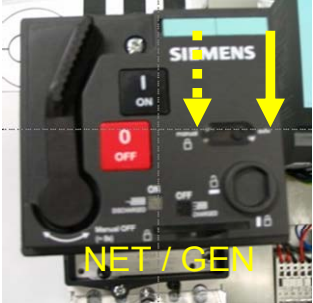

Table 5-3

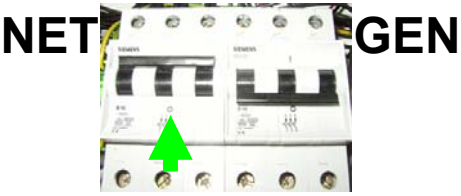
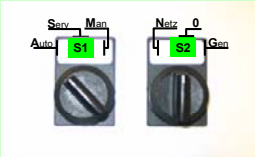
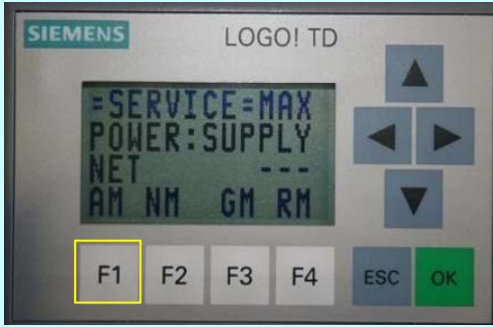
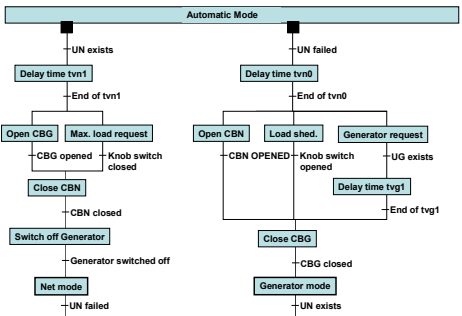
No.	Instruction	Comment
1.	<p>In order to simplify the demonstration the network supply and the generator supply come, in our set, from the same source.</p> <p>Wire the automatic circuit-breakers according to the depicted example.</p>	

5.4 Preparations

- The power shall be supplied via the public net

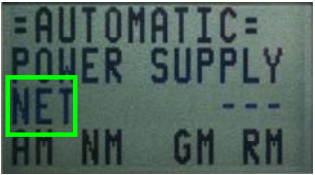
Table 5-4

No.	Instruction	Comment
1.	Ensure that neither the circuit-breakers nor the LOGO! are supplied with power.	
2.	Switch both automatic circuit-breakers "OFF".	
3.	Ensure that both circuit-breakers are in "Automatic" mode.	
4.	<p>Operating via external switches and push buttons:</p> <p>Set knob switch "S1" to "Service" mode and knob switch "S2" to selection "0".</p>	 <p>The constellation of the switch position will prevent unintended actions after the startup.</p>
5.	<p>Operation via the new LOGO! text display unit:</p> <p>No preparations necessary.</p>	<p>After the startup the LOGO! is in Service mode. There will be no unintended actions after the startup.</p>

No.	Instruction	Comment
6.	Switch the automatic circuit-breaker for NET to “ON”. Keep the automatic circuit-breaker for the Generator “OFF”.	
7.	Turn on the 400 Volt power supply.	
8.	Switch on the LOGO!.	The LOGO! is switched on and in STOP mode and without program.
9.	Transfer the startup code to the LOGO!	Startup Code see
10.	Set the LOGO! to RUN.	After the startup you are in “Service” mode.
11.	<p>Operating external switches and push buttons:</p> <p>Set knob switch “S1” to “Automatic” mode.</p>	
12.	<p>Operation via the new LOGO! text display unit:</p> <p>Press “F1” for automatic mode (AM)</p>	
13.	The LOGO! searches its state. In our case “NET” mode.	

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Entry-ID 27074055

No.	Instruction	Comment
14.	The power is supplied via the public net	

6 Live-Demo

The functions and features of the Micro Automation Set are displayed in form of an example application for better understanding.

If the components have been correctly configured as described in the previous chapters, the program code can be tested.

6.1 Overview of all scenarios

Table 6-1

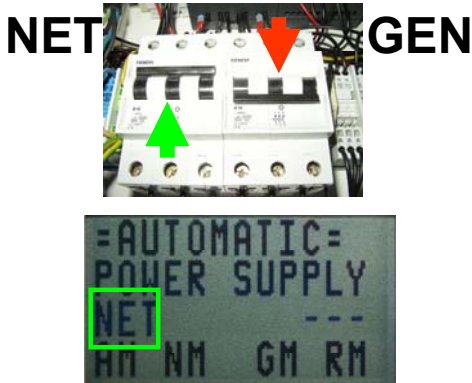

BART	Scenario	Comment
AUTO	Automatic system transfer	Normal case
AUTO	Short-term system failure	Short-term power system failures are ignored
AUTO	An error occurs during the automatic system transfer	Generator startup error
AUTO	Function test of the automatic system transfer	Simulation
AUTO	Overload/short-circuit test	Simulation
SERVICE	Service mode	In this mode the LOGO! is inactive. There are no undesired actions.
SERVICE	Power management	Load shed
MANUAL	Manual mode circuit-breaker NET	Manual operation of the power system circuit-breaker
MANUAL	Manual mode circuit-breaker GEN	Manual operation of the generator circuit-breaker
SERVICE	Operating the circuit-breakers directly via the controls	Simultaneously connecting the load with both power systems leads to a short-circuit!



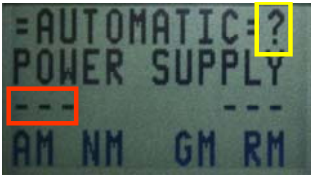

6.1.1 AUTO: Automatic system transfer



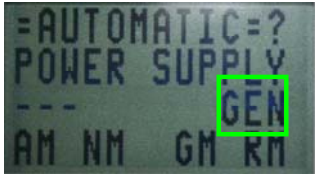
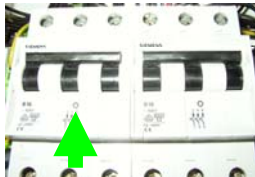

Note The automatic circuit-breaker for the power system must be kept in “OFF” position for more than 3 seconds. Only then does this scenario 1 occur.


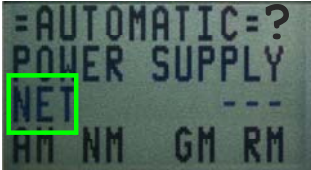


- Automatic mode
- The power is supplied via the public net
- Public net fails for a longer period of time (> 3sec)
- Generator mode takes over the role of the public net
- The public net is restored

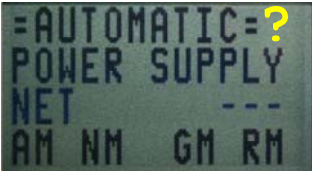
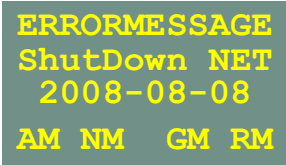
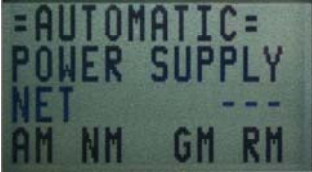
Table 6-2

No.	Instruction	Comment
1.	The power is supplied by the LOGO! via the public net	
2.	<p>The following event message is pending at the LOGO!.</p> <ul style="list-style-type: none"> • Request: NET • Request load: MAX • Request motor: OFF 	

No.	Instruction	Comment
3.	Switch the automatic circuit-breaker NET "OFF".	 <p>NET GEN</p> <p>> 3 sec</p>
4.	The public net drops out.	 <p>NET GEN</p>
5.	The power system drop is displayed at the LOGO!, the failure is logged and a system failure monitoring is started	
6.	<p>As soon as the system failure monitoring (here 3 sec) is exceeded, the following event message is pending at the LOGO!</p> <ul style="list-style-type: none"> Request: GEN Request load: MIN Request motor: ON <p>and the power system circuit-breaker is opened by the LOGO! by means of "tripping"</p>	 <p>Within the predefined monitoring times, the feedback for...</p> <ul style="list-style-type: none"> the opened state at the CBN the load shedding or the generator readiness <p>must be reported to the LOGO!, otherwise it generates a fault message.</p>
7.	<p>Request: GEN This request is fulfilled by the LOGO!</p>	
8.	<p>Request load: MIN This request is fulfilled by the existing bridge between output Q8 and input I5, of the LOGO!</p>	

No.	Instruction	Comment
9.	<p>Request motor: ON Switch the automatic circuit-breaker GEN "ON".</p>	<p>NET  GEN</p>
10.	<p>As soon as the monitoring relay for the generator mode detects that sufficient power is supplied, a wait time is activated in the LOGO! (here 15 sec) in order to ensure that the generator power system is stable.</p>	<p>NET  GEN</p> <p>15 sec</p>
11.	<p>After this wait time, the LOGO! generates the generator request, which runs as follows:</p> <ul style="list-style-type: none"> the spring in the circuit-breaker for the public net is charged with "open" the circuit-breaker of the generator power system is closed 	<p>Within the predefined monitoring times, the feedback for</p> <ul style="list-style-type: none"> the opened state at the CBN the closed state at the CBG <p>must be reported to the LOGO!, otherwise it generates a fault message.</p>
12.	<p>System transfer to "Generator mode" has been completed. The power is now supplied via the generator.</p>	
13.	<p>Switch the automatic circuit-breaker NET back "ON".</p>	<p>NET  GEN</p>
14.	<p>The public net is restored As soon as the monitoring relay for the power system detects that sufficient power is supplied, a wait time is activated in the LOGO! (here 15 sec) in order to ensure that the public net is stable.</p>	<p>NET  GEN</p> <p>15 sec</p>

No.	Instruction	Comment
15.	<p>After this wait time, the LOGO! generates the request NET and the following event messages are displayed:</p> <ul style="list-style-type: none"> Request: NET Request load: MAX Request motor: ON 	
16.	<p>The following events run on LOGO!.</p> <ul style="list-style-type: none"> The circuit-breaker for the generator mode is opened by the LOGO!. The load shedding is cancelled again by the LOGO! (Q8:TRUE) The circuit-breaker for the public net is closed by LOGO!. 	<p>Within the predefined monitoring times, the feedback for...</p> <ul style="list-style-type: none"> the opened state at the CBG the cancellation for the load shedding the closed state at the CBN <p>must be reported to the LOGO!, otherwise it generates a fault message.</p>
17.	<p>The system transfer action is completed. The power is now again supplied via the public net.</p>	
18.	<p>The generator request is cancelled again by the LOGO! (Q5:FALSE)</p>	
19.	<p>Switch the automatic circuit-breaker GEN back "OFF".</p>	

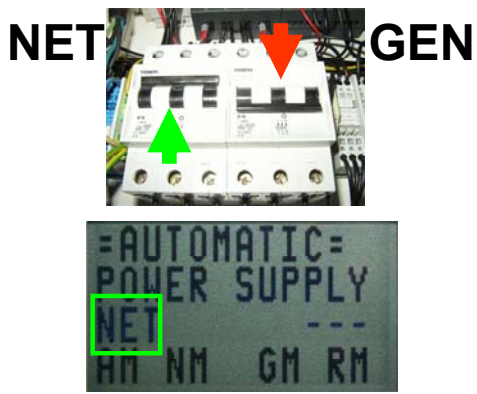

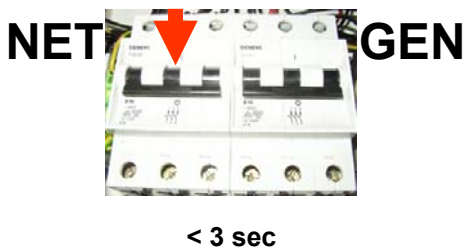
No.	Instruction	Comment
20.	However, a fault which requires acknowledgement is still pending. Noticeable by the displayed “?” icon.	
21.	The logged “ShutDown Net” fault can be acknowledged by you on the LOGO!, alternatively at the text display unit, using the OK button. To do this go to the individual fault and acknowledge.	
22.	No fault is pending if the “?” icon is no longer displayed.	


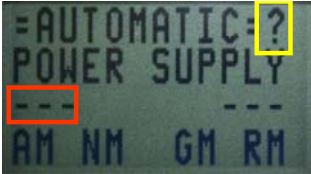

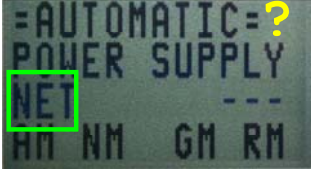
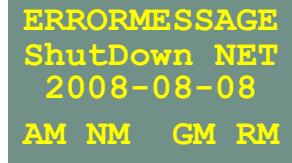
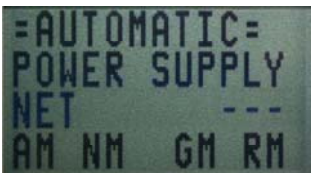
6.1.2 AUTO: Short-term power system failure

Note The automatic circuit-breaker for the power system must only be set to “OFF” position for < 3sec. Otherwise scenario 1 takes place.

- Automatic mode
- The power is supplied via the public net
- Public net has a short-term power system failure (< 3sec)

Table 6-3

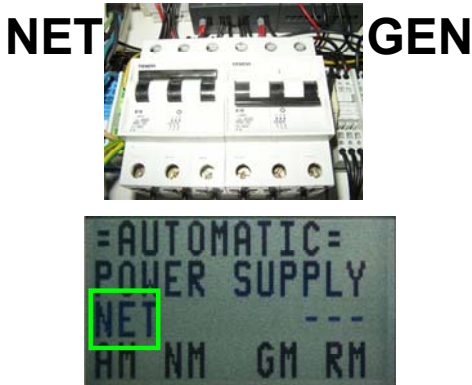

No.	Instruction	Comment
1.	The power is supplied by the LOGO! via the public net	
2.	The following event message is pending at the LOGO!: <ul style="list-style-type: none"> • Request: NET • Request load: MAX • Request motor: OFF 	
3.	Switch the automatic circuit-breaker NET “OFF”.	



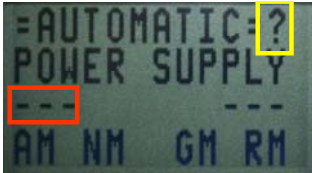

No.	Instruction	Comment
4.	The public net drops out.	<p>NET  GEN</p>
5.	The power system drop is displayed at the LOGO!, the failure is logged and a system failure monitoring is started.	
6.	Within this power system monitoring time you switch the automatic circuit-breaker NET back "ON".	<p>NET  GEN</p> <p>< 3 sec</p>
7.	The public net is restored. However, a fault which requires acknowledgement is still pending. Noticeable by the displayed "?" icon.	
8.	The logged "ShutDown Net" fault can be acknowledged by you on the LOGO!, alternatively at the text display unit, using the OK button. To do this go to the individual fault and acknowledge.	
9.	No fault is pending if the "?" icon is no longer displayed.	





6.1.3 AUTO: An error occurs during the automatic system transfer

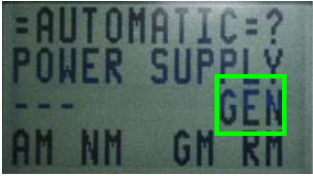
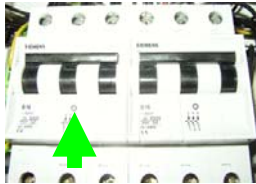


- Automatic mode
- The power is supplied via the public net
- Public net fails for a longer period of time
- The generator mode can initially not take over the role of the public net
- The generator can only take over the role of the public net upon the second attempt
- The public net is restored.

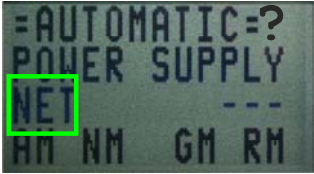


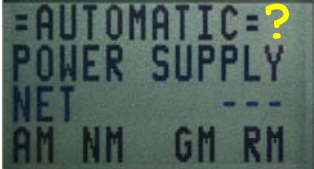
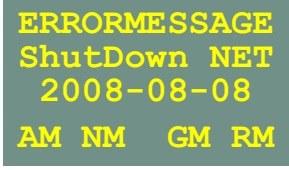
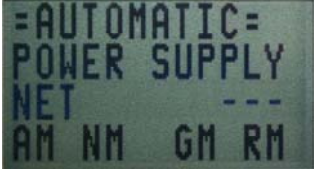
Table 6-4

No.	Instruction	Comment
1.	The power is supplied by the LOGO! via the public net	
2.	<p>The following event message is pending at the LOGO!.</p> <ul style="list-style-type: none"> • Request: NET • Request load: MAX • Request motor: OFF 	

No.	Instruction	Comment
3.	Switch the automatic circuit-breaker NET "OFF".	 <p>NET GEN</p> <p>> 3 sec</p>
4.	The public net drops out.	 <p>NET GEN</p>
5.	The power system drop is displayed at the LOGO!, the failure is logged and a system failure monitoring is started.	
6.	<p>As soon as the power system failure monitoring (here 3 sec) is exceeded, the following event message is pending at the LOGO!</p> <ul style="list-style-type: none"> Request: GEN Request load: MIN Request motor: ON <p>and the power system circuit-breaker is opened by the LOGO! by means of "tripping"</p>	 <p>Within the predefined monitoring times, the feedback for...</p> <ul style="list-style-type: none"> the opened state at the CBN the load shedding or the generator readiness <p>must be reported to the LOGO!, otherwise it generates a fault message.</p>
7.	<p>Request: GEN</p> <p>This request is fulfilled by the LOGO!</p>	

No.	Instruction	Comment
8.	<p>Request load: MIN This request is fulfilled by the existing bridge between output Q8 and input I5, of the LOGO!</p>	
9.	<p>Request motor: ON Let the monitoring time for the readiness of the generator pass (here 60 seconds). (Simulated by the not switching the automatic circuit-breaker "GEN".)</p>	<p>NET  GEN</p> <p>> 60sec</p>
10.	<p>As soon as the monitoring time for the generator request has elapsed, the system transfer action goes into a defined fault state. The generator request is cancelled.</p>	
11.	<p>Request motor: ON Switch the automatic circuit-breaker GEN "ON".</p>	<p>NET  GEN</p>
12.	<p>As soon as the monitoring relay for the generator mode detects that sufficient power is supplied, a wait time is activated in the LOGO! (here 15 sec) in order to ensure that the generator power system is stable.</p>	<p>NET  GEN</p> <p>15 sec</p>
13.	<p>After this wait time, the LOGO! generates the generator request, which runs as follows:</p> <ul style="list-style-type: none"> the spring in the circuit-breaker for the public net is charged with "open" the circuit-breaker of the generator power system is closed 	<p>Within the predefined monitoring times, the feedback for</p> <ul style="list-style-type: none"> the opened state at the CBN the closed state at the CBG <p>must be reported to the LOGO!, otherwise it generates a fault message.</p>

No.	Instruction	Comment
14.	System transfer to "Generator mode" has been completed. The power is now supplied via the generator.	
15.	Switch the automatic circuit-breaker NET back "ON".	<p>NET  GEN</p>
16.	The public net is restored As soon as the monitoring relay for the power system detects that a sufficient voltage is supplied, a wait time is activated in the LOGO! (here 15 sec) in order to ensure that the public net is stable.	<p>NET  GEN</p> <p>15 sec</p>
17.	After this wait time, the LOGO! generates the request NET and the following event messages are displayed: <ul style="list-style-type: none"> Request: NET Request load: MAX Request motor: ON 	
18.	The following events run on LOGO!. <ul style="list-style-type: none"> The circuit-breaker for the generator mode is opened by LOGO!. The load shedding is cancelled again by the LOGO! (Q8:TRUE) The circuit-breaker for the public net is closed by LOGO!. 	<p>Within the predefined monitoring times, the feedback for...</p> <ul style="list-style-type: none"> the opened state at the CBG the cancellation for the load shed the closed state at the CBN <p>must be reported to the LOGO!, otherwise it generates a fault message.</p>

No.	Instruction	Comment
19.	The system transfer action is completed. The power is now again supplied via the public net.	
20.	The generator request is cancelled again by the LOGO! (Q5:FALSE)	
21.	Switch the automatic circuit-breaker GEN back "OFF".	
22.	However, a fault which requires acknowledgement is still pending. Noticeable by the displayed "?" icon.	
23.	The logged "ShutDown Net" fault can be acknowledged by you on the LOGO!, alternatively at the text display unit, using the OK button. To do this go to the individual fault and acknowledge.	
24.	No fault is pending if the "?" icon is no longer displayed.	

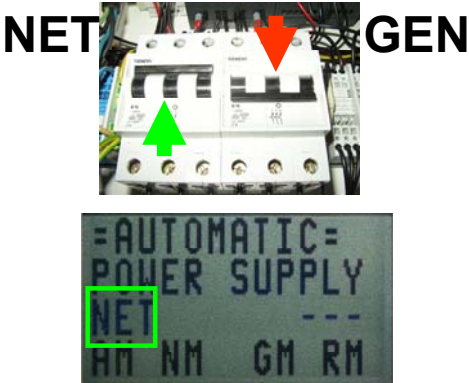

6.1.4 AUTO: Function test of the automatic system transfer



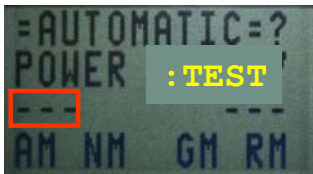

Note The function test for the automatic system transfer can be deactivated if not required. In the program you exchange the softkey button against a LOW condition.

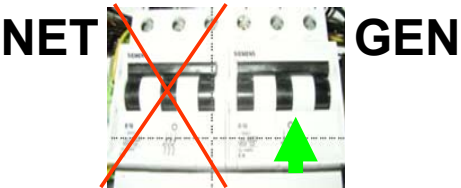

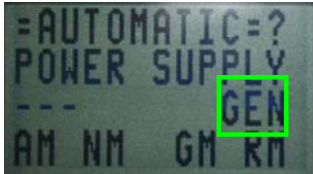

Note Instead of softkey buttons you can also use push buttons. In the program you exchange the respective softkey button against a free input.

- Automatic mode
- The power is supplied via the public net
- Function test of the automatic system transfer
- Generator takes over the role of the public net
- Function test is terminated
- The power is supplied by the public net again

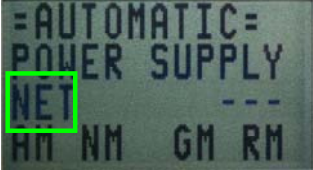

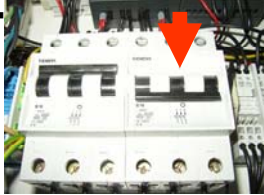
Table 6-5

No.	Instruction	Comment
1.	The power is supplied by the LOGO! via the public net	
2.	The following event message is pending at the LOGO!. <ul style="list-style-type: none"> • Request: NET • Request load: MAX • Request motor: OFF 	

No.	Instruction	Comment
3.	<p>Operating via external switches and push buttons:</p> <p>In Automatic mode you press the ESC + ▲ buttons</p>	
4.	<p>Operation via the new LOGO! text display unit:</p> <p>In Automatic mode you press the ESC + ▲ buttons</p>	
5.	<p>The function test for the automatic system transfer is performed by LOGO! and displayed as POWER:TEST</p> <ul style="list-style-type: none"> The power system circuit-breaker is opened by the LOGO! by means of "tripping" 	
6.	<p>The following event message is pending at the LOGO!.</p> <ul style="list-style-type: none"> Request: GEN Request load: MIN Request motor: ON 	 <p>Within the predefined monitoring times, the feedback for...</p> <ul style="list-style-type: none"> the opened state at the CBN the load shedding or the generator readiness <p>must be reported to the LOGO!, otherwise it generates a fault message.</p>

No.	Instruction	Comment
7.	Request: GEN This request is fulfilled by the LOGO!	
8.	Request load: MIN This request is fulfilled by the existing bridge between output Q8 and input I5, of the LOGO!	
9.	Request motor: ON Switch the automatic circuit-breaker GEN "ON".	
10.	As soon as the monitoring relay for the generator mode detects that sufficient power is supplied, a wait time is activated in the LOGO! (here 15 sec) in order to ensure that the generator power system is stable.	
11.	After this wait time, the LOGO! generates the generator request , which runs as follows: <ul style="list-style-type: none"> the spring in the circuit-breaker for the public net is charged with "open" the circuit-breaker of the generator power system is closed 	Within the predefined monitoring times, the feedback for <ul style="list-style-type: none"> the opened state at the CBN the closed state at the CBG must be reported to the LOGO!, otherwise it generates a fault message.
12.	The function test for the automatic system transfer has been completed successfully. TEST is hidden by the LOGO!. The power is now supplied via generator mode.	
13.	After the function test, the LOGO! generates the net request and the following event messages are displayed: <ul style="list-style-type: none"> Request: NET Request load: MAX Request motor: ON 	

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No.	Instruction	Comment
14.	<p>The following events run on LOGO!.</p> <ul style="list-style-type: none"> The circuit-breaker for the generator mode is opened by LOGO!. The load shedding is cancelled again by the LOGO! (Q8:TRUE) The circuit-breaker for the public net is closed by LOGO!. 	<p>Within the predefined monitoring times, the feedback for...</p> <ul style="list-style-type: none"> the opened state at the CBG the cancellation for the load shed the closed state at the CBN <p>must be reported to the LOGO!, otherwise it generates a fault message.</p>
15.	<p>The system transfer action is completed. The power is now again supplied via the public net.</p>	
16.	<p>The generator request is cancelled again by the LOGO! (Q5:FALSE)</p>	
17.	<p>Switch the automatic circuit-breaker GEN back "OFF".</p>	

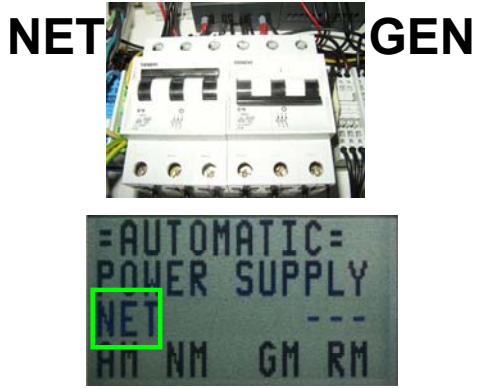

6.1.5 AUTO: Overload/short-circuit test


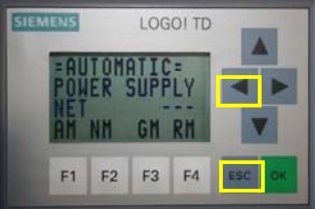
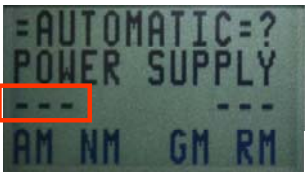
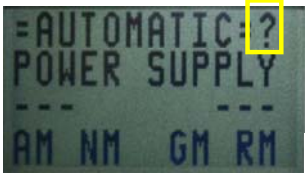
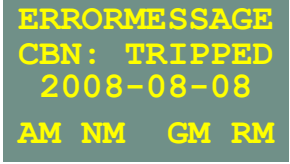
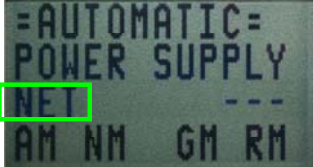
Note The function can be deactivated if it is not required. In the program you exchange the softkey button against a LOW condition.

Note Instead of softkey buttons you can also use push buttons. In the program you exchange the respective softkey button against a free input.

- Automatic mode
- The power is supplied via the public net
- Simulation overload/short-circuit at circuit-breaker NET
- Fault removal
- The power is supplied by the public net again

Table 6-6


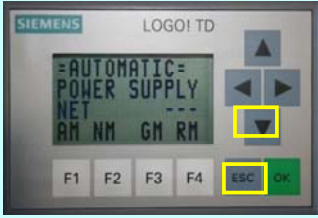
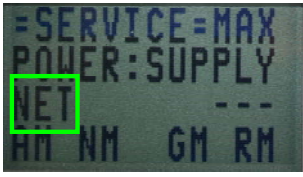


No.	Instruction	Comment
1.	The power is supplied by the LOGO! via the public net	
2.	<p>The following event message is pending at the LOGO!.</p> <ul style="list-style-type: none"> • Request: NET • Request load: MAX • Request motor: OFF 	

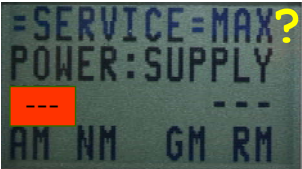

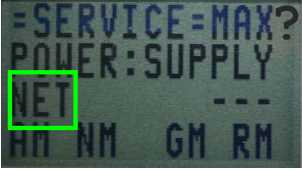
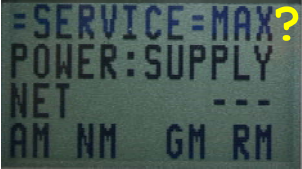

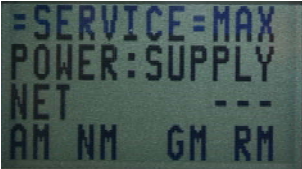
No.	Instruction	Comment
3.	<p>Operating via external switches and push buttons:</p> <p>In Automatic mode you press the ESC + ◀ buttons</p>	
4.	<p>Operation via the new LOGO! text display unit:</p> <p>In Automatic mode you press the ESC + ◀ buttons</p>	
5.	<p>The power system circuit-breaker is opened by the LOGO! by means of "tripping".</p>	 <p>There is no automatic system transfer.</p>
6.	<p>A fault which requires acknowledgement is pending. Noticeable by the displayed "?" icon.</p>	
7.	<p>The logged "CBM: TRIPPED" fault must be acknowledged by you on the LOGO!, alternatively at the text display unit, using the OK button.</p> <p>To do this go to the individual fault and acknowledge.</p>	
8.	<p>After the acknowledgement, the system circuit-breaker is closed by the LOGO!. The power is supplied via the net again.</p>	

6.1.6 SERVICE: Service mode

Note In this mode the LOGO! is inactive. There are no undesired actions by the LOGO!.

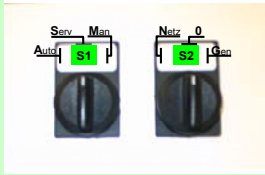

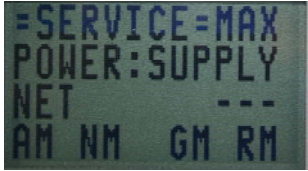
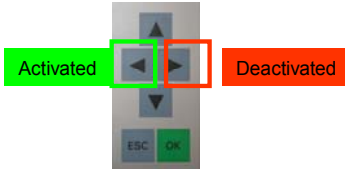
Table 6-7

No.	Instruction	Comment
1.	<p>Operating via external switches and push buttons:</p> <p>Set knob switch “S1” to “Service” mode and knob switch “S2” to selection “0”.</p>	
2.	<p>Operation via the new LOGO! text display unit:</p> <p>In Automatic mode you press the ESC + ▼ buttons</p>	
3.	<p>You are now in service mode. In this mode the LOGO! is inactive and there are no undesired actions.</p>	
4.	<p>Provoke a power system failure. Switch the automatic circuit-breaker NET “OFF”.</p>	<p>NET  GEN</p>
5.	<p>The public net drops out.</p>	<p>NET  GEN</p>

No.	Instruction	Comment
6.	The drop out is indicated at the LOGO!. The fault is logged.	
7.	However, no action is taken on the LOGO! side.	No automatic system transfer
8.	Switch the automatic circuit-breaker NET back "ON".	<p>NET  GEN</p>
9.	The power is now again supplied via the public net.	
10.	However, a fault which requires acknowledgement is still pending. Noticeable by the displayed "?" icon.	
11.	The logged "ShutDown Net" fault can be acknowledged by you on the LOGO!, alternatively at the text display unit, using the OK button. To do this go to the individual fault and acknowledge it.	
12.	No fault is pending if the "?" icon is no longer displayed.	

6.1.7 SERVICE: Power management

Table 6-8


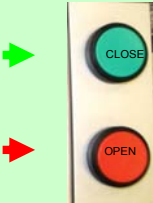
No.	Instruction	Comment
1.	<p>Operating via external switches and push buttons:</p> <p>Set knob switch “S1” to “Service” mode and knob switch “S2” to selection “0”.</p>	
2.	<p>Operation via the new LOGO! text display unit:</p> <p>In Automatic mode you press the ESC + ▼ buttons</p>	
3.	<p>You are now in Service mode and the status of the power management is displayed.</p> <p>Power management activated:</p> <ul style="list-style-type: none"> • Status: MIN <p>Power management deactivated:</p> <ul style="list-style-type: none"> • Status: MAX 	
4.	<p>Power management can be activated using the ESC + ► buttons (status: MIN)</p> <p>Or be deactivated using the ESC + ◀ buttons (status: MAX).</p>	

6.1.8 MANUAL: Manual mode circuit-breaker NET

- Note** The NET circuit-breaker can only be closed if the circuit-breaker GEN has been opened.
- Note** Go through the scenario “Manual mode circuit-breaker GEN” and open circuit-breaker GEN if it is still closed.


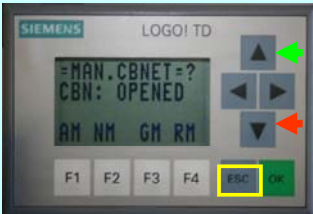
Operating via external switches and push buttons

Table 6-9

No.	Instruction	Comment
1.	Set the knob switch “S1” to “Manual” mode. Set the knob switch “S2” to circuit-breaker mode “NET”.	
2.	The CLOSE button is used to close the NET circuit-breaker. The OPEN button is used to open or charge the NET circuit-breaker again. Repeat this action several times.	
3.	Open the NET circuit-breaker as the last action.	

Operation via the new LOGO! text display unit

Table 6-10


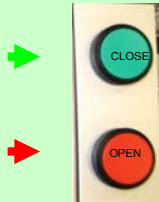
No.	Instruction	Comment
1.	Press the “F2” button (NM: NET MANUAL)	
2.	The ESC + ▲ buttons are used to close the NET circuit-breaker. The ESC + ▼ buttons are used to open or charge the NET circuit-breaker again. Repeat this action several times.	
3.	Open the NET circuit-breaker as the last action.	

6.1.9 MANUAL: Manual mode circuit-breaker GEN

- Note** The circuit-breaker GEN can only be closed if the circuit-breaker NET has been opened and load shedding has been performed.
- Note** Go through the scenario “Manual mode circuit-breaker NET” and open the circuit-breaker NET if it is still closed.
- Note** Go through the “Power management” scenario, where load shedding has not yet occurred.

Operating via external switches and push buttons


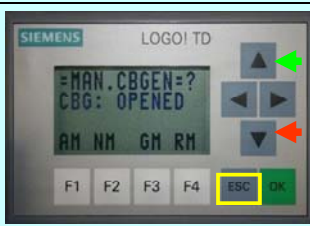
Table 6-11

No.	Instruction	Comment
1.	Set the knob switch “S1” to “Manual” mode. Set the knob switch “S2” to circuit-breaker mode “GEN”.	
2.	The CLOSE button is used to close the GEN circuit-breaker. The OPEN button is used to open or charge the GEN circuit-breaker again. Repeat this action several times.	
3.	Open the GEN circuit-breaker as the last action.	

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Operation via the new LOGO! text display unit

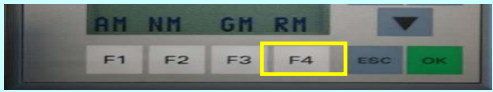
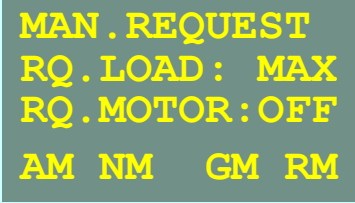
Table 6-12

No.	Instruction	Comment
1.	Press the “F3” button (GM: GENERATOR MANUAL)	
2.	The ESC + ▲ buttons are used to close the GEN circuit-breaker. The ESC + ▼ buttons are used to open or charge the GEN circuit-breaker again. Repeat this action several times.	
3.	Open the GEN circuit-breaker as the last action.	

6.1.10 MANUAL: Manual load and generator request

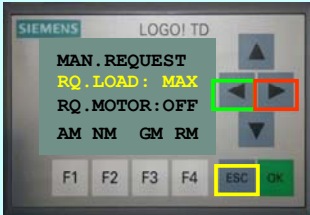
Note Only possible for operation via the new LOGO! text display unit.

Table 6-13

No.	Instruction	Comment
1.	Press the "F4" button (RM: REQUEST MANUAL)	
2.	You are now in the manual request for <ul style="list-style-type: none"> Load: MAX/MIN Diesel generator (motor): ON/ OFF Status of load and diesel generator is displayed and can be changed.	

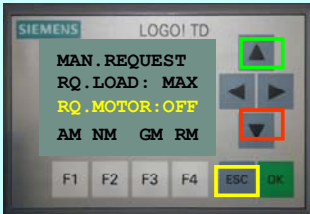
Request load

Table 6-14

No.	Instruction	Comment
1.	The ESC + ▲ buttons are used to request maximum load. Load shedding is cancelled. Status: MAX The ESC + ▼ buttons are used to request partial load. Load shedding is executed. Status: MIN Repeat this action several times.	

Request motor (diesel generator):

Table 6-15

No.	Instruction	Comment
1.	The ESC + ▲ buttons are used to request the diesel generator. Status: ON! The ESC + ▼ buttons are used to cancel the diesel generator. Status: OFF Repeat this action several times.	

6.1.11 SERVICE: Operating the circuit-breakers directly via the controls

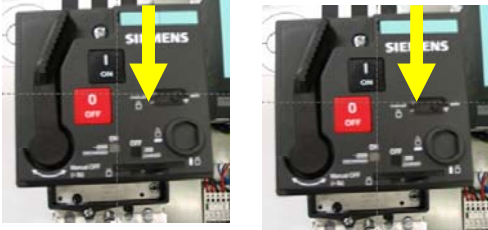
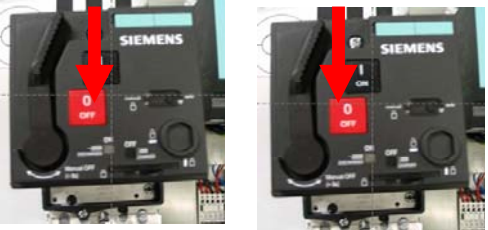
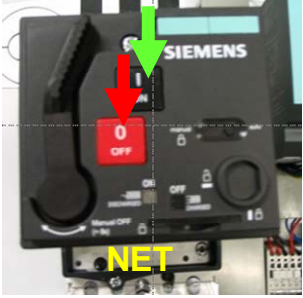
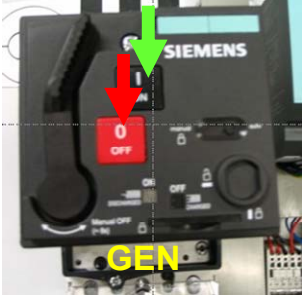


The circuit-breakers are not interlocked between each other. Simultaneously connecting the load with both power systems leads to a short-circuit!

- Service mode
- One supply must exist (public net or generator)
- Both circuit-breakers must be in “Manual” mode.

Table 6-16

No.	Instruction	Comment
1.	Ensure that one power supply is available. For example via the public net.	
2.	<p>Operating via external switches and push buttons:</p> <p>Set knob switch “S1” to “Service” mode and knob switch “S2” to selection “0”.</p>	
3.	<p>Operation via the new LOGO! text display unit:</p> <p>In Automatic mode you press the ESC + ▼ buttons</p>	
4.	You are now in Service mode. In this mode the LOGO! is inactive and there are no undesired actions.	

No.	Instruction	Comment
5.	Set both circuit-breakers to "Manual" mode.	 <p style="text-align: center;">NET GEN</p>
6.	Open both circuit-breakers via the OPEN button. This ensures, that the circuit-breakers are not simultaneously closed.	 <p style="text-align: center;">NET GEN</p>
7.	<p>Let us take a look at the circuit-breaker for the public net.</p> <p>The CLOSE button is used to close the circuit-breaker.</p> <p>The OPEN button is used to open or charge the circuit-breaker again.</p> <p>Repeat this action several times.</p> <p>Open the NET circuit-breaker as the last action.</p>	 <p style="text-align: center;">NET</p>
8.	<p>Let us take a look at the circuit-breaker for the generator mode.</p> <p>The CLOSE button is used to close the circuit-breaker.</p> <p>The OPEN button is used to open or charge the circuit-breaker again.</p> <p>Repeat this action several times.</p> <p>Open the GEN circuit-breaker as the last action.</p>	 <p style="text-align: center;">GEN</p>
9.	The scenario for this service mode is terminated here.	

7 Technical Data

7.1 LOGO!

Table 7-1

Criterion	Technical data	Additional note
LOGO! logic module (12/24RC)	SV/E/A: DC12/24V / DC12/24V / relay 8DE (2AE 0..10V)/4DA,	Logic module with display and keyboard 200 blocks Modular extendible
LOGO! DM8 24R expansion module	SV/E/A: AC/DC 24V / AC/DC 24V PNP and NPN / relay 4DE/4DA	2TE

7.2 SENTRON

Table 7-2

Criterion	Technical data	Additional note
SENTRON circuit-breaker VL 160N	ICU=40kA, 415V AC 3-pole, shunt release 24V AC/DC auxiliary mounting set 2 HS (1S+1OE)	System protection over-current trigger TM, LI IN=50A, rated current IR=40...50A, Overload protection II=300...600A, short-circuit protection, protection
Motorized operating mechanism with spring energy store	220...250V AC/DC	

7.3 SIRIUS

Table 7-3

Criterion	Technical data	Additional note
SIRIUS monitoring relay 3UG4	PHASE FAILURE 3X 160 TO 690V AC 50 TO 60 HZ UNDER AND OVER VOLTAGE 160-690V HYSTERESE 1-20V SWITCH-OFF DELAY 0-20S ASYMMETRY 0-20% 1W FOR PHASE CORRECTION 1 W FOR NETWORK ERROR	DIGITAL MONITORING RELAY FOR THREE-PHASE NET VOLTAGE AUT. CORRECTION THREE-PHASE SEQUENCE SCREW-TYPE CONNECTION
Contactors	2S+2OE, DC 24V	SCREW-TYPE CONNECTION
Quenching circuit	RC-ELEMENT AC 24...48V, DC 24...70V	OVER-VOLTAGE LIMITER