37386D

DTSC-200
ATS Controller

Configuration
Software Version 1.0008

Manual 37386D

WARNING

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

The engine, turbine, or other type of prime mover should be equipped with an overspeed (overtemperature, or overpressure, where applicable) shutdown device(s), that operates totally independently of the prime mover control device(s) to protect against runaway or damage to the engine, turbine, or other type of prime mover with possible personal injury or loss of life should the mechanical-hydraulic governor(s) or electric control(s), the actuator(s), fuel control(s), the driving mechanism(s), the linkage(s), or the controlled device(s) fail.

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

CAUTION

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts.

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

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Important definitions

WARNING

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

CAUTION

Indicates a potentially hazardous situation that, if not avoided, could result in damage to equipment.

NOTE

Provides other helpful information that does not fall under the warning or caution categories.

Revision History

Rev.	Date	Editor	Changes
NEW	07-12-12	TP	Release
A	08-11-25	TE	Implementation of the changes starting with SW version 1.0006
B	09-09-17	TE	Implementation of the changes starting with SW version 1.0008 • S1 & S2 Start fail delay time: configuration range expanded from 100 s to 6500 s. • New LogicManager command variable 20.22 added
C	09-12-02	TE	Minor corrections
D	11-06-17	TE	Minor corrections

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Illustrations

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Type		English	German
DTSC-200 Series			
DTSC-200 - Installation		37385	-
DTSC-200 - Configuration	this manual ⇨	37386	-
DTSC-200 - Operation		37387	-
DTSC-200 - Application		37388	-
DTSC-200 - Interfaces		37389	-

Additional Manuals		
IKD 1 - Manual	37135	GR37135
Discrete expansion board with 8 discrete inputs and 8 relay outputs that can be coupled via the CAN bus to the control unit. Evaluation of the discrete inputs as well as control of the relay outputs is done via the control unit.		
LeoPC1 - User Manual	37146	GR37146
PC program for visualization, configuration, remote control, data logging, language upload, alarm and user management, and management of the event recorder. This manual describes the set up of the program and interfacing with the control unit.		
LeoPC1 - Engineering Manual	37164	GR37164
PC program for visualization, configuration, remote control, data logging, language upload, alarm and user management, and management of the event recorder. This manual describes the configuration and customization of the program.		

Table 1-1: Manual - overview

Intended Use The unit must only be operated for the uses described in this manual. The prerequisite for a proper and safe operation of the product is correct transportation, storage, and installation as well as careful operation and maintenance.

NOTE

This manual has been developed for a unit fitted with all available options. Inputs/outputs, functions, configuration screens and other details described, which do not exist on your unit may be ignored.

The present manual has been prepared to enable the installation and commissioning of the unit. On account of the large variety of parameter settings, it is not possible to cover every possible combination. The manual is therefore only a guide. In case of incorrect entries or a total loss of functions, the default settings can be taken from the enclosed list of parameters at the rear of this manual.

Chapter 2.
Configuration

Configuration Via The Front Panel

How to operate the unit via the front panel is explained in the operation manual 37387. Please familiarize yourself with the unit, the buttons and their meaning/operation and the display monitoring using this manual. The display of parameters via the front panel will differ from the display of the parameters via the LeoPC1 program described in this manual. The sequence, the meaning and the setting limits are identical.

Configuration Using The PC

CAUTION

For the configuration of the unit via the PC please use the LeoPC1 software with the following software version:

LeoPC1 from 3.1.xxx

NOTE

Please note that configuration using the direct configuration cable DPC (product number 5417-557) is possible starting with revision B of the DPC (first delivered July 2003). If you have an older model please contact our sales department.

For configuration of the unit via PC program please proceed as follows:

- Install the PC program on your laptop/PC according to the installation manual.
- Before the end of the installation you are requested to select the language with which you want to start the PC program. You can change the language at any time. The selection of the language refers only to language with which the menus and subprograms of the PC program works. This setting will not change the language of the control unit being configured.
- After the installation of the PC program reboot your laptop/PC.
- Establish the connection between your laptop/PC and the unit via the DPC. Plug one side to the configuration plug of the unit and the other side to the COM1 port of your laptop/PC (other possibilities are described in the installation manual).
- You may start the PC program as follows:
  - by "Start/Program/Woodward/LeoPC" (starting at version 3.1.xxx), or
  - by a double click on a file ending ".cfg" in the subdirectory "/LeoPC".
- After the PC program was started, establish the communication by pressing the "F2" button. This will establish a data link between the unit and the laptop/PC.
- Start the sub program "Device Parameterization" and adjust the parameter of the unit to your application using this manual.

NOTE

The connection cables delivered with the DPC must be used to connect to the DTSC to ensure that the controller functions properly. An extension or utilization of different cable types for the connection between DTSC and DPC may result a malfunction of the DTSC. This may possibly result in damage to components of the system. If an extension of the data connection line is required, only the serial cable between DPC and laptop/PC may be extended.

NOTE

If the laptop/PC fails to communicate with the control unit being configured, refer to LeoPC1 manual 37146.

NOTE

Depending on the used computer and the installed operation system, problems with the communication via an infrared connection may occur.

NOTE

If you want to read or write parameters using a [LeoPC1 Gateway-RS-232 via GW4] connection, you must configure the parameter "Visualization" to "not active" in LeoPC1. The parameter "Visualization" may be configured back to "active" after reading and/or writing.

General Information

The DTSC-200 has been developed to control ATS (Automatic Transfer Switch) units.

The main purpose of the ATS controller is to control and monitor the transfer switch as well as issuing an engine start signal to a connected genset control. The controller is continuously monitoring the presence of a source. If the preferred source fails, it attempts to transfer to a second source (emergency power supply, etc.).

It is NOT the task of an ATS controller to monitor a start/stop sequence. Start and stop failures will be displayed, but have no effect on the functionality of the controller. Only switch failures or problems with connected position limit switches, which signal the actual position of the ATS (connected with utility or connected with emergency power supply, etc.) to the controller, block the ATS controller for further automatic functions.

Important Designations

- Source 1 Usually the preferred power source, e.g. utility supply (depends on application)
- Source 2 Usually the emergency power source, e.g. genset (depends on application)
- Transfer Change from one source to the other

Signal and Command Abbreviations

- S1 Signal: breaker in source 1 position
- S2 Signal: breaker in source 2 position
- S1O Signal: breaker in source 1 OPEN position
- S2O Signal: breaker in source 2 OPEN position
- C1 Command: close to source 1
- C2 Command: close to source 2
- C1O Command: open from source 1
- C2O Command: open from source 2

Monitoring Functions

Source Monitoring

- Overvoltage / undervoltage
- Overfrequency / underfrequency
- Voltage imbalance
- Rotation field monitoring

NOTE

If one of these monitoring functions is triggered, the ATS controller attempts to change to the non-preferred source.

Load Monitoring

- Overload
- Overcurrent

Switch Monitoring

- Monitoring for plausible position feedback
- Monitoring for transfer failure

NOTE

If one of these monitoring functions is triggered, the all automatic transfers are blocked.

Generator Monitoring

- Unintended stop
- Start failure

Battery Monitoring

- Overvoltage / undervoltage

Interface Monitoring

- Monitoring of the CANopen communication

Function Of The Inputs And Outputs

Discrete Inputs

The discrete inputs may be grouped into two categories:

- ***programmable***
  The programmable discrete input has been programmed with a factory default function using the *LogicsManager*. The following text describes how these functions may be changed using the *LogicsManager*.

- ***fixed***
  The discrete input has a specific function that cannot be changed. The discrete input cannot be used in the *LogicsManager*.

NOTE

Depending on the configured transfer switch type (parameter 3424), the discrete inputs can be "*programmable*" or "*fixed*". Please refer to Table 3-8 on page 78.

Reply from ATS limit switch: Breaker in source 1 position — ***fixed*** to discrete input [DI 1], terminal 51/50

⇨ Note: Normally closed (break) contact!

This discrete input indicates to the control that the breaker is closed to source 1 position if it is de-energized (logic "0").

Reply from ATS limit switch: Breaker in source 2 position — ***fixed*** to discrete input [DI 2], terminal 52/50

⇨ Note: Normally closed (break) contact!

This discrete input indicates to the control that the breaker is closed to source 2 position if it is de-energized (logic "0").

Reply from ATS limit switch: Breaker in source 1 open position — ***fixed*** to discrete input [DI 3], terminal 53/50

⇨ Note: Normally closed (break) contact!

This discrete input indicates to the control that the breaker is in source 1 open position if it is de-energized (logic "0"). This discrete input is ***programmable*** with standard transfer switch type.

Reply from ATS limit switch: Breaker in source 2 open position — ***fixed*** to discrete input [DI 4], terminal 54/50

⇨ Note: Normally closed (break) contact!

This discrete input indicates to the control that the breaker is in source 2 open position if it is de-energized (logic "0"). This discrete input is ***programmable*** with standard transfer switch type.

Disconnect switch: Inhibit ATS — ***programmable*** to discrete input [DI 5], terminal 55/50

⇨ Note: Normally closed (break) contact!

This discrete input indicates to the control that the disconnect switch is actuated. If this discrete input is de-energized (logic "0"), the "Inhibit ATS" function is enabled.

Control Inputs — ***programmable*** to discrete inputs [DI 6] through [DI 12], terminals 56 through 62 / 50

These discrete inputs may be used as control signals for functions, like priority selection, remote peak shave, inhibit transfer, etc. The control inputs can be configured freely. Please refer to Discrete Inputs on page 68.

Relay Outputs

The discrete outputs can be grouped into two categories:

- ***programmable***
  The relay output is freely programmable using the *LogicsManager* (which is described in the following text).

- ***pre-defined***
  The relay output has been pre-defined (programmed) with this function using the *LogicsManager* (which is described in the following text). The function may be changed by using the *LogicsManager*.

NOTE

The relay outputs can be "*programmable*" or "*pre-defined*" for a specific function required for the configured transfer switch type (parameter 3424). Please refer to Table 3-11 on page 80.

LogicsManager **Relay {all}** ***programmable*** to relay [R1] through [R3], terminals 32 through 34 / 31

⇨ Note: Normally open (make) contact!

All relays not assigned a defined function, may be configured via the *LogicsManager*.

LogicsManager **Relay {all}** ***programmable*** to relay [R4], terminals 35/36/37

⇨ Note: Change-over contact!

All relays not assigned a defined function, may be configured via the *LogicsManager*.

Start engine {all} ***pre-defined*** to relay [R5], terminals 39/40/41

⇨ Note: Change-over contact!

By energizing (or de-energizing, depending on the utilized contact) this relay an engine start signal will be issued to the genset control.

Command: close to source 1 position {all} ***pre-defined*** to relay [R6], terminals 42/43

⇨ Note: Normally open (make) contact!

By energizing this relay, a "close to source 1 position" command will be issued to the ATS.

Command: close to source 2 position {all} ***pre-defined*** to relay [R7], terminals 44/45

⇨ Note: Normally open (make) contact!

By energizing this relay, a "close to source 2 position" command will be issued to the ATS.

Command: open from source 1 position to neutral position{all} ***pre-defined*** to relay [R8], terminals 46/47

⇨ Note: Normally open (make) contact!

By energizing this relay, an "open from source 1 position to neutral position" command will be issued to the ATS.

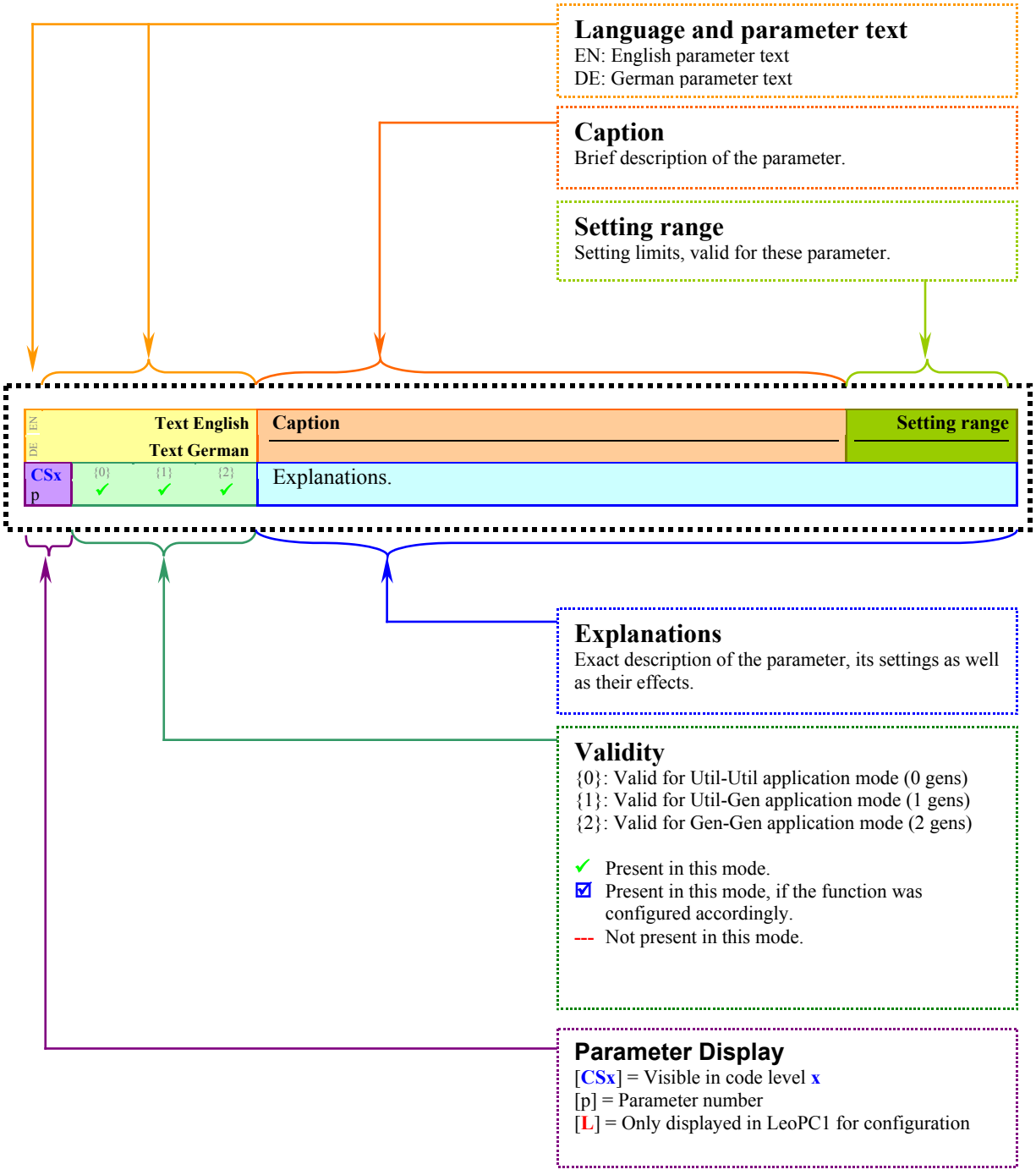
Command: open from source 2 position to neutral position{all} ***pre-defined*** to relay [R9], terminals 48/49

⇨ Note: Normally open (make) contact!

By energizing this relay, an "open from source 2 position to neutral position" command will be issued to the ATS.

Chapter 3.
Parameters

The description of the parameters is confined to the illustration via the PC-program. The parameters are thereby described as follows.



Language

The following parameter is used to set the unit display language.

EN				Language	Set language — English / Deutsch
DE				Language	
CS0 1700	{0} ✓	{1} ✓	{2} ✓		The desired language for the unit display text is configured here.

Password

The DTSC-200 utilizes a password protected multi-level configuration access hierarchy. This permits varying degrees of access to the parameters being granted by assigning unique passwords to designated personnel. A distinction is made between the access levels as follows:

Code level CL0 ***(User Level)*** Standard password = none
This code level permits for monitoring of the system and limited access to the parameters. Configuration of the control is not permitted. Only the parameters for setting the language, the date, the time, and the horn reset time are accessible. The unit powers up in this code level.

Code level CL1 ***(Basic Level)*** Standard password = "**0 0 0 1**"
This code level entitles the user to change selected non-critical parameters, such as setting the parameters accessible in CL0 plus Bar/PSI, °C/°F. The user may also change the password for level CL1. Access granted by this password expires two hours after the password has been entered and the user is returned to the CL0 level.

Code level CL2 ***(Temporary Commissioning Level)*** No standard password available
This code level grants temporary access to most of the parameters. The password is calculated from the random number generated when the password is initially accessed. It is designed to grant a user one-time access to a parameter without having to give him a reusable password. The user may also change the password for level CL1. Access granted by this password expires two hours after the password has been entered and the user is returned to the CL0 level. The password for the temp. commissioning level may be obtained from the vendor.

Code level CL3 ***(Commissioning Level)*** Standard password = "**0 0 0 3**"
This code level grants complete and total access to most of the parameters. In addition, the user may also change the passwords for levels CL1, CL2 and CL3. Access granted by this password expires two hours after the password has been entered and the user is returned to the CL0 level.

NOTE

Once the code level is entered, access to the configuration menus will be permitted for two hours or until another password is entered into the control. If a user needs to exit a code level then code level, CL0 should be entered. This will block unauthorized configuration of the control. A user may return to CL0 by allowing the entered password to expire after two hours or by changing any one digit on the random number generated on the password screen and entering it into the unit.

It is possible to disable expiration of the password by entering "0000" after the CL1 or CL3 password has been entered. Access to the entered code level will remain enabled until another password is entered. Otherwise, the code level would expire when loading the standard values (default 0000) via LeoPC 1.

EN				Password	Password: Entry via front panel — 0000 to 9999
DE				Passwort	
CS0 10416	{0} ✓	{1} ✓	{2} ✓		The password for configuring the control via the front panel must be entered here.

Event History

The event history is a FIFO (First In/First Out) memory for logging alarm events and operation states of the unit. The capacity of the event history is 300 entries. As new event messages are entered into the history, the oldest messages are deleted once 300 events have occurred.
The individual alarm messages, which are stored in the event history, are described in detail in Appendix A: Operation of manual 37387. The operation states, which are stored in the event history, are listed in the table below.
The event history display is password-protected.
Refer to Appendix B: GetEventLog starting at page 123 for a description about reading out the event logger using a software tool.

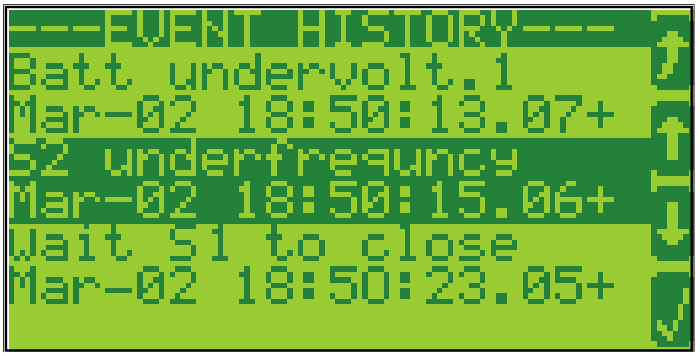


Figure 3-1: Event history- display

NOTE

The ↓ button deletes the highlighted entry!

A date/time stamp is added to each entry. Additional characters (+ and -) indicate the state of the alarm. The "+" character indicates an alarm condition that is still active. If the alarm conditions are no longer present anymore, the "+" character will be changed to "-".

EN / DE	Event history display / Ereignisspeicher anzeigen		
CL2	{0} ✓	{1} ✓	{2} ✓

Event history: Display event history — **Info**

Individual entries can be selected with the ↑ or ↓ keys and deleted from the event history with the ↓ key.

NOTE

Refer to Table 3-18 on page 125 for a complete list of all entries, which may appear in the event history.

EN / DE	Clear event log / Ereignisspeicher löschen		
CL2 1706	{0} ✓	{1} ✓	{2} ✓

Event history: Clear event history — **YES / NO**

YES..... The complete event history will be deleted. After the event history has been deleted, this parameter changes back to "NO" automatically.
NO..... The event history will not be deleted.

Measuring

NOTE

This controller is available in two different hardware version with either 1A [../1] or 5A [../5] current transformer inputs. Both versions are discussed in this manual. The set points for specific parameters will differ depending upon the hardware version.

NOTE

It is absolutely necessary for correct rated voltage values to be entered, as many measurement and monitoring functions refer to these values.

Measuring: Rated Values

EN Rated system frequency
DE Nennfrequenz im System
CL2 {0} {1} {2}
1750 ✓ ✓ ✓

Rated system frequency **50/60 Hz**

The rated frequency of the system is used as a reference figure for all frequency related functions, which use a percentage value, like frequency monitoring or breaker operation windows.

EN Rated voltage S1
DE Nennspannung S1
CL2 {0} {1} {2}
1774 ✓ ✓ ✓

Rated voltage source 1 **50 to 650,000 V**

ⓘ This value refers to the rated voltage of source 1 and is the voltage measured on the potential transformer primary.

The source 1 potential transformer primary voltage is entered in this parameter. The source 1 rated voltage is used as a reference figure for all source 1 voltage related functions, which use a percentage value, like utility voltage monitoring or breaker operation windows.

EN Rated voltage S2
DE Nennspannung S2
CL2 {0} {1} {2}
1772 ✓ ✓ ✓

Rated voltage source 2 **50 to 650,000 V**

ⓘ This value refers to the rated voltage of source 2 and is the voltage measured on the potential transformer primary.

The source 2 potential transformer primary voltage is entered in this parameter. The source 2 rated voltage is used as a reference figure for all source 2 voltage related functions, which use a percentage value, like utility voltage monitoring or breaker operation windows.

EN	S1 voltage measuring		
DE	S1 Spannungsmessung		
CL2	{0}	{1}	{2}
1862	✓	✓	✓

Measurement principle: Source 1 **3Ph 4W / 3Ph 3W / 1Ph 2W / 1Ph 3W**

ⓘ Please refer to the comments on measuring principles in the installation manual (37385).

3Ph 4W ..... Measurement is performed Line-Neutral (WYE connected system). Phase voltages and the neutral must be connected for proper calculation. The measurement, display and protection are adjusted according to the rules for WYE connected systems. Monitoring refers to the following voltages:
- V_{L12}, V_{L23}, and V_{L31}, or
- V_{L1N}, V_{L2N} and V_{L3N}.

3Ph 3W ..... Measurement is performed Line-Line (Delta connected system). Phase voltages must be connected for proper calculation. The measurement, display and protection are adjusted according to the rules for Delta connected systems. Monitoring refers to the following voltages:
- V_{L12}, V_{L23}, V_{L31}.

1Ph 2W ..... Measurement is performed for single-phase systems. The measurement, display and protection are adjusted according to the rules for single-phase systems. Monitoring refers to the following voltages:
- V_{L1N}, V_{L12}

1Ph 3W ..... Measurement is performed Line-Neutral (WYE connected system). The measurement, display, and protection are adjusted according to the rules for single-phase systems. Monitoring refers to the following voltages:
- V_{L1N}, V_{L3N}.

EN S2 voltage measuring
DE S2 Spannungsmessung
CL2 {0} {1} {2}
1861 ✓ ✓ ✓

Measurement principle: Source 2 **3Ph 4W / 3Ph 3W / 1Ph 2W / 1Ph 3W**

ⓘ Please refer to the comments on measuring principles in the installation manual (37385).

3Ph 4W ..... Measurement is performed Line-Neutral (WYE connected system). Phase voltages and the neutral must be connected for proper calculation. The measurement, display and protection are adjusted according to the rules for WYE connected systems. Monitoring refers to the following voltages:
- V_{L12}, V_{L23}, and V_{L31}, or
- V_{L1N}, V_{L2N} and V_{L3N}.

3Ph 3W ..... Measurement is performed Line-Line (Delta connected system). Phase voltages must be connected for proper calculation. The measurement, display and protection are adjusted according to the rules for Delta connected systems. Monitoring refers to the following voltages:
- V_{L12}, V_{L23}, V_{L31}.

1Ph 2W ..... Measurement is performed for single-phase systems. The measurement, display and protection are adjusted according to the rules for single-phase systems. Monitoring refers to the following voltages:
- V_{L1N}, V_{L12}

1Ph 3W ..... Measurement is performed Line-Neutral (WYE connected system). The measurement, display, and protection are adjusted according to the rules for single-phase systems. Monitoring refers to the following voltages:
- V_{L1N}, V_{L3N}.

EN 1Ph2W voltage measuring
DE Art der 1Ph2W Messung
CL2 {0} {1} {2}
1858 ✓ ✓ ✓

Measurement principle: 1Ph 2voltage measuring **Ph – Ph / Phase - N**

ⓘ Please refer to the comments on measuring principles in the installation manual (37385).

This parameter is only visible, if parameter 1862 and/or parameter 1861 is configured as "1Ph 2W".

Ph – Ph ..... The phase-phase voltages are monitored for 1Ph 2W measuring.
Phase - N ..... The phase-neutral voltages are monitored for 1Ph 2W measuring.

EN 1Ph2W phase rotation
DE Art der 1Ph2W Drehrichtung
CL2 {0} {1} {2}
1859 ✓ ✓ ✓

Measurement principle: 1Ph 2W phase rotation **CW / CCW**

ⓘ Please refer to the comments on measuring principles in the installation manual (37385).

This parameter is only visible, if parameter 1862 and/or parameter 1861 is configured as "1Ph 2W".

CW..... A clockwise rotation field is considered for 1Ph 2W measuring .
CCW..... A counter-clockwise rotation field is considered for 1Ph 2W measuring.

EN S1 Load current measuring
DE S1 Last Strommessung
CL2 1863 {0} ✓ {1} ✓ {2} ✓

Measurement principle: S1 Load current **L1 L2 L3 / Phase L1 / Phase L2 / Phase L3**

ⓘ Please refer to the comments on measuring principles in the installation manual (37385).

L1 L2 L3..... All three phases are monitored. The measurement, display and protection are adjusted according to the rules for 3-phase measurement. Monitoring refers to the following currents:
- I_{L1}, I_{L2}, I_{L3}.

Phase L{1/2/3} Only one phase is monitored. The measurement, display and protection are adjusted according to the rules for single-phase measurement. Monitoring refers to the selected phase.

Current and power from source 1 to the load are only measured, if the transfer switch is closed to source 1 position (S1).
The parameters 1860 and 1863 must be configured identical because they share one common CT set at the load connection.

EN S2 Load current measuring
DE S2 Last Strommessung
CL2 1860 {0} ✓ {1} ✓ {2} ✓

Measurement principle: S2 Load current **L1 L2 L3 / Phase L1 / Phase L2 / Phase L3**

ⓘ Please refer to the comments on measuring principles in the installation manual (37385).

L1 L2 L3..... All three phases are monitored. The measurement, display and protection are adjusted according to the rules for 3-phase measurement. Monitoring refers to the following currents:
- I_{L1}, I_{L2}, I_{L3}.

Phase L{1/2/3} Only one phase is monitored. The measurement, display and protection are adjusted according to the rules for single-phase measurement. Monitoring refers to the selected phase.

Current and power from source 2 to the load are only measured, if the transfer switch is closed to source 2 position (S2).
The parameters 1860 and 1863 must be configured identical because they share one common CT set at the load connection.

NOTE

It is absolutely necessary for correct rated power and current values to be entered, as many measurement and monitoring functions refer to these values.

EN Rated active power [kW]
DE Nennwirkleistung [kW]
CL2 1752 {0} ✓ {1} ✓ {2} ✓

Rated active power **0.5 to 99,999.9 kW**

This value specifies the rated power.

EN Rated current
DE Nennstrom
CL2 1754 {0} ✓ {1} ✓ {2} ✓

Rated current **5 to 32,000 A**

This value specifies the rated current.

Measuring: Transformers

Voltage Transformer

EN S1 voltage transf. primary
DE S1 Spannungswandler primär
CL2 {0} {1} {2}
1819 ✓ ✓ ✓

Voltage transformer, source 1, primary **50 to 650,000 V**

Some applications may require the use of potential transformers to facilitate measuring the source voltages. The rating of the primary side of the potential transformer on source 1 must be entered into this parameter.
If the application does not require potential transformers (i.e. the generated voltage is 480 V or less), then the source volt. will be entered into this parameter.

EN S1 voltage transf. secondary
DE S1 Spannungswandler sekund.
CL2 {0} {1} {2}
1818 ✓ ✓ ✓

Voltage transformer, source 1, secondary **50 to 480 V**

ⓘ The control is equipped with dual voltage measuring inputs. The voltage range of these measurement inputs is dependent upon input terminals are used (see below). This value refers to the secondary voltages of the potential transformers, which are directly connected to the control.

Some applications may require the use of potential transformers to facilitate measuring the source voltages. The rating of the secondary side of the potential transformer on source 1 must be entered into this parameter.
If the application does not require potential transformers (i.e. the generated voltage is 480 V or less), then the source volt. will be entered into this parameter.

- Rated voltage: 100 Vac (this parameter configured between 50 and 130 V)
  - Source 1 voltage: Terminals 15/17/19/21
- Rated voltage: 400 Vac (this parameter configured between 131 and 480 V)
  - Source 1 voltage: Terminals 16/18/20/22

EN S2 volt. transf. primary
DE S2 Spannungswandler primär
CL2 {0} {1} {2}
1816 ✓ ✓ ✓

Voltage transformer, source 2, primary **50 to 650,000 V**

Some applications may require the use of potential transformers to facilitate measuring the source voltages. The rating of the primary side of the potential transformer on source 2 must be entered into this parameter.
If the application does not require potential transformers (i.e. the generated voltage is 480 V or less), then the source volt. will be entered into this parameter.

EN S2 volt. transf. secondary
DE S2 Spannungswandler sekund.
CL2 {0} {1} {2}
1815 ✓ ✓ ✓

Voltage transformer, source 2, secondary **50 to 480 V**

ⓘ The control is equipped with dual voltage measuring inputs. The voltage range of these measurement inputs is dependent upon input terminals are used (see below). This value refers to the secondary voltages of the potential transformers, which are directly connected to the control.

Some applications may require the use of potential transformers to facilitate measuring the source voltages. The rating of the secondary side of the potential transformer on source 2 must be entered into this parameter.
If the application does not require potential transformers (i.e. the generated voltage is 480 V or less), then the source volt. will be entered into this parameter.

- Rated voltage: 100 Vac (this parameter configured between 50 and 130 V)
  - Source 2 voltage: Terminals 23/25/27/29
- Rated voltage: 400 Vac (this parameter configured between 131 and 480 V)
  - Source 2 voltage: Terminals 24/26/28/30

Current Transformer

NOTE

This controller is available in two different hardware version with either 1A [../1] or 5A [../5] current transformer inputs. Both versions are discussed in this manual. The set points for specific parameters will differ depending upon the hardware version, indicated on the data plate.

- **[1] DTSC-200-1 = Current transformer with ../1 A rated current**
- **[5] DTSC-200-5 = Current transformer with ../5 A rated current**

EN Load Current transformer
DE Last Stromwandler

	{0}	{1}	{2}
CL2 1821	✓	✓	✓

Current transformer, load **1 to 32,000/5 A**

This screen only applies to controls equipped with 5 A CT inputs. This will not be displayed in the controller screen of a unit equipped with 1 A CT inputs.

The input of the current transformer ratio is necessary for the indication and control of the actual monitored value. The current transformers ratio should be selected so that at least 60% of the secondary current rating can be measured when the monitored system is at 100% of operating capacity (i.e. at 100% of system capacity a 5 A CT should output 3 A). If the current transformers are sized so that the percentage of the output is lower, the loss of resolution may cause inaccuracies in the monitoring and control functions and affect the functionality of the control.

EN Load Current transformer
DE Last Stromwandler

	{0}	{1}	{2}
CL2 1822	✓	✓	✓

Current transformer, load **1 to 32,000/1 A**

This screen only applies to controls equipped with 1 A CT inputs. This will not be displayed in the controller screen of a unit equipped with 5 A CT inputs.

The input of the current transformer ratio is necessary for the indication and control of the actual monitored value. The current transformers ratio should be selected so that at least 60% of the secondary current rating can be measured when the monitored system is at 100% of operating capacity (i.e. at 100% of system capacity a 5 A CT should output 3 A). If the current transformers are sized so that the percentage of the output is lower, the loss of resolution may cause inaccuracies in the monitoring and control functions and affect the functionality of the control.

Application

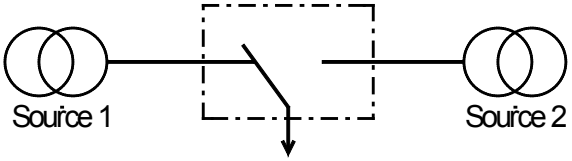
Application: Application Mode

EN	Application mode		
DE	Betriebsmodus		
CL2	{0}	{1}	{2}
4148	✓	✓	✓

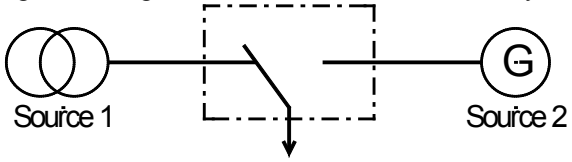
Application mode **Util-Gen / Gen-Gen / Util-Util**

This parameter selects the basic function of the unit. If the unit is used to transfer the load between two utility sources (setting "Util-Util"), no engine start signals are issued.

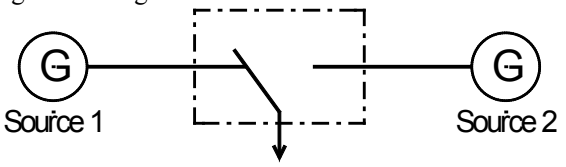
Util-Util.....Application "utility-utility" {0}
No engine start signals will be issued.



Util-Gen .....Standard application "utility-generator" {1}
Engine start signals will be issued for source 2 only.



Gen-Gen.....Application "generator-generator" {2}
Engine start signals will be issued for source 1 and source 2.



NOTE

In Util-Gen application, source S2 is considered as the generator.

Application: Transfer Timers

EN Transfer commit
DE Transfer zustimmen

	{0}	{1}	{2}
CL2		✓	
4146	---		---

Transfer commit **YES / NO**

This function is only effective if a transfer from the preferred source to the non-preferred source is requested.

YES..... A transfer to the non-preferred source is committed as soon as the non-preferred source stable timer has started to count. The transfer will be performed after the stable timer has expired, even if the preferred source restores.

NO..... A transfer to the non-preferred source is only committed, if the non-preferred source stable timer has **expired completely**.
If the preferred source restores while the non-preferred source stable timer is still counting, the whole process will be aborted and the transfer switch remains on the preferred source.

EN S1 start delay time
DE S1 Startverzögerung

	{0}	{1}	{2}
CL2			✓
4149	---	---	

Source 1 start delay time **1 to 300 s**

This parameter delays the de-energizing of the start relay (and thus the engine start) if source 2 is considered as "not OK" or a start, "Load Test", " No Load Test", remote peak shave or interruptible power rates request is performed.
The counter starts as soon as source 2 is considered as "not OK" or the start request is initiated.
If source 2 returns before this counter has expired, the timer will be terminated and the controller returns to standby mode (since it is not intended that the engine starts with every short temporary line fault).
If the timer has expired and source 2 has not been considered as "OK", the engine start relay will be de-energized, the engine will be started, and flag 20.05 "S1 Start Signal" will be enabled.

If this timer is running, the "S1 start delay" message and the Bypass softkey are displayed.

EN S2 start delay time
DE S2 Startverzögerung

	{0}	{1}	{2}
CL2		✓	✓
3330	---		

Source 2 start delay time **1 to 300 s**

This parameter delays the de-energizing of the start relay (and thus the engine start) if source 1 is considered as "not OK" or a start, "Load Test", " No Load Test", remote peak shave or interruptible power rates request is performed.
The counter starts as soon as source 1 is considered as "not OK" or the start request is initiated.
If source 1 returns before this counter has expired, the timer will be terminated and the controller returns to standby mode (since it is not intended that the engine starts with every short temporary line fault).
If the timer has expired and source 1 has not been considered as "OK", the engine start relay will be de-energized, the engine will be started, and flag 20.06 "S2 Start Signal" will be enabled.

If this timer is running, the "S2 start delay" message and the Bypass softkey are displayed.

EN	S1 Source Stable time
DE	S1 Stabilisierzeit

CL2	{0}	{1}	{2}
3333	✓	✓	✓

Source 1 source stable time **1 to 6500 s**

This parameter configures the delay before source 1 is considered as OK. This timer starts after the last monitored value has returned within the restore limits following a source 1 outage. Source 1 will be considered as OK again after this timer has expired. If the voltage and/or frequency exceeds the restore limits again before the timer expires, the timer will be reset (refer to Figure 3-2).
The source 1 stable timer is automatically bypassed if source 1 is the preferred source and the outage delay of source 2 (non-preferred) has expired.
If source 1 fails unexpectedly before this timer has expired, it will be terminated and the load will still be supplied by source 2.
This timer is intended to delay the transfer to ensure that source 1 voltage and frequency are definitely stable before the ATS switch is operated to perform a transfer to source 1.

If this timer is running, the "S1 stable timer" message and the Bypass softkey are displayed.

NOTE

In case a "load test" is being performed (i.e. the load is supplied by source 2, but source 1 is present as well and OK) and source 2 fails, the "S1 source stable timer" will be bypassed completely to be able to change back (OK) to source 1 immediately. This is intended to ensure that the load is not de-energized if a genset failure takes place during a load test.

EN	S2 Source Stable time
DE	S2 Stabilisierzeit

CL2	{0}	{1}	{2}
3332	✓	✓	✓

Source 2 source stable time **1 to 6500 s**

This parameter configures the delay before source 2 is considered as OK. This timer starts after the last monitored value has returned within the restore limits following a source 2 outage. Source 2 will be considered as OK again after this timer has expired. If the voltage and/or frequency exceeds the restore limits again before the timer expires, the timer will be reset (refer to Figure 3-2).
The source 2 stable timer is automatically bypassed if source 2 is the preferred source and the outage delay of source 1 (non-preferred) has expired.
If source 2 fails unexpectedly before this timer has expired, it will be terminated and the load will still be supplied by source 1.
This timer is intended to delay the transfer to ensure that source 2 voltage and frequency are definitely stable before the ATS switch is operated to perform a transfer to source 2.

If this timer is running, the "S2 stable timer" message and the Bypass softkey are displayed.

EN	S1 outage delay		
DE	S1 Ausfallverzögerung		
CL2	{0}	{1}	{2}
2804	---	---	✓

Source 1 outage delay **0.1 to 10.0 s**

This timer defines the maximum time before source 1 (voltage, frequency and phase rotation) is considered as "not OK" to initiate a transfer to source 2. This timer starts if one of the monitored source 1 values exceeds the fail limits. Source 1 will be considered as "not OK", after this timer has expired. If the voltage and/or frequency returns within the fail limits before the timer expires, the timer will be reset (refer to Figure 3-2).
This timer is intended to prevent an immediate transfer to source 2 in case of a temporary voltage or frequency drop during a load test due to a short temporary failure of source 1 (i.e. ignition miss of a genset, etc.).

If this timer has expired, the alarm "Unint. stop S1" is issued.

Note: If source 2 is the "preferred source" and the "S1 outage delay" timer has expired (i.e. source 1 is considered as "not OK"), the "S2 source stable timer" will be bypassed.

EN	S2 outage delay		
DE	S2 Ausfallverzögerung		
CL2	{0}	{1}	{2}
2803	---	✓	✓

Source 2 outage delay **0.1 to 10.0 s**

This timer defines the maximum time before source 2 (voltage, frequency and phase rotation) is considered as "not OK" to initiate a transfer to source 1. This timer starts if one of the monitored source 2 values exceeds the fail limits. Source 2 will be considered as "not OK", after this timer has expired. If the voltage and/or frequency returns within the fail limits before the timer expires, the timer will be reset (refer to Figure 3-2).
This timer is intended to prevent an immediate transfer to source 1 in case of a temporary voltage or frequency drop during a load test due to a short temporary failure of source 2 (i.e. ignition miss of a genset, etc.).

If this timer has expired, the alarm "Unint. stop S2" is issued.

Note: If source 1 is the "preferred source" and the "S2 outage delay" timer has expired (i.e. source 2 is considered as "not OK"), the "S1 source stable timer" will be bypassed.

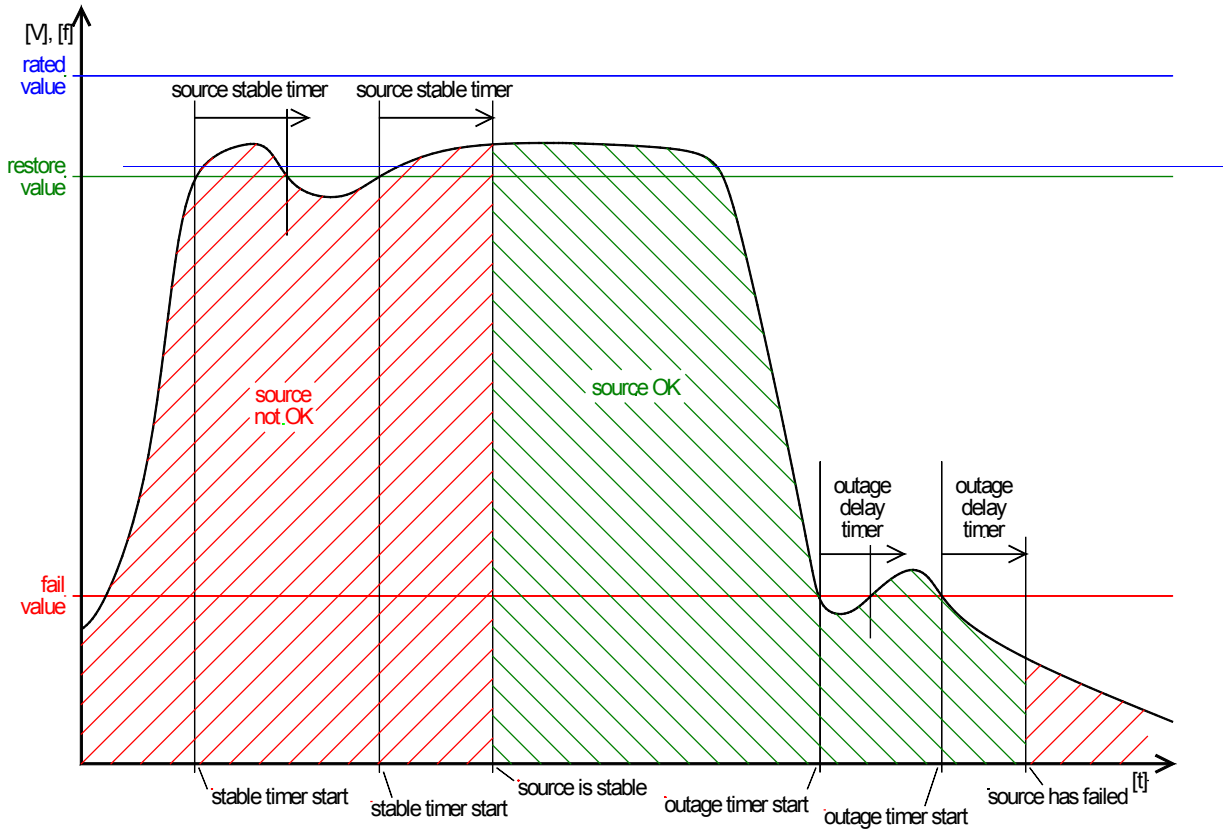


Figure 3-2: Source stable and outage timers

NOTE

Figure 3-2 describes the principle of stable and outage timers for an example where a threshold needs to be exceeded to consider the source as "OK" (like underfrequency or undervoltage).

In case, a threshold needs to be fallen below to consider the source as "OK" (like overfrequency, voltage imbalance or overvoltage), the restore value is lower than the fail value.

EN S1 cooldown time
DE S1 Nachlaufzeit

	{0}	{1}	{2}
CL2			
3343	---	---	✓

Engine 1 cooldown time **1 to 6500 s**

This parameter configures the duration of the cool down phase of engine 1 after the load has been disconnected.

If this timer is running, the "S1 cooldown" message and the Bypass softkey are displayed.

EN S2 cooldown time
DE S2 Nachlaufzeit

	{0}	{1}	{2}
CL2			
3344	---	✓	✓

Engine 2 cooldown time **1 to 6500 s**

This parameter configures the duration of the cool down phase of engine 2 after the load has been disconnected.

If this timer is running, the "S2 cooldown" message and the Bypass softkey are displayed.

Application: Transfer Logics (*LogicsManager*)

NOTE

All functions which are described in the following text may be assigned by the *LogicsManager* to any relay which is available via the *LogicsManager* and not assigned to another function. The assignment of the defined relays to defined functions occurs by selection of the application mode. The same way some relays are designated to specific functions, others may be assigned to different functions. These are listed as "programmed" relays. If a relay is "programmable" the function may be assigned to other relays via the *LogicsManager* by configuration.

Inhibit ATS

If this logical output becomes TRUE, the ATS controller is blocked against automatic transfers and the "ATS Inhibit" message is displayed. Usually, a selected relay output is configured to this *LogicsManager* function, which may be used to block the ATS controller when a disconnect switch is connected to this "Inhibit ATS" relay output.
All automatic transfers will be blocked. Only the "Engine start" signal will still be issued.

EN				Inhibit ATS
DE				Blockiere ATS
CL2	{0}	{1}	{2}	
12600	✓	✓	✓	

Inhibit ATS *LogicsManager*

The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

NOTE

The disconnect switch is ALWAYS inside the ATS cabinet. If the ATS shall be operated manually, the disconnect switch will be switched to the "Inhibit ATS" position. This blocks the ATS controller against the automatic initiation of a transfer and the switch may easily be operated manually.

WARNING

If the ATS controller performs a transfer during a service technician switches the ATS with a manual handle, this may cause serious injuries.

Always inhibit automatic ATS transfers before performing a manual transfer!

Inhibit Transfer to Source 1

If this logical output becomes TRUE, the transfer back to source 1 will be blocked temporarily and the "Inhib. XFR to S1" message is displayed.

Application example:
Supposed, there is a failure of source 1 (preferred source) in a hospital. Then, source 2 will be started and a transfer to source 2 will be performed. Now, the load is supplied by source 2.
If source 1 would return, a transfer back to source 1 would be initiated. This may be prevented by making this *LogicsManager* function TRUE (by energizing a DI for example) because a transfer back to source 1 may cause some risks if a difficult surgery is in progress for example. A mechanical failure of the transfer switch during transferring back would be a serious risk for the patient.

EN			Inhib. XFR to S1	**Inhibit transfer to source 1**	***LogicsManager***
DE			Trans S1 sperren		
CL2 12610	{0} ✓	{1} ✓	{2} ✓	The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".	

Inhibit Transfer to Source 2

If this logical output becomes TRUE, the transfer to source 2 will be blocked temporarily and the "Inhib. XFR to S2" message is displayed.

This function has the same behavior as the "Inhibit XFR to source 1" function, except that a transfer to source 2 will be prevented.

EN			Inhib. XFR to S2	**Inhibit transfer to source 2**	***LogicsManager***
DE			Trans S2 sperren		
CL2 12620	{0} ✓	{1} ✓	{2} ✓	The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".	

Remote Peak Shave

If this logical output becomes TRUE, the non-preferred source will be started, a transfer to the non-preferred source will be performed, and the "Rem.peak shave" message is displayed as soon as the non-preferred source supplies the load. Now, the load will be supplied by the non-preferred source. If the logical output becomes FALSE again, a regular transfer sequence back to the preferred source will be performed including the expiry of all timers belonging to this sequence.
If the non-preferred source fails during a remote peak shave request and the preferred source is available, an immediate transfer back to the preferred source will be performed.

This function may be used to initiate a load test.

EN			Remote peak shave	**Remote peak shave**	***LogicsManager***
DE			Spitzenlast Modus		
CL2 12630	{0} ✓	{1} ✓	{2} ✓	The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".	

Interruptible Power Rate Provisions

If this logical output becomes TRUE, the non-preferred source will be started, a transfer to the non-preferred source will be performed, and the "Pwr.rate.prov." message is displayed as soon as the non-preferred source supplies the load. Now, the load will be supplied by the non-preferred source. If the logical output becomes FALSE again, a regular transfer sequence back to the preferred source will be performed including the expiry of all timers belonging to this sequence.
If the non-preferred source fails during an interruptible power rate provisions request and the preferred source is available, an immediate transfer back to the preferred source will be performed.

This function may be used in some countries where the provider offers contracts, which contain provisions for the customer to disconnect from the utility during peak load times and change to a different power supply (e.g. genset), like the United States. In case the alternative (genset) supply fails during a "Interruptible power rate provisions" request, a transfer to the preferred source will be performed with the effect that the customer must pay a reimbursement to the provider.

EN		Int. pow. rates		
DE		Anforder. Netzbetr.		
CL2 12660	{0} ✓	{1} ✓	{2} ✓	

Interruptible power rate provisions *LogicsManager*

The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

External Timer Bypass

If this logical output becomes TRUE (by energizing a DI for example), all timers, which are in progress at the moment and can be bypassed, are bypassed. This has the same effect as pressing the "Bypass" softkey.

EN		Ext. bypass		
DE		Ext. Zeit Bypass		
CL2 12820	{0} ✓	{1} ✓	{2} ✓	

External timer bypass *LogicsManager*

The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

NOTE

If another timer becomes active immediately after the previous timer has been bypassed, the discrete input must be de-energized before it may be energized again to bypass the next timer. We recommend to use a momentary push-to-make button for this function.

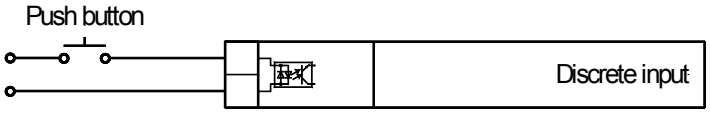


Figure 3-3: External timer bypass - push button

Gen-Gen Enable

This function is only enabled if the application mode (parameter 4148) is configured to "Gen-Gen". If this logical output becomes TRUE (by energizing a DI for example), the gen-gen mode will be enabled.

The behavior of the function depends on the source priority:

- Only the *LogicsManager* function "Source priority S1" (parameter 12680) is TRUE:
  The source 1 genset will be started. If source 1 doesn't start or fails, source 2 genset will be started automatically.

- Only the *LogicsManager* function "Source priority S2" (parameter 12810) is TRUE:
  The source 2 genset will be started. If source 2 doesn't start or fails, source 1 genset will be started automatically.

- Both source priority *LogicsManager* functions (parameters 12680 and 12810) are TRUE or both are FALSE:
  Source 1 has priority, i.e. the source 1 genset will be started. If source 1 doesn't start, source 2 genset will be started automatically.

If the gen-gen mode will be disabled again, all start requests are terminated and the genset, which is currently in operation, will be shut down with a cool down.

EN	Gen-Gen enable		
DE	Gen-Gen Aktivieren		
CL2	{0}	{1}	{2}
12830	---	---	✓

Generator-Generator mode enable ***LogicsManager***

The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

Application: Elevator Pre-Signal

The elevator pre-signal flag (20.01) may be assigned to any output relay using the *LogicsManager*.

The elevator pre-signal is important for buildings which are equipped with elevators. This signal will be enabled before any transfer in order to signal a transfer to an elevator control. If this signal is received by an elevator control, the elevator stops at the next floor and opens the doors. This signal is enabled until the transfer is completed. Then, the signal will be disabled and the elevator is able to operate regularly again.

This function may be used if there is a load test performed during regular hospital operation. A load test means that two sources are available. This signal will not be set in case of a utility failure. In this case, the elevator might get stuck between two floors and it makes no sense to enable the elevator pre-signal. Possibly stuck elevators are accepted and the main target is to attempt to supply the load. As soon as the supply returns, the elevators are ready to operate again.

NOTE

The elevator pre signal (EPS) may be enabled in parallel with a motor load disconnect signal (MLD) if a MLD signal is configured. EPS and MLD are two functions, which operate completely independent and don't affect each other.

If the EPS timer will be bypassed, the MLD signal will be processed consequently (if configured). Otherwise, the transfer sequence will be continued. If the transfer has been performed, the EPS signal will be reset. This is also valid, if the EPS signal has been bypassed prior to the transfer and a MLD timer was configured additionally.

This timer is automatically bypassed, if not both sources are available (and stable) for transfer.

If, for example, a load test has been requested and cancelled again while the EPS signal is active, the EPS relay will be reset automatically and the complete process will be terminated.

EN Elevator Pre Signal
DE Aufzugswarnsignal

	{0}	{1}	{2}
CL2 4490	✓	✓	✓

Elevator pre-signal **ON / OFF**

OFF..... No elevator pre-signal is issued, no elevator pre-signal timer starts and the *LogicsManager* flag 20.01 is not enabled.
ON..... The elevator pre-signal will be issued before any transfer and the *LogicsManager* flag 20.01 will be enabled. The remaining elevator pre-signal time is displayed.

EN Elevator pre-signal duration
DE Warnsignal Dauer

	{0}	{1}	{2}
CL2 4491	✓	✓	✓

Elevator pre-signal duration **1 to 6500 s**

The time configured here determines how long the elevator pre-signal is enabled before the transfer process will be continued. The signal will be disabled again if the transfer process has been completed.
If this timer is running, the "Pre signal timer" message is displayed.

The following examples show the behavior of the elevator pre-signal for different applications.

Example 1 (elevator pre-signal disabled):

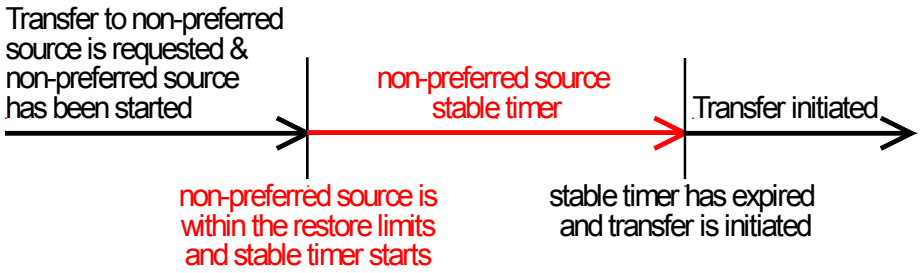


Figure 3-4: Elevator pre-signal - example 1

Example 2 (elevator pre-signal enabled):

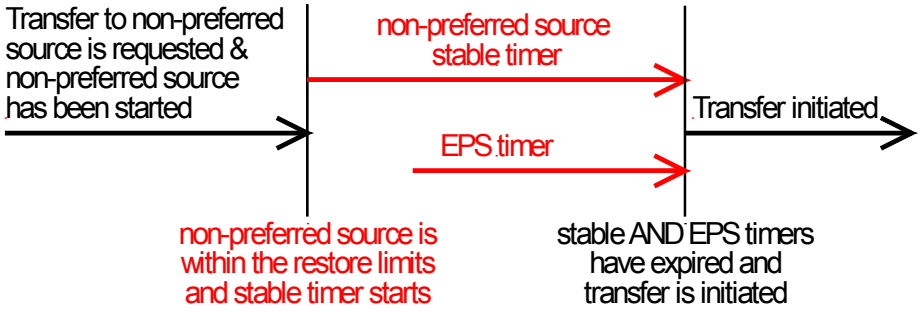


Figure 3-5: Elevator pre-signal - example 2

This example assumes that the non-preferred source stable timer is configured higher than the EPS timer. If the EPS timer would be configured higher, it would start together with the stable timer and the transfer is initiated if all timers have expired.

Example 3 (elevator pre-signal and motor load disconnect enabled):

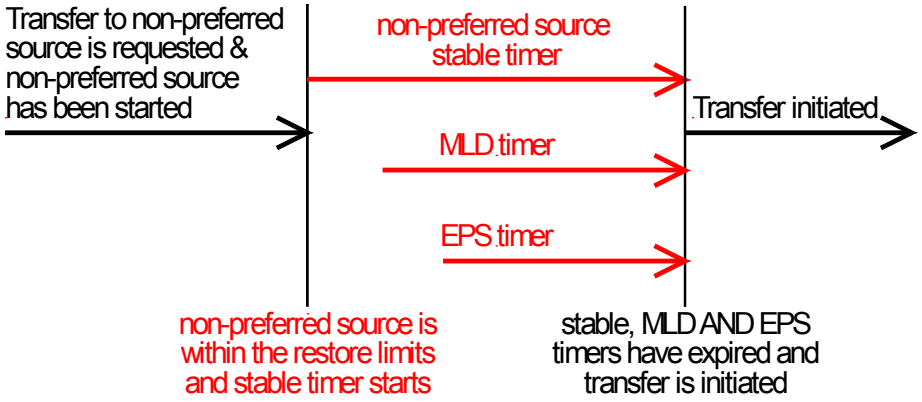


Figure 3-6: Elevator pre-signal - example 3

This example assumes that the non-preferred source stable timer is configured higher than the EPS and the MLD timer. If the EPS or the MLD timer would be configured higher, they would start together with the stable timer and the transfer is initiated if all timers have expired.

Application: Motor Load Disconnect

The motor load disconnect flag (20.02) may be assigned to any output relay using the *LogicsManager*.

The motor load disconnect function is intended for sequential load shedding before a transfer and sequential load addition after a transfer. This shall prevent the addition of the complete load at once.
The loads will be disconnected one after the other before a transfer. Then, the loads will be connected again in the same order following the transfer.

In contrast to the elevator pre-signal, this signal will also be enabled in case of a preferred source failure. No automatic or manual bypass of this signal will be performed.

EN Motor Load Disconnect
DE Lastabwurf
CL2 4550 {0} ✓ {1} ✓ {2} ✓

Motor load disconnect **ON / OFF**

OFF..... No motor load disconnect signal is issued, no motor load disconnect signal timer starts and the *LogicsManager* flag 20.02 is not enabled. It will be proceeded with the operation of the transfer switch.
ON..... The motor load disconnect signal will be issued before any transfer and the *LogicsManager* flag 20.02 will be enabled. The remaining motor load disconnect signal time is displayed with the "Motor Load Disc." message. After the motor load disconnect timer expires, the transfer switch will be operated. The signal will be disabled again if the transfer process has been completed.

EN Active direction
DE Aktive Richtung für Lastabwurf
CL2 4553 {0} ✓ {1} ✓ {2} ✓

Active direction **S1->S2 / S1<-S2 / Both**

This parameter configures the transfer direction into which the motor load disconnect signal is enabled.
S1->S2 ..... The motor load disconnect signal is only enabled in this transfer direction. The *LogicsManager* flag 20.02 will not be enabled when transferring from source 2 to source 1.
S1<-S2 ..... The motor load disconnect signal is only enabled in this transfer direction. The *LogicsManager* flag 20.02 will not be enabled when transferring from source 1 to source 2.
Both ..... The motor load disconnect signal is always enabled in both transfer directions.

EN Disconnect time S1->S2
DE Lastabwurfszeit S1
CL2 4551 {0} ✓ {1} ✓ {2} ✓

Disconnect time S1 -> S2 **1 to 6500 s**

This parameter configures the maximum duration of the motor disconnect signal in source 1 to source 2 transfer direction. After the timer has expired, the transfer to source 2 will be performed

EN Disconnect time S2->S1
DE Lastabwurfszeit S2
CL2 4552 {0} ✓ {1} ✓ {2} ✓

Disconnect time S2 -> S1 **1 to 6500 s**

This parameter configures the maximum duration of the motor disconnect signal in source 2 to source 1 transfer direction. After the timer has expired, the transfer to source 1 will be performed

Application: Source Priority Selection

The two *LogicsManager* functions "Source Priority S1" and "Source Priority S2" are used to determine which source is to be considered as preferred. The *LogicsManager* enables to use a discrete input for example to select the preferred source externally using a source priority selector switch, which is usually on the operation panel.

In general, the preferred source is the one, which is permanently available. The NON-preferred source serves as second source, which will be enabled if the preferred source fails or if a remote start signal is present.

The following constellations are possible:

- One utility supply, one generator (Util-Gen application)
  If the utility (source 1) is defined as preferred source, the genset (source 2) will be started if the utility fails. If the genset is defined as preferred source, the engine start signal is permanently enabled until the source priority changes to the other source.

NOTE

Changing the priority during a load test (parameter 12640), remote peak shave (parameter 12630) or interruptible power rates (parameter 12660) operation is enabled, results in a transfer to the selected non-preferred source.

- Two utility supply networks (Util-Util application)
  In this case, the customer might select one utility supply as preferred source. In case of a failure of the preferred source, the load will be transferred to the other source.

- Two generators (Gen-Gen application)
  In this case, the customer might select one generator as preferred source. In case of a failure of the preferred source, the other genset will be started and the load will be transferred to the other source.

If the *LogicsManager* function "Source Priority S1" becomes TRUE, source 1 will be considered as preferred.

EN			S1 Priority		
DE			S1 Priorität		
CL2	{0}	{1}	{2}	**Source Priority S1**	***LogicsManager***
12680	✓	✓	✓		

The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

If the *LogicsManager* function "Source Priority S2" becomes TRUE, source 2 will be considered as preferred.

EN			S2 Priority		
DE			S2 Priorität		
CL2	{0}	{1}	{2}	**Source Priority S2**	***LogicsManager***
12810	✓	✓	✓		

The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

NOTE

If no source is preferred (both *LogicsManager* functions are FALSE or both *LogicsManager* functions are TRUE), source 1 will be the preferred source.

Application example 1 (source priority = S1):

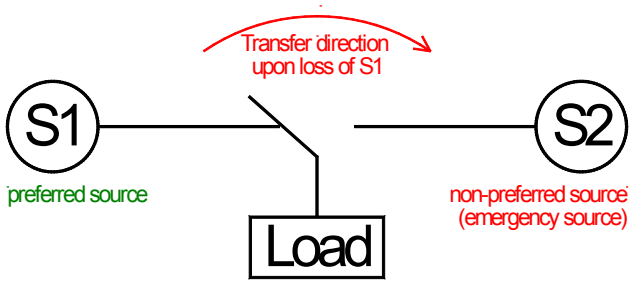


Figure 3-7: Source priority selection - S1 preferred

Application example 2 (source priority = S2):

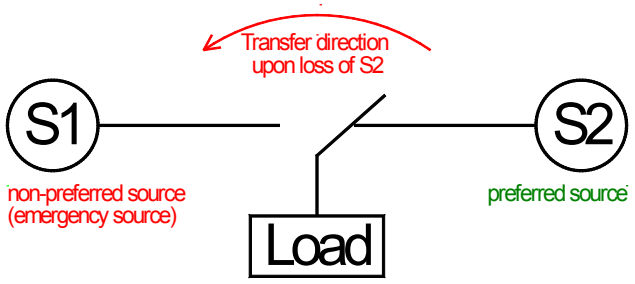


Figure 3-8: Source priority selection - S2 preferred

If the preferred source is available, the load will automatically be connected to the preferred source (except a transfer to the non-preferred source is forced by a load test or remote peak shave, etc.).

It is also possible to change the source priority while the load is connected to the preferred or non-preferred source.

If the load is connected to the non-preferred source and this non-preferred source will be declared as the preferred source, the load remains connected to this source.
If the load is connected to the preferred source and this preferred source will be declared as the non-preferred source, the load will be transferred to the "new" preferred source.

Extended Parallel Time

NOTE

This function is only effective if the transfer switch type (parameter 3424) is configured to "Closed" and in-phase monitoring (parameter 4570) is enabled.

If a closed transition is performed, the overlap time of the make-before-break process, in which both sources are parallel, is as configured in parameter 4577 (Max. overlap time). If this time is to be extended, a *LogicsManager* function is available to keep the transition switch in overlap position. This may be achieved by a digital signal of an external synchronization device for example.

If the *LogicsManager* function "Ext. para. time" becomes TRUE, the transfer switch will remain in overlap position. If it becomes FALSE again, the source, from which the transfer has been initiated, will be disconnected and the load will be supplied by the new source.

EN	Ext. para. time		
DE	Erweiterte para. Zeit		
CL2 12860	{0} ✓	{1} ✓	{2} ✓

Extended parallel time ***LogicsManager***

The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

NOTE

As long as this function is TRUE, parameter 4577 (Max. overlap time) is not effective.

Exception: If parameter 4577 (Max. overlap time) is configured to 0.1 s, an extended parallel time is not possible regardless of the state of this function.

NOTE

If one source fails as long as this function is TRUE, the failed source will automatically be disconnected.

WARNING

Both sources remain in overlap position as long as this function is TRUE.

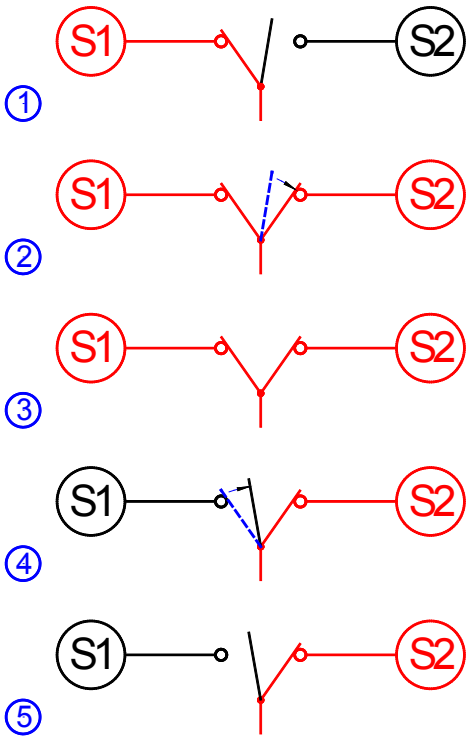
Both sources are not decoupled if

- **a load test (parameter 12640 on page 50) is disabled**
- **a remote peak shave request (parameter 12630 on page 30) is disabled**
- **an interruptible power rate request (parameter 12660 on page 31) is disabled**
- **the priority is changed**

An overlap situation is only decoupled if

- **the "Extended parallel time" function becomes FALSE again**
- **the phase angle during overlap position is > 2.0° or < -2.0°**

The following example shows a typical transfer sequence from source 1 to source 2 with extended parallel time:



Initial situation:
Load is supplied by source 1

A transfer is initiated (e.g. by a load test):
As soon as source 2 is detected as stable and synchronicity is achieved, the transfer switch is closed to source 2.

Extended parallel time is active:
As long as the *LogicsManager* function is TRUE, the transfer switch remains in overlap position and load is supplied by both sources.

Extended parallel time expires:
As soon as the *LogicsManager* function becomes FALSE, the transfer switch opens from source 2.

Final situation:
Load is supplied by source 1

Load Shed

NOTE

Load shed is inactive as long as an "Extended parallel time" (parameter 12860) is enabled.

The load shed function bypasses the in-phase monitoring function. This can cause an asynchronous transfer in case a standard transition switch is used.

The load shed function is intended to shed the load from the non-preferred source if a load shed signal is received from a master controller (e.g. SCADA system) via a discrete input.

If a load shed signal is received from a master control, the DTSC disconnects the load from the non-preferred source immediately. The following rules are valid for the load shed function:

- The load must be supplied by the non-preferred source. The load shed function can only trigger to disconnect the load from the non-preferred source. If the load is supplied by the preferred source while a load shed signal is triggered, the load will not be disconnected.
- Possible timers for pre-transfer signals like motor load disconnect or elevator pre-signal, which are enabled prior to the transfer will be ignored in case of a load shed request.
- If in-phase monitoring is enabled, this will be ignored in case of a load shed request.
- If the *LogicsManager* function "Inhibit XFR to S1" or "Inhibit XFR to S2" is TRUE and would prevent a transfer to the preferred source, this function will be ignored on case of a standard transition switch. If a delayed or closed transition switch is used, the switch will open to neutral position.
- If transfer switches are used, which may only be operated in case a measuring voltage is present, a transfer to the preferred source may only be possible, when it is present. If only the non-preferred source is present, the *LogicsManager* flag "Load shed" (20.11) will be enabled. This flag enables to close a load shed relay, which connects the voltage of the non-preferred source to the preferred source side of the transfer switch to operate it. If the neutral position (delayed / closed switch) or the preferred source position (standard switch) is detected by the DTSC, the load shed signal will be reset again. Refer to Figure 3-9 and Figure 3-10 for more detailed information.

If the *LogicsManager* function "Load shed" becomes TRUE, a load shed from the non-preferred source will be performed.

EN Load shed
DE Nicht prio. LS auf
CL2 12870 {0} ✓ {1} ✓ {2} ✓

Load shedding enabled ***LogicsManager***

The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

Table 3-1 defines the behavior in case of a load shed request when utilizing a standard transition switch depending on the system conditions.

Load is connected to	Pre-transfer signals	In-phase monitoring	Preferred source available	Behavior on load shed request
Non-preferred source	Bypassed	Bypassed	Yes	Immediate transfer to preferred source
Non-preferred source	Bypassed	Bypassed	No	*LogicsManager* flag "Load shed" (20.11) is set to transfer to the preferred source
Preferred source	N/A	N/A	Yes	No action performed - load remains connected to preferred source

Table 3-1: Application - load shed with standard transition switch

Table 3-2 defines the behavior in case of a load shed request when utilizing a delayed or closed transition switch depending on the system conditions.

Load is connected to	Pre-transfer signals	In-phase monitoring	Preferred source available	Behavior on load shed request
Non-preferred source	Bypassed	Bypassed	Yes	Immediate transfer to preferred source
Non-preferred source	Bypassed	Bypassed	No	*LogicsManager* flag "Load shed" (20.11) is immediately set to open to neutral position If the preferred source restores while the switch is in neutral position, a transfer to the preferred source is initiated without waiting for the preferred source stable timer to expire
Preferred source	N/A	N/A	Yes	No action performed - load remains connected to preferred source

Table 3-2: Application - load shed with delayed or closed transition switch

Figure 3-9 shows how to wire a load shed relay for applications, which use a standard transition switch (S1 is the preferred source and S2 is the non-preferred source with this application).

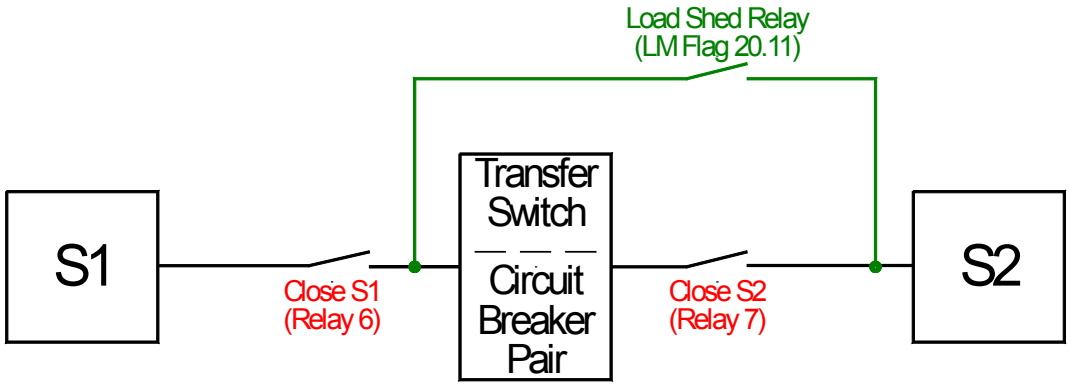


Figure 3-9: Load shed relay wiring - standard transition switch

Figure 3-10 shows how to wire a load shed relay for applications, which use a delayed or closed transition switch (S1 is the preferred source and S2 is the non-preferred source with this application).

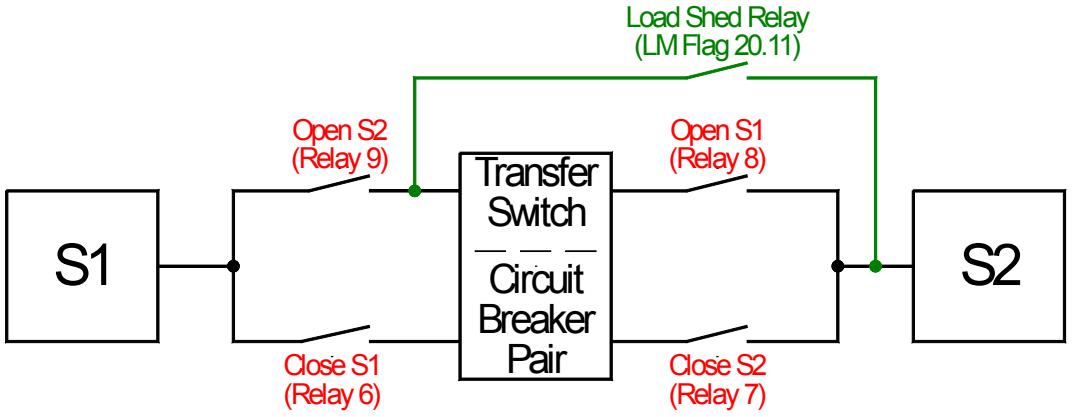


Figure 3-10: Load shed relay wiring - delayed or closed transition switch

NOTE

The load shed relay must always be operated at the non-preferred source side with the power of the non-preferred source.

If a load shed relay is used, preferred and non-preferred source must not be changed since this would lead to a malfunction of the load shed function.

Breaker

Breaker: Transfer Switch Type

EN	Transfer switch type			
DE	Transfer Schalter Typ			
CL2	{0}	{1}	{2}	
3424	✓	✓	✓	

Transfer switch type **Standard / Delayed / Closed**

This parameter configures the type of ATS switch, which is connected to the controller. The switch logic behavior depends on the setting configured here.
Standard .....An "open transition" switch is selected.
Delayed .....A "delayed transition" switch is selected.
Closed.....A "closed transition" switch is selected.

Standard Transfer Switch

If an open transition switch is used, "Standard" transfer switch type must be selected.
This switch type may only take on two states:

- Position 1: Connected to source 1

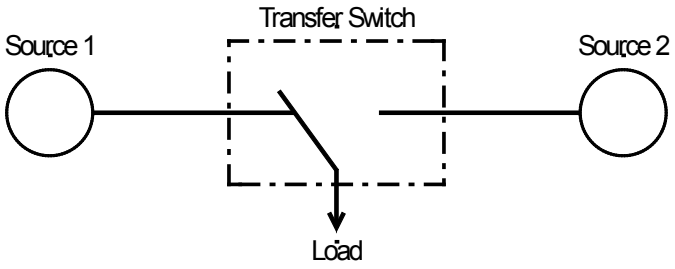


Figure 3-11: Open transition switch - connected to source 1

- Position 2: Connected to source 2

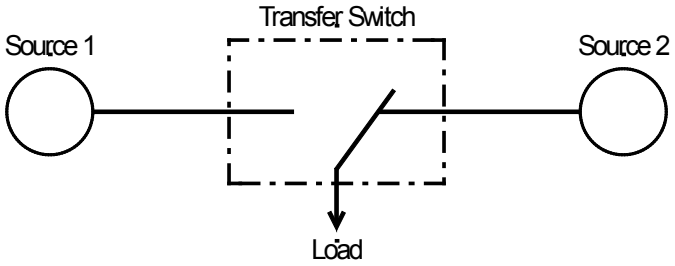


Figure 3-12: Open transition switch - connected to source 2

The following switch commands are enabled in this mode:
- *LogicsManager* flag (20.07) : Command: Close to Source 1
- *LogicsManager* flag (20.09) : Command: Close to Source 2

These signals may be configured to relay outputs to operate the ATS switch mechanics.

The following feedback signals are evaluated in this mode:
- Discrete input 1 (ATS breaker in Source 1 position) = signal designation: S1
- Discrete input 2 (ATS breaker in Source 2 position) = signal designation: S2

These feedback signals are evaluated by the ATS controller for monitoring the actual switch position.

The following additional features are recommended for this mode:
- In-phase monitor (refer to the In-Phase Monitor section)
- Motor load disconnect

Delayed Transfer Switch

If an delayed transition switch is used, "Delayed" transfer switch type must be selected.
This switch type may take on three states:

- Position 1: Connected to source 1

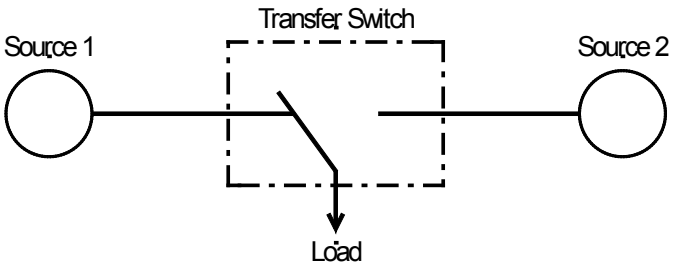


Figure 3-13: Delayed transition switch - connected to source 1

- Position 2: Neutral

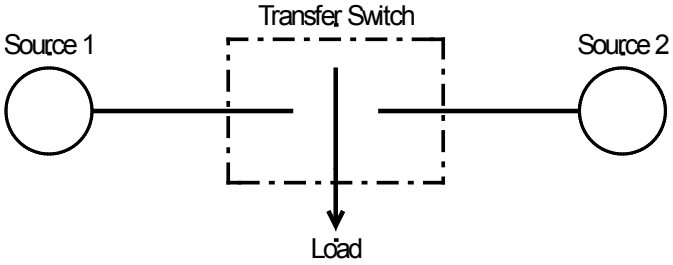


Figure 3-14: Delayed transition switch - neutral position

- Position 3: Connected to source 2

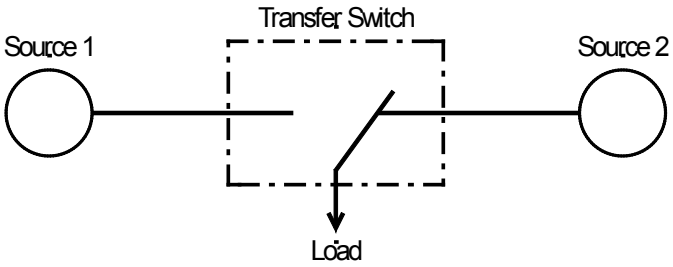


Figure 3-15: Delayed transition switch - connected to source 2

The following switch commands are enabled in this mode:
- *LogicsManager* flag (20.07) : Command: Close to Source 1
- *LogicsManager* flag (20.08) : Command: Open Source 1
- *LogicsManager* flag (20.09) : Command: Close to Source 2
- *LogicsManager* flag (20.10) : Command: Open Source 2

These signals may be configured to relay outputs to operate the ATS switch mechanics.

The following feedback signals are evaluated in this mode:
- Discrete input 1 (ATS breaker in Source 1 position) = signal designation: S1
- Discrete input 2 (ATS breaker in Source 2 position) = signal designation: S2
- Discrete input 3 (ATS breaker in Source 1 OPEN position) = signal designation: S1O
- Discrete input 4 (ATS breaker in Source 2 OPEN position) = signal designation: S2O

These feedback signals are evaluated by the ATS controller for monitoring the actual switch position.

The following additional features are recommended for this mode:
- In-phase monitor (refer to the In-Phase Monitor section)
- Motor load disconnect

Closed Transfer Switch

If an closed transition switch is used, "Closed" transfer switch type must be selected.
This switch type may take on four states:

- Position 1: Connected to source 1

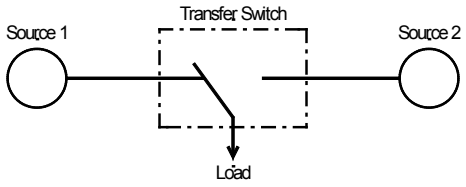


Figure 3-16: Closed transition switch - connected to source 1

- Position 2: Neutral

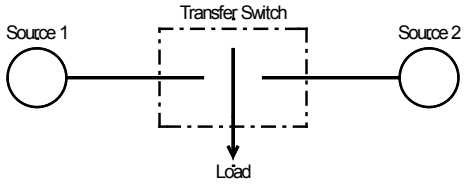


Figure 3-17: Closed transition switch - neutral position

- Position 3: Synchronized

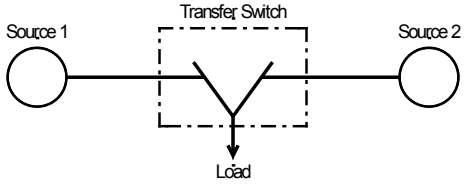


Figure 3-18: Closed transition switch - connected to source 1 and 2 (overlap position)

- Position 4: Connected to source 2

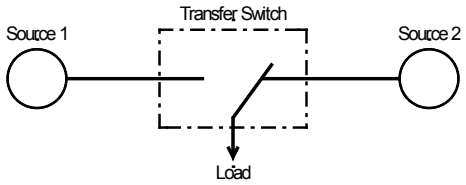


Figure 3-19: Closed transition switch - connected to source 2

The following switch commands are enabled in this mode:
- *LogicsManager* flag (20.07) : Command: Close to Source 1
- *LogicsManager* flag (20.08) : Command: Open Source 1
- *LogicsManager* flag (20.09) : Command: Close to Source 2
- *LogicsManager* flag (20.10) : Command: Open Source 2

These signals may be configured to relay outputs to operate the ATS switch mechanics.

The following feedback signals are evaluated in this mode:
- Discrete input 1 (ATS breaker in Source 1 position) = signal designation: S1
- Discrete input 2 (ATS breaker in Source 2 position) = signal designation: S2
- Discrete input 3 (ATS breaker in Source 1 OPEN position) = signal designation: S1O
- Discrete input 4 (ATS breaker in Source 2 OPEN position) = signal designation: S2O

These feedback signals are evaluated by the ATS controller for monitoring the actual switch position.

The following additional features are recommended for this mode:
- In-phase monitor (refer to the In-Phase Monitor section)
- Motor load disconnect

Use Limit Switch Open Replies

This function is used to define the limit switch reply signals, which are evaluated for determining the current ATS switch position.

The following four signals are available for determining the ATS switch position:
- Discrete input 1 (ATS breaker in Source 1 position) = signal designation: S1
- Discrete input 2 (ATS breaker in Source 2 position) = signal designation: S2
- Discrete input 3 (ATS breaker in Source 1 OPEN position) = signal designation: S1O
- Discrete input 4 (ATS breaker in Source 2 OPEN position) = signal designation: S2O

NOTE

All reply signals, which are selected for determining the current ATS switch position must be connected to the discrete inputs of the DTSC to ensure a correct evaluation of the switch replies.

These discrete inputs have an N.C. logic, i.e. the breaker is considered as "in position" if the respective DI is de-energized.

EN	Use Limit sw. OPEN replies			
DE	Schalter RM OFFEN verwenden			
CL2 3434	{0} ✓	{1} ✓	{2} ✓	

Use limit switch open replies **YES / NO**

This parameter may only be enabled (setting "YES") if parameter 3424 on page 42 is configured to "Delayed" or "Closed". If it is configured to "Standard", this parameter is always disabled (setting "NO").

This parameter defines whether the limit switch open signals are also used to determine the ATS switch position.

YES..... The signals S1, S2, S1O, and S2O are used to determine the ATS switch position.
This setting provides a higher system safety because the "Switch Open" replies are also evaluated besides the "Switch Closed" replies.

NO ..... Only the signals S1 and S2 are used to determine the ATS switch position.
This setting does not use the DIs 3 and 4 for determining the ATS switch position and makes them available for other functions.

Delayed Mode Active

This function is only effective if parameter 3424 (Transfer switch type) is configured to "Closed". If the *LogicsManager* function "Delayed mode act." becomes TRUE, the transfer switch type will be set to "Delayed" temporarily.

EN	Delayed mode act.			
DE	Verzög. modus akt.			
CL2 12850	{0} ✓	{1} ✓	{2} ✓	

Enable delayed mode ***LogicsManager***

The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

Transition Timers

The "Neutral Time S2 -> S1" parameter is only enabled, if "Delayed" or "Closed" is configured as "Transfer switch type" (parameter 3424) and inphase monitoring is disabled (parameter 4570).

EN	Neutral Time S2->S1
DE	Neutral Verweilzeit S2->S1
CL2 3426	{0} ✓ {1} ✓ {2} ✓

Neutral Time S2 -> S1 **0 to 6500 s**

This parameter configures the residence time in neutral position when transferring the load in this transfer direction.
After this timer has expired, the transfer to source 1 will be performed.

If this timer is running, the "Neutral S1 -> S2" message is displayed.

The "Neutral Time S2 <- S1" parameter is only enabled, if "Delayed" or "Closed" is configured as "Transfer switch type" (parameter 3424) and inphase monitoring is disabled (parameter 4570).

EN	Neutral Time S1->S2
DE	Neutral Verweilzeit S1->S2
CL2 3425	{0} ✓ {1} ✓ {2} ✓

Neutral Time S1 -> S2 **0 to 6500 s**

This parameter configures the residence time in neutral position when transferring the load in this transfer direction.
After this timer has expired, the transfer to source 2 will be performed.

If this timer is running, the "Neutral S1 <- S2" message is displayed.

EN	Limit switch reply timeout
DE	Zeitüberschreitung Rückmeld.
CL2 3428	{0} ✓ {1} ✓ {2} ✓

Limit switch reply timeout **0.1 to 99.9 s**

This parameter configures the maximum waiting time for a feedback signal from the ATS switch. If no reply is detected within the configured time, a new transition attempt will be performed after the "Wait time until next XFR attempt" (parameter 3429) has expired (refer to Figure 3-20 on page 47). If the "Max. of transfer attempts" (parameter 3427) is exceeded, a switch failure will be issued.

If this timer is running, the Bypass softkey is not displayed. The display message while the timer is running indicates that a reply is expected and depends on the command issued:

- If source 1 is to be opened : "Wait S1 open"
- If source 2 is to be opened : "Wait S2 open"
- If source 1 is to be closed : "Wait S1 close"
- If source 2 is to be closed : "Wait S2 close"

Note: The operator coils may be damaged. if this timer is configured too long (i.e. the maximum time, for which the transition pulse may be enabled must not be exceeded).

NOTE

The limit switch reply timeout monitoring is only enabled if a transfer command (C2, C1, C2O, or C1O) has been issued from the ATS controller.

EN Wait time until next XFR attempt
DE Wartezeit vor neuem Transfer
CL2 {0} {1} {2}
3429 ✓ ✓ ✓

Waiting time until next transition attempt **0.1 to 99.9 s**

This parameter configures the interval following an unsuccessful transition attempt before a new transition attempt is being performed.
This time allows the relay coil to cool down between the open/close signals.

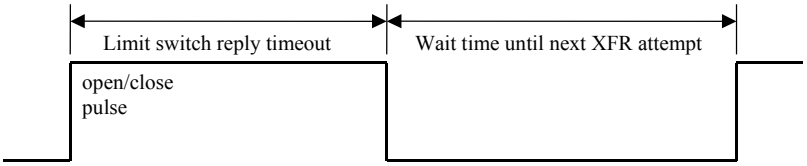


Figure 3-20: Breaker - transition pulse

EN Max. of Transfer attempts
DE Max. Anzahl Fehlzuschaltungen
CL2 {0} {1} {2}
3427 ✓ ✓ ✓

Maximum number of unsuccessful transition attempts **1 to 10**

This parameter configures the maximum number of unsuccessful transition attempts before a switch failure will be issued. The counter for the number of unsuccessful transition attempts will be increased with the start of each waiting time period (parameter 3429)

•

Triggering of the "Fail to close S1" failure

This failure is triggered if the following conditions are met:

- Source 1 is available
- The ATS controller has issued the C1 signal (*LogicsManager* flag (20.07)) to close to source 1

As soon as the C1 signal (command: close to source 1) is issued, the "Limit switch reply timeout" timer (parameter 3428) starts to count and the period for monitoring whether the S1 reply (closed to source 1) is fed back from the ATS switch to the controller starts. The C1 signal is enabled until the "Limit switch reply timeout" timer has expired. Thus, this defines maximum permissible pulse duration for the transfer command. If the "Limit switch reply timeout" timer has expired, the C1 signal will be disabled. If the "Wait time until next XFR attempt" timer (parameter 3429) has expired, the C1 signal will be enabled again and the "Limit switch reply timeout" timer is re-started. If the timer expires again without detecting the S1 reply, the "Fail to close S1" failure is issued. The message "Fail to close S1" will be displayed and entered into the event logger.

If the reply from the ATS controller is detected while the "Limit switch reply timeout" timer is still counting, the C1 signal will be disabled immediately since the transfer was successful. The message is not be displayed anymore and the reply monitoring is terminated.

NOTE

Closing the ATS switch will be attempted until the maximum number of unsuccessful transition attempts (parameter 3427) is reached. The failure will be issued after the last failed transfer attempt.

Triggering of the "Fail to close S2" failure

This failure is triggered if the following conditions are met:

- Source 2 is available
- The ATS controller has issued the C2 signal (*LogicsManager* flag (20.09)) to close to source 2

As soon as the C2 signal (command: close to source 2) is issued, the "Limit switch reply timeout" timer (parameter 3428) starts to count and the period for monitoring whether the S2 reply (closed to source 2) is fed back from the ATS switch to the controller starts. The C2 signal is enabled until the "Limit switch reply timeout" timer has expired. Thus, this defines maximum permissible pulse duration for the transfer command. If the "Limit switch reply timeout" timer has expired, the C2 signal will be disabled. If the "Wait time until next XFR attempt" timer (parameter 3429) has expired, the C2 signal will be enabled again and the "Limit switch reply timeout" timer is re-started. If the timer expires again without detecting the S2 reply, the "Fail to close S2" failure is issued. The message "Fail to close S2" will be displayed and entered into the event logger.

If the reply from the ATS controller is detected while the "Limit switch reply timeout" timer is still counting, the C2 signal will be disabled immediately since the transfer was successful. The message is not be displayed anymore and the reply monitoring is terminated.

NOTE

Closing the ATS switch will be attempted until the maximum number of unsuccessful transition attempts (parameter 3427) is reached. The failure will be issued after the last failed transfer attempt.

NOTE

If a closure failure occurs, the system always tries to close the second breaker to a good source.

Triggering of the "Fail to open S1" failure

This failure is triggered if the following conditions are met:

- Source 2 is available
- The ATS controller has issued the C1O signal (*LogicsManager* flag (20.08)) to open source 1

As soon as the C1O signal (command: open source 1) is issued, the "Limit switch reply timeout" timer (parameter 3428) starts to count and the period for monitoring whether the S1O reply (source 1 is open) is fed back from the ATS switch to the controller starts. The C1O signal is enabled until the "Limit switch reply timeout" timer has expired. Thus, this defines maximum permissible pulse duration for the transfer command. If the "Limit switch reply timeout" timer has expired, the C1O signal will be disabled. If the "Wait time until next XFR attempt" timer (parameter 3429) has expired, the C1O signal will be enabled again and the "Limit switch reply timeout" timer is re-started. If the timer expires again without detecting the S1O reply, the "Fail to open S1" failure is issued. The message "Fail to open S1" will be displayed and entered into the event logger.

If the reply from the ATS controller is detected while the "Limit switch reply timeout" timer is still counting, the C1O signal will be disabled immediately since the transfer was successful. The message is not be displayed anymore and the reply monitoring is terminated.

NOTE

Opening the ATS switch will be attempted until the maximum number of unsuccessful transition attempts (parameter 3427) is reached. The failure will be issued after the last failed transfer attempt.

Triggering of the "Fail to open S2" failure

This failure is triggered if the following conditions are met:

- Source 1 is available
- The ATS controller has issued the C2O signal (*LogicsManager* flag (20.10)) to open source 2

As soon as the C2O signal (command: open source 2) is issued, the "Limit switch reply timeout" timer (parameter 3428) starts to count and the period for monitoring whether the S2O reply (source 2 is open) is fed back from the ATS switch to the controller starts. The C2O signal is enabled until the "Limit switch reply timeout" timer has expired. Thus, this defines maximum permissible pulse duration for the transfer command. If the "Limit switch reply timeout" timer has expired, the C2O signal will be disabled. If the "Wait time until next XFR attempt" timer (parameter 3429) has expired, the C2O signal will be enabled again and the "Limit switch reply timeout" timer is re-started. If the timer expires again without detecting the S2O reply, the "Fail to open S2" failure is issued. The message "Fail to open S2" will be displayed and entered into the event logger.

If the reply from the ATS controller is detected while the "Limit switch reply timeout" timer is still counting, the C2O signal will be disabled immediately since the transfer was successful. The message is not be displayed anymore and the reply monitoring is terminated.

NOTE

Opening the ATS switch will be attempted until the maximum number of unsuccessful transition attempts (parameter 3427) is reached. The failure will be issued after the last failed transfer attempt.

Test Modes

There are two different types of system tests:

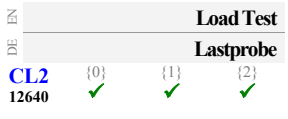
- Load Test
  This is a test with load transfer. If a load test is requested, a failure of the preferred source will be simulated. The non-preferred source will be started and load will be transferred to the non-preferred source.
  This test serves to ensure that the complete system is ready for operation in case of a real failure of the preferred source.

- No Load Test
  This is an engine test. If a no load test is requested, only the non-preferred source will be started, but no load transfer will be performed.
  This test serves to ensure that the non-preferred source is starting and running properly.

NOTE

A "No Load Test" may only be performed if the non-preferred source is a generator.

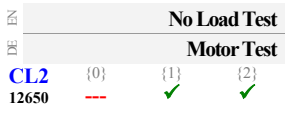
If the *LogicsManager* function "Load Test" becomes TRUE (by energizing a DI for example), a load test will be performed.



Load Test *LogicsManager*

The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

If the *LogicsManager* function "No Load Test" becomes TRUE (by energizing a DI for example), a no load test will be performed.



No Load Test *LogicsManager*

The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

Monitoring

Monitoring: Alarm Acknowledgement

EN Time until horn reset
DE Zeit Hupenreset
CL2 {0} {1} {2}
1756 ✓ ✓ ✓

Self acknowledgment of the centralized alarm (horn) **0 to 1,000 s**

After each alarm occurs, the alarm LED flashes and the command variable 03.05 (horn) is issued. After the delay time 'time until horn reset' has expired, the flashing LED changes into a steady light and the command variable 03.05 (horn) is reset. The alarm LED is illuminated continuously until the alarm has been acknowledged.

Note: If this parameter is configured to 0, the horn will remain active until it will be acknowledged.

EN External acknowledge
DE Ext. Quittierung
CL2 {0} {1} {2}
12490 ✓ ✓ ✓

Protection: External acknowledgment of alarms ***LogicsManager***

It is possible to acknowledge all alarms simultaneously from remote, e.g. with a discrete input. The command variables of the *LogicsManager* have to become TRUE twice.

ⓘ The first high signal into the discrete input acknowledges the command variable 03.05 (horn). The second high signal acknowledges all inactive alarm messages.

The ON-delay time is the minimum time the input signals have to be "1". The OFF-delay time is the time how long the input conditions have to be "0" before the next high signal is accepted.

The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

Monitoring: Limit Switch Monitoring

EN Limit switch monitoring
DE Rückmeldungswächter
CL2 {0} {1} {2}
3430 ✓ ✓ ✓

Limit switch monitoring **ON / OFF**

Limit switch monitoring evaluates the ATS limit switch replies and checks them for plausibility with reference to the operating state. If the replies are not plausible, the "Actual" and "Expected" replies are displayed.
Meanwhile, the status of the breaker replies cannot be reset with the Reset button and all further transfers are inhibited.

A table with the actual and expected replies may be found in the Operation Manual 37387.
ON..... The replies of the ATS limit switch are evaluated and compared with the expected replies.
OFF..... The replies of the ATS limit switch are not evaluated.

Note: Do not enable this monitoring function before the system is commissioned and fully operational. Otherwise, missing reply signals would lead to a limit switch failure, which blocks the control unit. This can only be solved by wiring the reply signals correctly or disabling this function using LeoPC1.

Monitoring: Source 1 Monitoring

EN Voltage monitoring S1
DE Spg.-Überwachung S1
CL2 {0} {1} {2}
1787 ✓ ✓ ✓

Voltage monitoring source 1 **Ph - Ph / Phase - N**

The unit can either monitor the wye voltages (phase-neutral: 3ph-4w, 1ph-3w and 1ph-2w) or the delta voltages (phase-phase: 3ph-3w and 3ph-4w).

> **! WARNING:**
> This parameter influences the protective functions.

Ph - Ph .....The phase-phase voltage will be measured and all subsequent parameters concerning voltage monitoring "source 1" are referred to this value (V_{L-L}).
Phase - N.....The phase-neutral voltage will be measured and all subsequent parameters concerning voltage monitoring "source 1" are referred to this value (V_{L-N}).

Monitoring: Source 1 Monitoring: Undervoltage

Voltage is monitored depending on parameter 1787 "Voltage monitoring S1".

EN S1 undervoltage restore
DE S1 Unterspannung rücksetzen
CL2 {0} {1} {2}
4450 ✓ ✓ ✓

Source 1 undervoltage restore **50.0 to 125.0 %**

> ⓘ This value refers to the Rated voltage Source 1 (parameter 1774 on page 18).

This parameter configures the threshold, which must be exceeded to consider source 1 as "OK" again.

EN S1 undervoltage fail
DE S1 Unterspannung auslösen
CL2 {0} {1} {2}
4451 ✓ ✓ ✓

Source 1 undervoltage fail **50.0 to 125.0 %**

> ⓘ This value refers to the Rated voltage Source 1 (parameter 1774 on page 18).

This parameter configures the threshold, which must be fallen below to consider source 1 as "not OK".

Monitoring: Source 1 Monitoring: Underfrequency

Three-phase measurement of the frequency is performed, if all voltages are higher than 15 % of the rated value. This permits a very rapid and accurate frequency measurement. The frequency however will be measured properly even if voltage is applied to one phase only.

EN S1 underfrequency monitoring
DE S1 Unterfrequenz Wächter
CL2 4452 {0} ✓ {1} ✓ {2} ✓

Source 1 underfrequency monitoring **ON / OFF**

This parameter configures, whether underfrequency monitoring for source 1 is performed.
OFF .....No underfrequency monitoring is performed for source 1.
ON .....Underfrequency monitoring is performed for source 1.

EN S1 underfrequency restore
DE S1 Unterfrequenz rücksetzen
CL2 4453 {0} ✓ {1} ✓ {2} ✓

Source 1 underfrequency restore **50.0 to 130.0 %**

ⓘ This value refers to the Rated system frequency (parameter 1750 on page 18).

This parameter configures the threshold, which must be exceeded to consider source 1 as "OK" again..

EN S1 underfrequency fail
DE S1 Unterfrequenz auslösen
CL2 4454 {0} ✓ {1} ✓ {2} ✓

Source 1 underfrequency fail **50.0 to 130.0 %**

ⓘ This value refers to the Rated system frequency (parameter 1750 on page 18)

This parameter configures the threshold, which must be fallen below to consider source 1 as "not OK".

Monitoring: Source 1 Monitoring: Overvoltage

Voltage is monitored depending on parameter 1787 "Voltage monitoring S1".

EN S1 overvoltage monitoring
DE S1 Überspannung Wächter
CL2 4455 {0} ✓ {1} ✓ {2} ✓

Source 1 overvoltage monitoring **ON / OFF**

This parameter configures, whether overvoltage monitoring for source 1 is performed.
OFF .....No overvoltage monitoring is performed for source 1.
ON .....Overvoltage monitoring is performed for source 1.

EN S1 overvoltage restore
DE S1 Überspannung rücksetzen
CL2 4456 {0} ✓ {1} ✓ {2} ✓

Source 1 overvoltage restore **50.0 to 125.0 %**

ⓘ This value refers to the Rated voltage Source 1 (parameter 1774 on page 18).

This parameter configures the threshold, which must be fallen below to consider source 1 as "OK" again..

EN S1 overvoltage fail
DE S1 Überspannung auslösen
CL2 4457 {0} ✓ {1} ✓ {2} ✓

Source 1 overvoltage fail **50.0 to 125.0 %**

ⓘ This value refers to the Rated voltage Source 1 (parameter 1774 on page 18).

This parameter configures the threshold, which must be exceeded to consider source 1 as "not OK".

Monitoring: Source 1 Monitoring: Overfrequency

Three-phase measurement of the frequency is performed, if all voltages are higher than 15 % of the rated value. This permits a very rapid and accurate frequency measurement. The frequency however will be measured properly even if voltage is applied to one phase only.

EN S1 overfrequency monitoring
DE S1 Überfrequenz Wächter
CL2 4458 {0} ✓ {1} ✓ {2} ✓

Source 1 overfrequency monitoring **ON / OFF**

This parameter configures, whether overfrequency monitoring for source 1 is performed.
OFF .....No overfrequency monitoring is performed for source 1.
ON .....Overfrequency monitoring is performed for source 1.

EN S1 overfrequency restore
DE S1 Überfrequenz rücksetzen
CL2 4459 {0} ✓ {1} ✓ {2} ✓

Source 1 overfrequency restore **50.0 to 130.0 %**

ⓘ This value refers to the Rated system frequency (parameter 1750 on page 18).

This parameter configures the threshold, which must be fallen below to consider source 1 as "OK" again..

EN S1 overfrequency fail
DE S1 Überfrequenz auslösen
CL2 4460 {0} ✓ {1} ✓ {2} ✓

Source 1 overfrequency fail **50.0 to 130.0 %**

ⓘ This value refers to the Rated system frequency (parameter 1750 on page 18).

This parameter configures the threshold, which must be exceeded to consider source 1 as "not OK".

Monitoring: Source 1 Monitoring: Voltage Imbalance

The voltage imbalance monitoring is practically used to detect defective fuses in certain phases. The voltage imbalance monitoring measures voltage differences between the phases of source 1. The voltage is measured three-phase. If the phase-to-phase voltage difference between the three phases exceeds the configured imbalance limit the alarm will be issued.

EN S1 voltage imbalance monitoring
DE S1 Asymmetrie Wächter
CL2 4461 {0} ✓ {1} ✓ {2} ✓

Source 1 voltage imbalance monitoring **ON / OFF**

This parameter configures, whether voltage imbalance monitoring for source 1 is performed.
OFF .....No voltage imbalance monitoring is performed for source 1.
ON .....Voltage imbalance monitoring is performed for source 1.

EN S1 volt. Imbalance restore
DE S1 Asymmetrie rücksetzen
CL2 4462 {0} ✓ {1} ✓ {2} ✓

Source 1 voltage imbalance restore **0.5 to 99.9 %**

ⓘ This value refers to the Rated voltage Source 1 (parameter 1774 on page 18).

This parameter configures the threshold, which must be fallen below to consider source 1 as "OK" again..

EN S1 volt. Imbalance fail
DE S1 Asymmetrie auslösen
CL2 4463 {0} ✓ {1} ✓ {2} ✓

Source 1 voltage imbalance fail **0.5 to 99.9 %**

ⓘ This value refers to the Rated voltage Source 1 (parameter 1774 on page 18).

This parameter configures the threshold, which must be exceeded to consider source 1 as "not OK".

EN Delay
DE Verzögerung
CL2 3914 {0} ✓ {1} ✓ {2} ✓

Source 1 voltage imbalance delay **0.02 to 99.99 s**

If the monitored voltage imbalance of source 1 exceeds the threshold value for the delay time configured here, an alarm will be issued.

Monitoring: Source 1 Monitoring: Phase Rotation

CAUTION

Please ensure during installation that all voltages applied to this unit are wired correctly to both sides of the circuit breaker. Failure to do so may result in damage to the control unit and/or generation equipment due to closing the breaker asynchronous or with mismatched phase rotations and phase rotation monitoring enabled at all connected components (engine, generator, breakers, cable, busbars, etc.).

This function may block a connection of systems with mismatched phases systems only under the following conditions:

- **The voltages being measured are wired correctly with respect to the phase rotation at the measuring points (i.e. the voltage transformer in front and behind the circuit breaker)**
- **The measuring voltages are wired without angular phase shift or interruption from the measuring point to the control unit**
- **The measuring voltages are wired to the correct terminals of the control unit (i.e. L1 of the generator is connected with the terminal of the control unit which is intended for the L1 of the generator)**

Correct phase rotation of the phase voltages ensures that damage will not occur during a transfer to either source 1 or source 2. The voltage phase rotation monitoring checks the phase rotation of the voltages and the configured phase rotation to ensure they are identical. The directions of rotation are differentiated as "clockwise" and "counter-clockwise". With a clockwise field the direction of rotation is "L1-L2-L3"; with a counter clockwise field the direction of rotation is "L1-L3-L2". If the control is configured for a clockwise rotation and the voltages into the unit are calculated as counterclockwise the alarm will be initiated.
A connection to certain source is only possible if this source has the correct phase sequence. If a source has a wrong phase sequence, a connection to this source is not possible.

EN S1 phase rotation monitoring
DE S1 Drehfeldüberwachung

	{0}	{1}	{2}
CL2 4562	✓	✓	✓

Source 1 phase rotation monitoring **ON / OFF**

This parameter configures, whether phase rotation monitoring for source 1 is performed.

OFF .....No phase rotation monitoring is performed for source 1.
ON .....Phase rotation monitoring is performed for source 1.

EN S1 phase rotation
DE S1 Drehfeld

	{0}	{1}	{2}
CL2 4563	✓	✓	✓

Source 1 phase rotation **CW / CCW**

This parameter configures the phase rotation of the system. If a different phase rotation is detected at source 1, source 1 is considered as "not OK" and a transfer to source 2 is initiated.

CW .....The three-phase measured Source 1 voltage is rotating CW (clockwise; that means the voltage rotates in direction L1-L2-L3; standard setting).
CCW .....The three-phase measured Source 1 voltage is rotating CCW (counter-clockwise; that means the voltage rotates in direction L1-L3-L2; standard setting).

Monitoring: Source 2 Monitoring

EN Voltage monitoring S2
DE Spg.-Überwachung S2
CL2 1786 {0} ✓ {1} ✓ {2} ✓

Voltage monitoring source 2 **Ph - Ph / Phase - N**

The unit can either monitor the wye voltages (phase-neutral: 3ph-4w, 1ph-3w and 1ph-2w) or the delta voltages (phase-phase: 3ph-3w and 3ph-4w).

> ! **WARNING:**
> This parameter influences the protective functions.

Ph - Ph ..... The phase-phase voltage will be measured and all subsequent parameters concerning voltage monitoring "source 2" are referred to this value (V_{L-L}).
Phase - N ..... The phase-neutral voltage will be measured and all subsequent parameters concerning voltage monitoring "source 2" are referred to this value (V_{L-N}).

Monitoring: Source 2 Monitoring: Undervoltage

Voltage is monitored depending on parameter 1786 "Voltage monitoring S2".

EN S2 undervoltage restore
DE S2 Unterspannung rücksetzen
CL2 4465 {0} ✓ {1} ✓ {2} ✓

Source 2 undervoltage restore **50.0 to 125.0 %**

> ⓘ This value refers to the Rated voltage Source 2 (parameter 1772 on page 18).

This parameter configures the threshold, which must be exceeded to consider source 2 as "OK" again.

EN S2 undervoltage fail
DE S2 Unterspannung auslösen
CL2 4466 {0} ✓ {1} ✓ {2} ✓

Source 2 undervoltage fail **50.0 to 125.0 %**

> ⓘ This value refers to the Rated voltage Source 2 (parameter 1772 on page 18).

This parameter configures the threshold, which must be fallen below to consider source 2 as "not OK".

Monitoring: Source 2 Monitoring: Underfrequency

Three-phase measurement of the frequency is performed, if all voltages are higher than 15 % of the rated value. This permits a very rapid and accurate frequency measurement. The frequency however will be measured properly even if voltage is applied to one phase only.

EN S2 underfrequency monitoring
DE S2 Unterfrequenz Wächter
CL2 4467 {0} ✓ {1} ✓ {2} ✓

Source 2 underfrequency monitoring **ON / OFF**

This parameter configures, whether underfrequency monitoring for source 2 is performed.
OFF ..... No underfrequency monitoring is performed for source 2.
ON ..... Underfrequency monitoring is performed for source 2.

EN S2 underfrequency restore
DE S2 Unterfrequenz rücksetzen
CL2 4468 {0} ✓ {1} ✓ {2} ✓

Source 2 underfrequency restore **50.0 to 130.0 %**

ⓘ This value refers to the Rated system frequency (parameter 1750 on page 18).

This parameter configures the threshold, which must be exceeded to consider source 2 as "OK" again.

EN S2 underfrequency fail
DE S2 Unterfrequenz auslösen
CL2 4469 {0} ✓ {1} ✓ {2} ✓

Source 2 underfrequency fail **50.0 to 130.0 %**

ⓘ This value refers to the Rated system frequency (parameter 1750 on page 18)

This parameter configures the threshold, which must be fallen below to consider source 2 as "not OK".

Monitoring: Source 2 Monitoring: Overvoltage

Voltage is monitored depending on parameter 1786 "Voltage monitoring S2".

EN S2 overvoltage monitoring
DE S2 Überspannung Wächter
CL2 4470 {0} ✓ {1} ✓ {2} ✓

Source 2 overvoltage monitoring **ON / OFF**

This parameter configures, whether overvoltage monitoring for source 2 is performed.
OFF ..... No overvoltage monitoring is performed for source 2.
ON ..... Overvoltage monitoring is performed for source 2.

EN S2 overvoltage restore
DE S2 Überspannung rücksetzen
CL2 4471 {0} ✓ {1} ✓ {2} ✓

Source 2 overvoltage restore **50.0 to 125.0 %**

ⓘ This value refers to the Rated voltage Source 2 (parameter 1772 on page 18).

This parameter configures the threshold, which must be fallen below to consider source 2 as "OK" again.

EN S2 overvoltage fail
DE S2 Überspannung auslösen
CL2 4472 {0} ✓ {1} ✓ {2} ✓

Source 2 overvoltage fail **50.0 to 125.0 %**

ⓘ This value refers to the Rated voltage Source 2 (parameter 1772 on page 18).

This parameter configures the threshold, which must be exceeded to consider source 2 as "not OK".

Monitoring: Source 2 Monitoring: Overfrequency

Three-phase measurement of the frequency is performed, if all voltages are higher than 15 % of the rated value. This permits a very rapid and accurate frequency measurement. The frequency however will be measured properly even if voltage is applied to one phase only.

EN S2 overfrequency monitoring
DE S2 Überfrequenz Wächter
CL2 4473 {0} ✓ {1} ✓ {2} ✓

Source 2 overfrequency monitoring **ON / OFF**

This parameter configures, whether overfrequency monitoring for source 2 is performed.
OFF..... No overfrequency monitoring is performed for source 2.
ON..... Overfrequency monitoring is performed for source 2.

EN S2 overfrequency restore
DE S2 Überfrequenz rücksetzen
CL2 4474 {0} ✓ {1} ✓ {2} ✓

Source 2 overfrequency restore **50.0 to 130.0 %**

ⓘ This value refers to the Rated system frequency (parameter 1750 on page 18).

This parameter configures the threshold, which must be fallen below to consider source 2 as "OK" again..

EN S2 overfrequency fail
DE S2 Überfrequenz auslösen
CL2 4475 {0} ✓ {1} ✓ {2} ✓

Source 2 overfrequency fail **50.0 to 130.0 %**

ⓘ This value refers to the Rated system frequency (parameter 1750 on page 18).

This parameter configures the threshold, which must be exceeded to consider source 2 as "not OK".

Monitoring: Source 2 Monitoring: Voltage Imbalance

The voltage imbalance monitoring is practically used to detect defective fuses in certain phases. The voltage imbalance monitoring measures voltage differences between the phases of source 2. The voltage is measured three-phase. If the phase-to-phase voltage difference between the three phases exceeds the configured imbalance limit the alarm will be issued.

EN S2 voltage imbalance monitoring
DE S2 Asymmetrie Wächter
CL2 4476 {0} ✓ {1} ✓ {2} ✓

Source 2 voltage imbalance monitoring **ON / OFF**

This parameter configures, whether voltage imbalance monitoring for source 1 is performed.
OFF..... No voltage imbalance monitoring is performed for source 1.
ON..... Voltage imbalance monitoring is performed for source 1.

EN S2 volt. Imbalance restore
DE S2 Asymmetrie rücksetzen
CL2 4477 {0} ✓ {1} ✓ {2} ✓

Source 2 voltage imbalance restore **0.5 to 99.9 %**

ⓘ This value refers to the Rated voltage Source 2 (parameter 1772 on page 18).

This parameter configures the threshold, which must be fallen below to consider source 2 as "OK" again..

EN S2 volt. Imbalance fail
DE S2 Asymmetrie auslösen
CL2 4478 {0} ✓ {1} ✓ {2} ✓

Source 2 voltage imbalance fail **0.5 to 99.9 %**

ⓘ This value refers to the Rated voltage Source 2 (parameter 1772 on page 18).

This parameter configures the threshold, which must be exceeded to consider source 2 as "not OK".

EN Delay
DE Verzögerung
CL2 3904 {0} ✓ {1} ✓ {2} ✓

Source 2 voltage imbalance delay **0.02 to 99.99 s**

If the monitored voltage imbalance of source 2 exceeds the threshold value for the delay time configured here, an alarm will be issued.

Monitoring: Source 2 Monitoring: Phase Rotation

CAUTION

Please ensure during installation that all voltages applied to this unit are wired correctly to both sides of the circuit breaker. Failure to do so may result in damage to the control unit and/or generation equipment due to closing the breaker asynchronous or with mismatched phase rotations and phase rotation monitoring enabled at all connected components (engine, generator, breakers, cable, busbars, etc.).

This function may block a connection of systems with mismatched phases systems only under the following conditions:

- **The voltages being measured are wired correctly with respect to the phase rotation at the measuring points (i.e. the voltage transformer in front and behind the circuit breaker)**
- **The measuring voltages are wired without angular phase shift or interruption from the measuring point to the control unit**
- **The measuring voltages are wired to the correct terminals of the control unit (i.e. L1 of the generator is connected with the terminal of the control unit which is intended for the L1 of the generator)**

Correct phase rotation of the phase voltages ensures that damage will not occur during a transfer to either source 1 or source 2. The voltage phase rotation monitoring checks the phase rotation of the voltages and the configured phase rotation to ensure they are identical. The directions of rotation are differentiated as "clockwise" and "counter-clockwise". With a clockwise field the direction of rotation is "L1-L2-L3"; with a counter clockwise field the direction of rotation is "L1-L3-L2". If the control is configured for a clockwise rotation and the voltages into the unit are calculated as counterclockwise the alarm will be initiated.
A connection to certain source is only possible if this source has the correct phase sequence. If a source has a wrong phase sequence, a connection to this source is not possible.

EN S2 phase rotation monitoring
DE S2 Drehfeldüberwachung
CL2 4566 {0} ✓ {1} ✓ {2} ✓

Source 2 phase rotation monitoring **ON / OFF**

This parameter configures, whether phase rotation monitoring for source 2 is performed.

OFF..... No phase rotation monitoring is performed for source 2.
ON..... Phase rotation monitoring is performed for source 2.

EN S2 phase rotation
DE S2 Drehfeld
CL2 4567 {0} ✓ {1} ✓ {2} ✓

Source 2 phase rotation **CW / CCW**

This parameter configures the phase rotation of the system. If a different phase rotation is detected at source 2, source 2 is considered as "not OK" and a transfer to source 1 is initiated.

CW..... The three-phase measured Source 2 voltage is rotating CW (clockwise; that means the voltage rotates in direction L1-L2-L3; standard setting).
CCW..... The three-phase measured Source 2 voltage is rotating CCW (counter-clockwise; that means the voltage rotates in direction L1-L3-L2; standard setting).

Monitoring: In-Phase Monitoring (Synch Check)

The in-phase monitoring function is used to determine whether the phase angles of the preferred source and the non-preferred source are in phase, i.e. whether the relative phase difference of the two sources is within specified limits.
Whenever one power source fails, the control follows the programmed transition operation sequence. If in-phase monitoring is enabled and both sources are available as determined by the "restore value" levels, the control shall follow the in-phase monitoring operation sequence.

In-phase Monitoring may be used to improve the transfer with open transition switches. An open (standard) transition transfer switch is the most simple and commonly used ATS. It may only take on two positions, connected with source 1, or connected with source 2. If it transfers a load, this will be performed according to the break-before-make process, i.e. the load will be disconnected from the previous source before it will be connected with the next source. This results a dead time of approximately 160 ms (depending on the ATS) during which the load is not connected to a source. Most of the load consumers are not effected by this dead time in the transfer phase (lamps may only flicker, etc.), but some appliances may be effected seriously, like computers and motor loads, etc. This may lead to damages of the equipment or data loss in the worst case. The problem is that the consumers behave like generators during this dead time and supply power. While some consumers are running out when changing to the other source, very high current may flow between generator and load because the phase angles between the two systems are not synchronous.

This high equalizing current may be minimized with two means:

- Using a transfer switch with neutral position
  If a delayed transition switch is used, the residence time in neutral position may be timed as long until the voltages at the load are settled so far that a transfer to the other source is possible.
- Using inphase monitoring
  Inphase monitoring checks the phase angle between source 1 and source 2 prior to a transfer and enables the transfer signal only if the phase angle has fallen below a configured threshold. Moreover, the unit calculates the leading angle for the closing commands by entering the "Switch reaction time" to enable a transfer with almost 0° phase shift. This ensures a nearly synchronous transfer to the other source and reduces the equalizing current to a minimum. Compared with the neutral position of a delayed transition switch, the advantage is that the load must not be shut down completely prior to a transfer.

Inphase monitoring may be used with open, delayed, and closed transition switches. As mentioned above, high equalizing current after a transfer may be minimized when utilizing inphase monitoring. However, the behavior of the ATS in case of a failed inphase transition must be considered. This may happen if the generator is equipped with a poorly adjusted frequency controller. Then, it may happen that it is not possible to achieve synchronicity. But the load must be transferred to the other source in any case.

NOTE

Refer to parameter 4582 "Outcome on in-phase timeout" for the ATS behavior in case of a failed inphase transition.

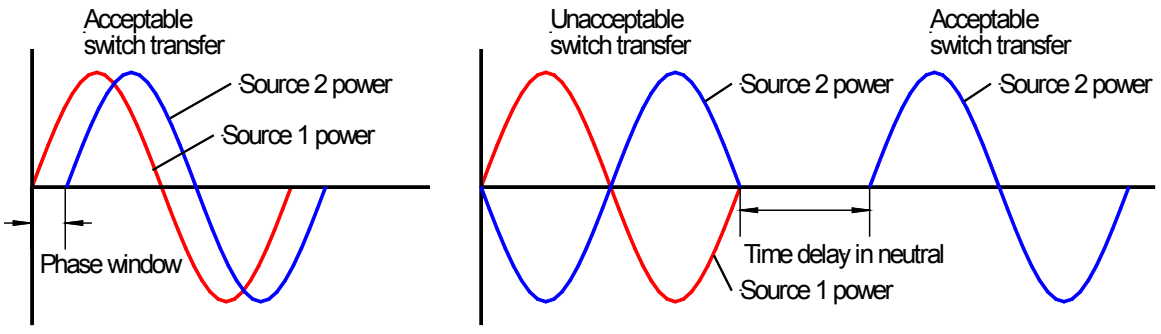


Figure 3-21: Inphase monitoring

Monitoring: Inphase Monitoring: Parameters

EN In-Phase monitor
DE Synchrocheck
CL2 4570 {0} ✓ {1} ✓ {2} ✓

Inphase monitoring **ON / OFF**

This parameter configures, whether inphase monitoring is performed.
OFF..... No inphase monitoring is performed prior to a transfer.
ON..... Inphase monitoring is performed prior to a transfer. If the phase angle between both systems is within the permissible limits, the transfer will be performed.

NOTE

The following voltages are monitored by the inphase monitoring function depending on the configuration of the measurement principle (parameter 1862 or 1861):

- **4Ph 3W : V_{L12}**
- **3Ph 3W : V_{L12}**
- **4Ph 3W : V_{L12} or V_{L1N} depending on the configuration of parameter 1858**
- **1Ph 3W : V_{L1N}**

If inphase monitoring enabled and the measurement principle for source 1 (parameter 1862) is configured as "1Ph 2W", the measurement principle for source 2 (parameter 1861) must also be configured as "1Ph 2W".

EN Voltage window
DE Spannungsdifferenz
CL2 4571 {0} ✓ {1} ✓ {2} ✓

Voltage window for synchronization **0.50 to 10.00 %**

ⓘ This value refers to the Rated voltage Source 1/2 (parameters 1774/1772 on page 18).

This parameter configures the maximum permissible voltage difference in each of the three phases. The voltage differences in all three phases ($V_{L1\ (Source\ 1)}$ - $V_{L1\ (Source\ 2)}$ / $V_{L2\ (Source\ 1)}$ - $V_{L2\ (Source\ 2)}$ / $V_{L3\ (Source\ 1)}$ - $V_{L3\ (Source\ 2)}$) must be within the limit configured here to be able to synchronize.
If the voltage difference in at least one phase exceeds this limit, the synchronization will not be enabled.

EN Positive frequency window
DE Maximaler 63escry63e Schlupf
CL2 4572 {0} ✓ {1} ✓ {2} ✓

Positive frequency window for synchronization **0.02 to 0.49 Hz**

This parameter configures the maximum permissible positive frequency difference between source 2 and source 1 (Δf = S2-S1).
If the frequency difference is not within the limits configured here, the synchronization will not be enabled because the frequency difference of the source to be connected to is too high.

EN Negative frequency window
DE Maximaler 63escry63e Schlupf
CL2 4573 {0} ✓ {1} ✓ {2} ✓

Negative frequency window for synchronization **-0.02 to -0.49 Hz**

This parameter configures the minimum permissible negative frequency difference between source 2 and source 1 (Δf = S2-S1).
If the frequency difference is not within the limits configured here, the synchronization will not be enabled because the frequency difference of the source to be connected to is too low.

Maximum Overlap Time

NOTE

This function is only effective if the transfer switch type (parameter 3424) is configured to "Closed" and in-phase monitoring (parameter 4570) is enabled.

NOTE

If the *LogicsManager* function "Extended parallel time" (parameter 12860) is TRUE, the maximum overlap time is not effective.

Exception: If the maximum overlap time is configured to 0.1 s, an extended parallel time is not possible regardless of the state of this function.

If a closed transition is performed, the overlap time of the make-before-break process, in which both sources are parallel, is less than 100 ms. If this time is to be extended, an overlap timer is available to keep the transition switch in overlap position for a configured time. The timer starts as soon as the transition switch is in overlap position. The source, from which the transfer has been initiated, will be disconnected and the load will be supplied by the new source as soon as this timer has expired.

EN	Max. overlap time			
DE	Max. Synchronzeit			
CL2	{0}	{1}	{2}	
4577	✓	✓	✓	

Maximum overlap time **0.1 to 9.99 s**

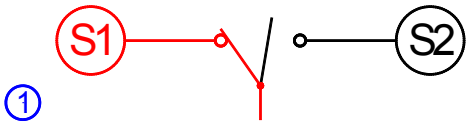
0.10 .....If the maximum overlap time is configured to 0.10 s, an overlap time below 100 ms, which depends on the used transfer switch, will be effective and "Extended parallel time" (parameter 12860) is disabled.

0.11 - 9.99 .....The time for which the transfer switch shall remain in overlap position is configured here.

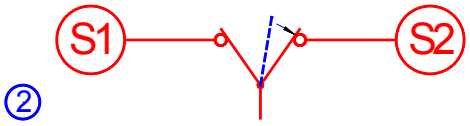
NOTE

If one source fails before this timer expires, the failed source will automatically be disconnected.

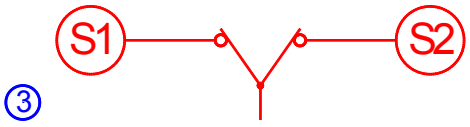
The following example shows a typical transfer sequence from source 1 to source 2 with overlap timer:



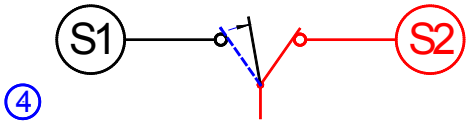
Initial situation:
Load is supplied by source 1.



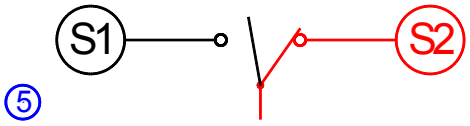
A transfer is initiated (e.g. by a load test):
As soon as source 2 is detected as stable and synchronicity is achieved, the transfer switch is closed to source 2.



Overlap timer is active:
The transfer switch remains in overlap position as long as the overlap timer has not expired and load is supplied by both sources.



Maximum overlap time expires:
As soon as the configured maximum overlap time has expired, the transfer switch opens from source 1.



Final situation:
Load is supplied by source 2.

Switch Reaction Time Configuration

EN	Open trans. Switch reac. Time	{0}	{1}	{2}
DE	Schaltzeit bei nicht Überlapp.			
CL2		✓	✓	✓
4578				

Open transition switch reaction time **15 to 300 ms**

The time, which is required by the switch in open transition mode to open from one source and close to the other source, is configured here.
This time is required for calculating the lead angle for inphase transfers.

EN	Closed trans. Switch reac. Time	{0}	{1}	{2}
DE	Schalterzeit bei Überlapp.			
CL2		✓	✓	✓
4583				

Closed transition switch reaction time **15 to 300 ms**

The time, which is required by the switch in closed transition mode to close to the other source to get parallel, is configured here.
This time is required for calculating the lead angle for inphase transfers.

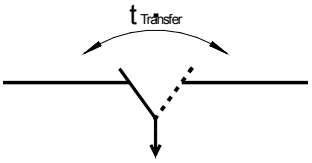


Figure 3-22: Switch reaction time

Vector Group Angle Adjustment

WARNING

Ensure the following parameters are configured correctly to prevent wrong synchronization settings. Incorrect wiring of the system cannot be compensated with this parameter!

EN	Vector group angle adjustment	{0}	{1}	{2}
DE	Schaltgruppe Winkel Anpassung			
CL2		✓	✓	✓
4581				

Vector group angle adjustment **-180° to 180°**

This parameter compensates for phase angle deviations, which can be caused by transformers (i.e. a delta to wye transformer) located within the electrical system. Ensure the following parameters are configured correctly to prevent wrong synchronization settings. Incorrect wiring of the system cannot be compensated for with this parameter!

Please act as follows: If a transformer is not located between systems [A] and [B] or if the transformer has a vector group without a phase angle deviation, then a phase angle deviation of 0° should be configured in this parameter.

20 Interconnection of the mains voltage possible

With a phase angle deviation of 0° and the generator not running and source 1 energized, close both breakers. This will result in system [A] and system [B] being at the same voltage potential. The phase angle deviation will now be displayed on the DTSC-200 Counters screen (refer to the Navigation section of the Operation manual 37387). Enter the displayed value into this parameter.

CAUTION

The correct setting must be validated in every control unit with a differential voltage measurement!

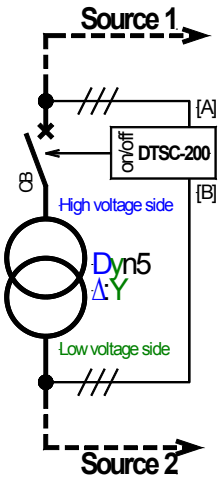
2. Interconnection of the mains voltage not possible but the vector group of the transformer is known

The vector group of the transformer is known and states the phase angle deviation in multiplies of 30°. Out of the vector group the phase angle deviation α can be calculated as an angle from 0° to 360°. **For this value the voltage of the low voltage side is behind the voltage of the high voltage side ⇨ phase angle deviation α! When calculating the resulting value, the low voltage side of the transformer always lags behind the high voltage side (phase angle deviation α).**

The phase difference is to be calculated as follows:

	High voltage side = System [A]	High voltage side = System [B]
α < 180 °	α	-α
α > 180 °	-360 ° + α	360 ° - α

Table 3-3: Calculation of the phase angle deviation

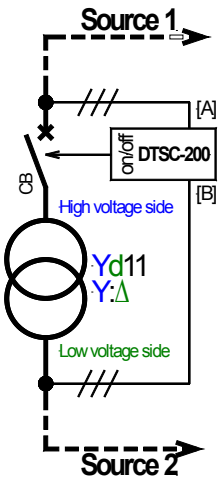


Example 1

System [B] is connected to source 2. Source 2 voltage is connected to the low voltage side of a transformer with the vector group ***Dyn5***. The source 1 breaker is connected to the high voltage side, which connects the transformer to the mains. System [A] is connected to source 1. Because of the transformer the phase angles at the breaker differ between the measuring voltages of system [A] and system [B]. A phase angle deviation exists which can be compensated with the DTSC-200.

Using the vector group 5 (Dyn**5**) it counts α = 5 × 30 ° = 150 °. Because 150 ° < 180 ° and system [A] is connected to the high voltage side this results into α to be used as phase difference. Enter **150 °** into as parameter for the phase difference.

```
Vector group angle
adjustment  +150°
```



Example 2

Data identical with example 1, but the vector group is ***Yd11***.

Using the vector group 11 (Yd**11**) it counts α = 11 × 30 ° = 330 °. Because 330 ° > 180 ° and system [A] is connected to the high voltage side this results into (-360 ° + α) to be used as phase difference. Enter **-30 °** into as parameter for the phase difference.

```
Vector group angle
adjustment  -030°
```

CAUTION

The correct setting must be validated in every control unit with a differential voltage measurement!

Outcome on Inphase Timeout

EN In-phase timeout after
DE Synchr. Zeitüberschr.

	{0}	{1}	{2}
CL2 4576	✓	✓	✓

Inphase timeout after **0 to 6,500 s**

This parameter configures the maximum time for attempting to detect synchronicity. This timer starts to count as soon as inphase monitoring is enabled prior to a transfer. If synchronicity is detected between the two sources, the transfer command will be issued. The timer will be bypassed.

EN Outcome on In-phase timeout
DE Aktion bei Sync. Zeitüberschr.

	{0}	{1}	{2}
CL2 4582	✓	✓	✓

Outcome on inphase timeout **Abort / Delayed**

This parameter determines the behavior of the unit following an unsuccessful synchronicity detection using the following options:

Abort ..... The transfer will be aborted.
Delayed..... A delayed transition will be performed.

Example:
If a load test is requested and inphase monitoring is enabled (parameter 4570 is configured to "ON"), the inphase timeout timer (parameter 4576) starts prior to a transfer and the unit attempts to detect a synchronicity between the two sources. If no synchronicity can be detected before the timer expires (because of a misadjusted voltage or speed controller at the engine for example), the behavior configured here determines the further transfer proceeding.

If **Abort** is configured here, the complete transfer request will be aborted. This means that all remote start requests (like load test) will be ignored if they are still present and the system will remain on the available source.

If **Delayed** is configured here, a delayed transition will be performed. This means that the switch changes to neutral position for a configured time to ramp down connected motor loads before it changes to the other source. This is important because motors, which are running down, may act as generators, which may lead to a detection of a failed synchronization in case of a too early transfer.

Note: This function may only be used, if "Delayed" or "Closed" is configured as "Transfer switch type" (parameter 3424). If "Standard" is configured as "Transfer switch type" (parameter 3424) and "Outcome on In-phase timeout" is configured to "Delayed", the unit behaves as if "Abort" would have been configured here.

Monitoring: Overcurrent

Current is monitored depending on the parameters 1860 "S2 Load current measuring" and 1863 "S1 Load current measuring". Only the current of the source, which is connected to the load, is measured, because the CT is located at the load connection. The load overcurrent alarm contains three limits and can be setup as a step definite time overcurrent alarm as illustrated in the figure below. Monitoring of the maximum phase current is performed in three steps. Every step can be provided with a delay time independent of the other steps.
If this protective function is triggered, the alarm list indicates "**`Overcurrent 1`**", "**`Overcurrent 2`**", or "**`Overcurrent 3`**".

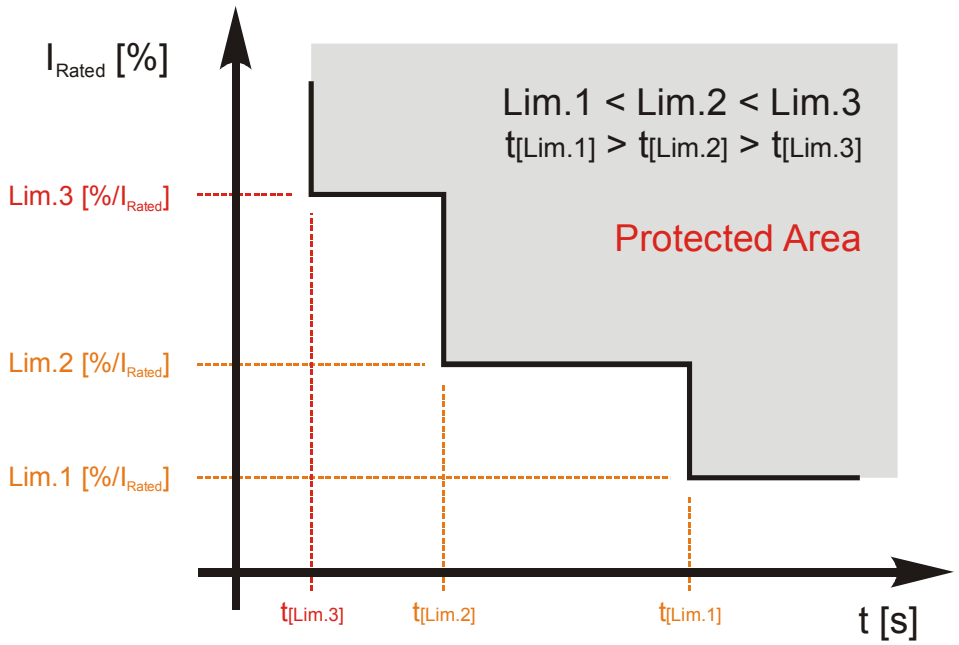


Figure 3-23: Monitoring - load time-overcurrent

Parameter table

The parameters represented in this table are specified in the following, whereas the description is identical for all levels; the levels may only differ in their setting ranges.

Level	Text	Setting range	Standard value
Overcurrent (the hysteresis is 1 % of the rated value)			
Level 1	Monitoring	ON / OFF	ON
	Limit	50.0 to 300.0 %	110.0 %
	Delay	0.02 to 99.99 s	30.00 s
	Self-acknowledgment	YES / NO	NO
Level 2	Monitoring	ON / OFF	ON
	Limit	50.0 to 300.0 %	150.0 %
	Delay	0.02 to 99.99 s	1.00 s
	Self-acknowledgment	YES / NO	NO
Level 3	Monitoring	ON / OFF	ON
	Limit	50.0 to 300.0 %	250.0 %
	Delay	0.02 to 99.99 s	0.40 s
	Self-acknowledgment	YES / NO	NO

Table 3-4: Monitoring - standard values - load time-overcurrent

EN Monitoring
DE Überwachung

	{0}	{1}	{2}
CL2			
2200	✓	✓	✓
2206			
2212			

Load overcurrent, TOC: Monitoring (Level 1/Level 2/Level 3) **ON / OFF**

ON..... Overcurrent monitoring is carried out according to the following parameters. Monitoring is performed at three levels. All three values may be configured independent from each other (prerequisite: Level 1 < Level 2 < Level 3).
OFF..... Monitoring is disabled for level 1, level 2, and/or level 3.

EN Limit
DE Limit

	{0}	{1}	{2}
CL2			
2204	✓	✓	✓
2210			
2216			

Load overcurrent, TOC: Threshold value (Level 1/Level 2/Level 3) **50.0 to 300.0 %**

ⓘ This value refers to the Rated current (parameter 1754, see page 18).

The percentage values that are to be monitored for each threshold limit are defined here. If this value is reached or exceeded for at least the delay time without interruption, an alarm is issued.

EN Delay
DE Verzögerung

	{0}	{1}	{2}
CL2			
2205	✓	✓	✓
2211			
2217			

Load overcurrent, TOC: Delay (Level 1/Level 2/Level 3) **0.02 to 99.99 s**

If the monitored load current exceeds the threshold value for the delay time configured here, an alarm will be issued. If the monitored load current falls below the threshold (minus the hysteresis) before the delay expires the time will be reset.

EN Self acknowledge
DE Selbstquittierend

	{0}	{1}	{2}
CL2			
2202	✓	✓	✓
2208			
2214			

Load overcurrent, TOC: Self acknowledgment (Level 1/Level 2/Level 3) **ON / OFF**

YES..... The control automatically clears the alarm if it is no longer valid.
NO..... An automatic reset of the alarm does not occur. The reset occurs manually by pressing the appropriate buttons, by activating the *LogicsManager* output "External acknowledgement" via an discrete input, or via an interface.

Monitoring: Overload

Power is monitored depending on the parameters 1861 "S2 voltage measuring", 1862 "S1 voltage measuring", 1860 "S2 Load current measuring" and 1863 "S1 Load current measuring". Only the power of the source, which is connected to the load, is measured, because the CT is located at the load connection. If the real power is above the configured limit an alarm will be issued.
If this protective function is triggered, the alarm list indicates "**`Overload 1`**" or "**`Overload 2`**".

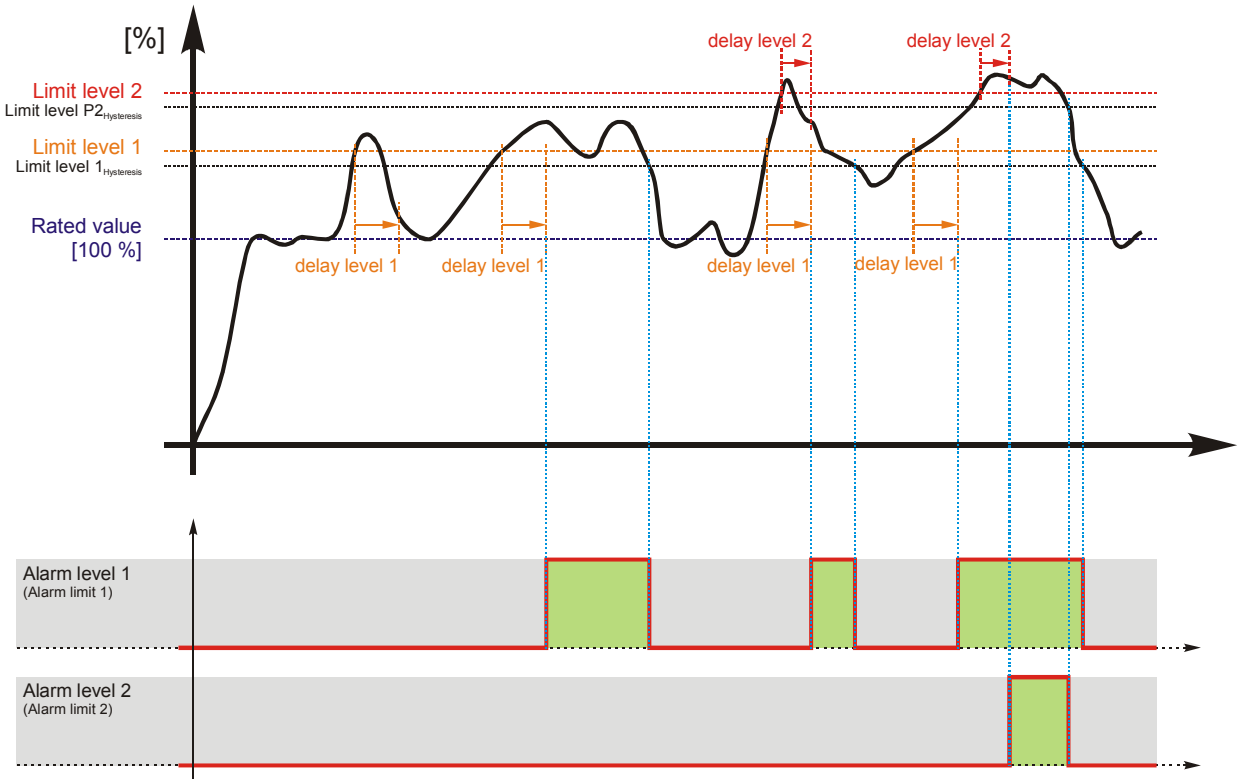


Figure 3-24: Monitoring - overload

Parameter table

The parameters represented in this table are specified in the following, whereas the description is identical for all levels; the levels may only differ in their setting ranges.

Level	Text	Setting range	Standard value
Overload (the hysteresis is 1 % of the rated value)			
Level 1	Monitoring	ON / OFF	ON
	Limit	50.0 to 300.0 %	110.0 %
	Delay	0.02 to 99.99 s	11.00 s
	Self-acknowledgment	YES / NO	NO
Level 2	Monitoring	ON / OFF	ON
	Limit	50.0 to 300.0 %	120.0 %
	Delay	0.02 to 99.99 s	0.10 s
	Self-acknowledgment	YES / NO	NO

Table 3-5: Monitoring - standard values - overload

EN Monitoring
DE Überwachung
CL2 {0} {1} {2}
2300 ✓ ✓ ✓
2306

Overload: Monitoring (Level 1/Level 2) **ON / OFF**

ON..... Overload monitoring is carried out according to the following parameters. Monitoring is performed at two levels. Both values may be configured independent from each other (prerequisite: limit 1 < limit 2).
OFF..... Monitoring is disabled for level 1 and/or level 2.

EN Limit
DE Limit
CL2 {0} {1} {2}
2304 ✓ ✓ ✓
2310

Overload: Threshold value (Level 1/Level 2) **50.0 to 300.00 %**

ⓘ This value refers to the Rated active power (parameter 1752, see page 18).

The percentage values that are to be monitored for each threshold limit are defined here. If this value is reached or exceeded for at least the delay time without interruption, an alarm is issued.

EN Delay
DE Verzögerung
CL2 {0} {1} {2}
2305 ✓ ✓ ✓
2311

Overload: Delayed (Level 1/Level 2) **0.02 to 99.99 s**

If the monitored load exceeds the threshold value for the delay time configured here, an alarm will be issued. If the monitored load falls below the threshold (minus the hysteresis) before the delay expires the time will be reset.

EN Self acknowledge
DE Selbstquittierend
CL2 {0} {1} {2}
2302 ✓ ✓ ✓
2308

Overload: Self acknowledgment (Level 1/Level 2) **YES / NO**

YES..... The control automatically clears the alarm if it is no longer valid.
NO..... An automatic reset of the alarm does not occur. The reset occurs manually by pressing the appropriate buttons, by activating the *LogicsManager* output "External acknowledgement" via an discrete input, or via an interface.

Monitoring: Engine, Start Failure Source 1

If this protective function is triggered, the alarm list indicates "**`Start Fail S1`**".

EN		S1 start fail delay time	
DE		S1 Startfehler Zeit	
CL2	{0}	{1}	{2}
3341	---	---	✓

Source 1 start fail: delay time **1 to 6500 s**

If the "S1 start delay" timer has expired, the engine start signal will be issued. If the "engine start" relay de-energizes, "Source 1 start fail delay" timer starts to count. Now, the controller expects the engine to start within the time configured here. If this time will be exceeded, a "Start Fail" alarm will be issued.

If this timer is running, the "Starting S1" message is displayed.

This parameter is only visible, if the application mode (parameter 4148) is configured to "Gen-Gen".

Monitoring: Engine, Start Failure Source 2

If this protective function is triggered, the alarm list indicates "**`Start Fail S2`**".

EN		S2 start fail delay time	
DE		S2 Startfehler Zeit	
CL2	{0}	{1}	{2}
3331	✓	✓	✓

Source 2 start fail: delay time **1 to 6500 s**

If the "S2 start delay" timer has expired, the engine start signal will be issued. If the "engine start" relay de-energizes, "Source 2 start fail delay" timer starts to count. Now, the controller expects the engine to start within the time configured here. If this time will be exceeded, a "Start Fail" alarm will be issued.

If this timer is running, the "Starting S2" message is displayed.

Monitoring: Battery, Overvoltage

There are two battery overvoltage alarm levels available in the control. Both alarms are definite time alarms and are illustrated in the below figure. The figure diagrams a frequency trend and the associated pickup times and length of the alarms. It should be noted that this figure illustrates a level 1 alarm that is self-acknowledged. Monitoring of the voltage is done in two steps.
If this protective function is triggered, the alarm list indicates "**`Batt.overvolt.1`**" or "**`Batt.overvolt.2`**".

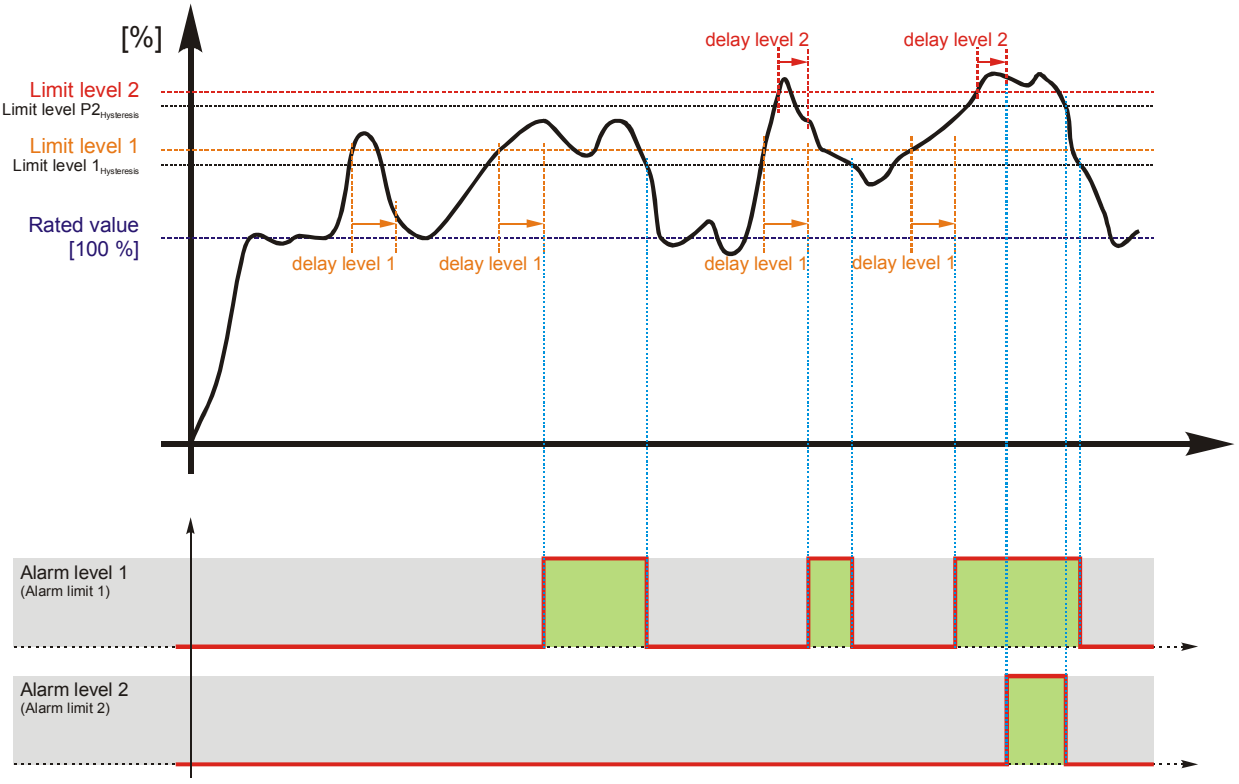


Figure 3-25: Monitoring - battery overvoltage

Parameter table

The parameters represented in this table are specified in the following, whereas the description is identical for all levels; the levels may only differ in their setting ranges.

Level	Text	Setting range	Standard value
Battery overvoltage (the hysteresis is 0,7 % of the rated value.)			
Level 1	Monitoring	ON / OFF	ON
	Limit	8.0 to 42.0 V	32.0 V
	Delay	0.02 to 99.99 s	5.00 s
	Self-acknowledgment	YES / NO	NO
Level 2	Monitoring	ON / OFF	OFF
	Limit	8.0 to 42.0 V	35.0 V
	Delay	0.02 to 99.99 s	1.00 s
	Self-acknowledgment	YES / NO	NO

Table 3-6: Monitoring - standard values - battery overvoltage

EN Monitoring
DE Überwachung
CL2 {0} {1} {2}
3450 ✓ ✓ ✓
3456

Battery overvoltage: Monitoring (Level 1/Level 2) **ON / OFF**

ON .....Overvoltage monitoring of the battery voltage is carried out according to the following parameters.
OFF .....Monitoring is disabled for level 1 and/or level 2.

EN Limit
DE Limit
CL2 {0} {1} {2}
3454 ✓ ✓ ✓
3460

Battery overvoltage: Threshold value (Level 1/Level 2) **8.0 to 42.0 V**

The threshold values that are to be monitored are defined here. If the monitored battery voltage reaches or exceeds this value for at least the delay time without interruption, an alarm is issued.

EN Delay
DE Verzögerung
CL2 {0} {1} {2}
3455 ✓ ✓ ✓
3461

Battery overvoltage: Delay time (Level 1/Level 2) **0.02 to 99.99 s**

If the monitored battery voltage exceeds the threshold value for the delay time configured here, an alarm will be issued. If the monitored battery voltage falls below the threshold (minus the hysteresis) before the delay expires the time will be reset.

EN Self acknowledge
DE Selbstquittierend
CL2 {0} {1} {2}
3452 ✓ ✓ ✓
3458

Battery overvoltage: Self acknowledgment (Level 1/Level 2) **YES / NO**

YES .....The control automatically clears the alarm if it is no longer valid.
NO .....An automatic reset of the alarm does not occur. The reset occurs manually by pressing the appropriate buttons, by activating the *LogicsManager* output "External acknowledgement" via an discrete input, or via an interface.

Monitoring: Battery, Undervoltage

There are two battery undervoltage alarm levels available in the control. Both alarms are definite time alarms and are illustrated in the below figure. The figure diagrams a frequency trend and the associated pickup times and length of the alarms. It should be noted that this figure illustrates a level 1 alarm that is self-acknowledged. Monitoring of the voltage is done in two steps.
If this protective function is triggered, the alarm list indicates "**`Batt.undervolt.1`**" or "**`Batt.undervolt.2`**".

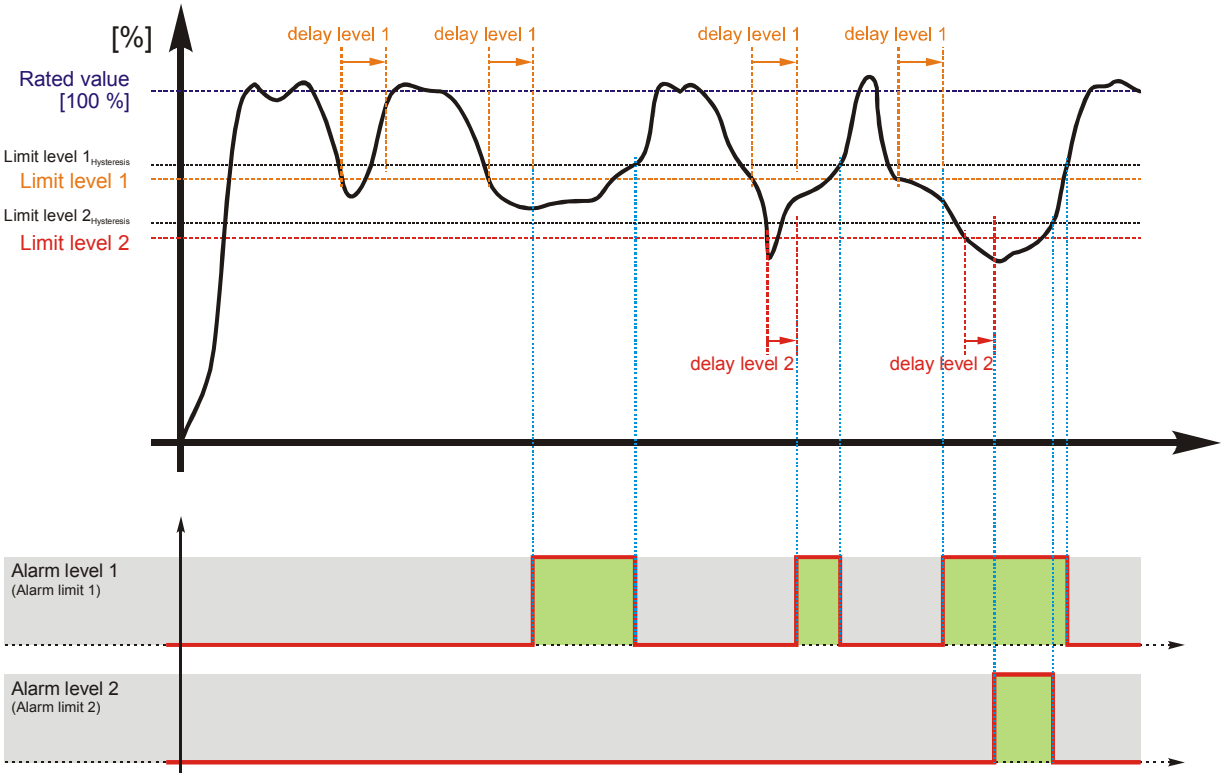


Figure 3-26: Monitoring - battery undervoltage

Parameter table

The parameters represented in this table are specified in the following, whereas the description is identical for all levels; the levels may only differ in their setting ranges.

Level	Text	Setting range	Standard value
Battery undervoltage (The hysteresis is 0,7 % of the rated value).			
Level 1	Monitoring	ON / OFF	ON
	Limit	8.0 to 42.0 V	24.0 V
	Delay	0.02 to 99.99 s	60.00 s
	Self-acknowledgment	YES / NO	NO
Level 2	Monitoring	ON / OFF	ON
	Limit	8.0 to 42.0 V	20.0 V
	Delay	0.02 to 99.99 s	10.00 s
	Self-acknowledgment	YES / NO	NO

Table 3-7: Monitoring - standard values - battery undervoltage

EN Monitoring
DE Überwachung

	{0}	{1}	{2}
CL2			
3500	✓	✓	✓
3506			

Battery undervoltage: Monitoring (Level 1/Level 2) **ON / OFF**

ON .....Undervoltage monitoring of the battery voltage is carried out according to the following parameters.
OFF .....Monitoring is disabled for level 1 and/or level 2.

EN Limit
DE Limit

	{0}	{1}	{2}
CL2			
3504	✓	✓	✓
3510			

Battery undervoltage: Threshold value (Level 1/Level 2) **8.0 to 42.0 V**

The threshold values that are to be monitored are defined here. If the monitored battery voltage reaches or falls below this value for at least the delay time without interruption, an alarm is issued..

Note:
The default monitoring limit for battery undervoltage is 24 Vdc after 60 seconds. This is because in normal operation the terminal voltage is approximately 26 Vdc (alternator charged battery).

EN Delay
DE Verzögerung

	{0}	{1}	{2}
CL2			
3505	✓	✓	✓
3511			

Battery undervoltage: Delay time (Level 1/Level 2) **0.02 to 99.99 s**

If the battery voltage falls below the threshold value for the delay time configured here, an alarm will be issued. If the battery voltage exceeds the threshold (plus the hysteresis) again before the delay expires the time will be reset.

EN Self acknowledge
DE Selbstquittierend

	{0}	{1}	{2}
CL2			
3502	✓	✓	✓
3508			

Battery undervoltage: Self acknowledgment (Level 1/Level 2) **YES / NO**

YES .....The control automatically clears the alarm if it is no longer valid.
NO .....An automatic reset of the alarm does not occur. The reset occurs manually by pressing the appropriate buttons, by activating the *LogicsManager* output "External acknowledgement" via an discrete input, or via an interface.

Monitoring: CANopen Interface

The CANopen interface is monitored. If the interface does not receive a CANopen protocol message before the delay expires, an alarm will be initiated.
If this protective function is triggered, the alarm list indicates "**CAN Open Fault**".

EN Monitoring
DE Überwachung
CL2 3150 {0} ✓ {1} ✓ {2} ✓

CANopen Interface: Monitoring **ON / OFF**

ON..... Monitoring of the CANopen interface is carried out according to the following parameters.
OFF..... Monitoring is disabled.

EN Delay
DE Verzögerung
CL2 3154 {0} ✓ {1} ✓ {2} ✓

CANopen Interface: Delay **0.1 to 650.0 s**

The delay is configured with this parameter. If the interface does not receive a CANopen protocol message before the delay expires, an alarm is issued. The delay timer is re-initialized after every message is received.

EN Self acknowledge
DE Selbstquittierend
CL2 3152 {0} ✓ {1} ✓ {2} ✓

CANopen Interface: Self acknowledgment **YES / NO**

YES..... The control automatically clears the alarm if it is no longer valid.
NO..... An automatic reset of the alarm does not occur. The reset occurs manually by pressing the appropriate buttons, by activating the *LogicsManager* output "External acknowledgement" via an discrete input, or via an interface.

NOTE

This protection is only available if an external digital I/O board (e.g. IKD 1) is connected.

Discrete Inputs

Number	Terminal	Function
Internal discrete inputs		
[DI 1]	51	Reply from ATS limit switch: Breaker in source 1 position [S1]
[DI 2]	52	Reply from ATS limit switch: Breaker in source 2 position [S2]
[DI 3]	53	Reply from ATS limit switch: Breaker in source 1 open position [S1O] #1
[DI 4]	54	Reply from ATS limit switch: Breaker in source 2 open position [S2O] #1
[DI 5]	55	Control input (*LogicsManager*), pre-assigned with Inhibit ATS
[DI 6]	56	Control input (*LogicsManager*)
[DI 7]	57	Control input (*LogicsManager*)
[DI 8]	58	Control input (*LogicsManager*)
[DI 9]	59	Control input (*LogicsManager*)
[DI 10]	60	Control input (*LogicsManager*)
[DI 11]	61	Control input (*LogicsManager*)
[DI 12]	62	Control input (*LogicsManager*)
External discrete inputs (via CANopen; not included in DTSC delivery; can be e.g. IKD1, etc.)		
[Dex01]	---	Control input (*LogicsManager*)
[Dex02]	---	Control input (*LogicsManager*)
[Dex03]	---	Control input (*LogicsManager*)
[Dex04]	---	Control input (*LogicsManager*)
[Dex05]	---	Control input (*LogicsManager*)
[Dex06]	---	Control input (*LogicsManager*)
[Dex07]	---	Control input (*LogicsManager*)
[Dex08]	---	Control input (*LogicsManager*)
[Dex09]	---	Control input (*LogicsManager*)
[Dex10]	---	Control input (*LogicsManager*)
[Dex11]	---	Control input (*LogicsManager*)
[Dex12]	---	Control input (*LogicsManager*)
[Dex13]	---	Control input (*LogicsManager*)
[Dex14]	---	Control input (*LogicsManager*)
[Dex15]	---	Control input (*LogicsManager*)
[Dex16]	---	Control input (*LogicsManager*)

#1..If the transfer switch type (parameter 3424) is configured to "Standard", this DI may be used as control input (*LogicsManager*)

Table 3-8: Discrete inputs - assignment

Discrete inputs may be configured to normally open (N.O.) or normally closed (N.C.) states. In the state N.O., no potential is present during normal operation; if a control operation is performed, the input is energized. In the state N.C., a potential is continuously present during normal operation; if a control operation is performed, the input is de-energized.

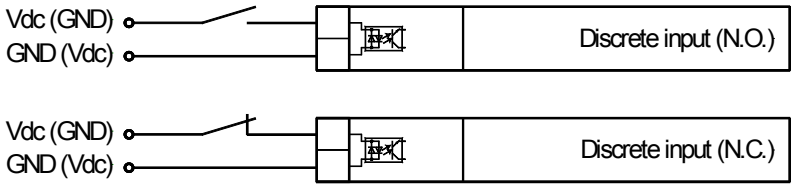


Figure 3-27: Discrete inputs - control inputs - operation logic

NOTE

The discrete inputs for the breaker position reply messages (DIs 1 through 4) are fixed to N.C. and are evaluated as N.C., i.e. the breaker is considered as "in position" if the respective DI is de-energized.

EN DI {x} operation
DE DI {x} Funktion
CL2 1281 {0} ✓ {1} ✓ {2} ✓

Discrete input: Operation **N.O. / N.C.**

The discrete inputs may be operated by an normally open (N.O.) or normally closed (N.C.) contact. The idle circuit current input can be used to monitor for a wire break. A positive or negative voltage polarity referred to the reference point of the DI may be applied.

N.O...... The discrete input is analyzed as "enabled" by energizing the input (normally open).

N.C...... The discrete input is analyzed as "enabled" by de-energizing the input (normally closed).

EN DI {x} delay
DE DI {x} Verzögerung
CL2 1280 {0} ✓ {1} ✓ {2} ✓

Discrete input: Delay **0.08 to 650.00 s**

A delay time in seconds can be assigned to each alarm or control input. The discrete input must be enabled without interruption for the delay time before the unit reacts. If the discrete input is used within the *LogicsManager* this delay is taken into account as well.

The preceding parameters are used to configure the discrete inputs 5 through 12. The parameter IDs refer to DI 5. Refer to Table 3-9 for the parameter IDs of the parameters DI 6 through DI 12. The DIs 1 through 4 are fixed for breaker position feedback signals to the settings, which are indicated in the List Of Parameters starting on page 126 and cannot be configured. However, the may still be used for other purposes if the breaker position feedback signals are not used.

	DI 5	DI 6	DI 7	DI 8	DI 9	DI 10	DI 11	DI 12
Operation	1281	1301	1321	1341	1361	1381	1206	1226
Delay	1280	1300	1320	1340	1360	1380	1205	1225

Table 3-9: Discrete inputs - parameter IDs

If a Woodward IKD 1 or other external expansion board (Phoenix BK 16DiDo/Co 16DiDo) is connected to the DTSC via the CAN bus, it is possible to use 16 additional discrete inputs.
The configuration of these external DIs is performed in a similar way like for the internal DIs. Refer to Table 3-10 for the parameter IDs of the parameters for external DIs 1 through 16.

External	DI 1	DI 2	DI 3	DI 4	DI 5	DI 6	DI 7	DI 8
Operation	16001	16011	16021	16031	16041	16051	16061	16071
Delay	16000	16010	16020	16030	16040	16050	16060	16070
External	DI 9	DI 10	DI 11	DI 12	DI 13	DI 14	DI 15	DI 16
Operation	16081	16091	16101	16111	16121	16131	16141	16151
Delay	16080	16090	16100	16110	16120	16130	16140	16150

Table 3-10: External discrete inputs - parameter IDs

Discrete Outputs (*LogicsManager*)

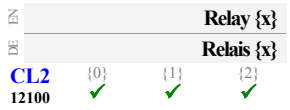
The discrete outputs are controlled via the *LogicsManager*.

⇨ **Please note the description of the *LogicsManager* starting on page 101.**

Some outputs are assigned a function according to the application mode (see following table).

Relay Number	Term.	Function
Internal relay outputs		
[R 1]	31/32	*LogicsManager*
[R 2]	31/33	*LogicsManager*
[R 3]	31/34	*LogicsManager*
[R 4]	35/36/37	*LogicsManager*
[R 5]	39/40/41	*LogicsManager* (*pre-defined* with engine 2 start)
[R 6]	42/43	*LogicsManager* (*pre-defined* with command: close to source 1 position) [C1]
[R 7]	44/45	*LogicsManager* (*pre-defined* with command: close to source 2 position) [C2]
[R 8]	46/47	*LogicsManager* (*pre-defined* with command: open from source 1 to neutral position) [C1O]
[R 9]	48/49	*LogicsManager* (*pre-defined* with command: open from source 2 to neutral position) [C2O]
External relay output (via CANopen; not included in DTSC-200 delivery; can be an expansion card like IKD1)		
[Rex01]	---	*LogicsManager*
[Rex02]	---	*LogicsManager*
[Rex03]	---	*LogicsManager*
[Rex04]	---	*LogicsManager*
[Rex05]	---	*LogicsManager*
[Rex06]	---	*LogicsManager*
[Rex07]	---	*LogicsManager*
[Rex08]	---	*LogicsManager*
[Rex09]	---	*LogicsManager*
[Rex10]	---	*LogicsManager*
[Rex11]	---	*LogicsManager*
[Rex12]	---	*LogicsManager*
[Rex13]	---	*LogicsManager*
[Rex14]	---	*LogicsManager*
[Rex15]	---	*LogicsManager*
[Rex16]	---	*LogicsManager*

Table 3-11: Relay outputs - Assignment



Digital outputs: *LogicsManager* for relay {x} ***LogicsManager***

Once the conditions of the *LogicsManager* have been fulfilled, the relay will be energized. The *LogicsManager* and its default settings are explained on page 101 in Appendix A: "*LogicsManager*".

Above parameter IDs refers to R 1. Refer to Table 3-12 for the parameter IDs of the parameters for R 2 to R 9.

	R 1	R 2	R 3	R 4	R 5	R 6	R 7	R 8	R 9
Parameter ID	12100	12110	12310	12320	12130	12140	12150	12160	12170

Table 3-12: Discrete outputs - parameter IDs

If a Woodward IKD 1 or other external expansion board (Phoenix BK 16DiDo/Co 16DiDo) is connected to the DTSC via the CAN bus, it is possible to use 16 additional discrete outputs.
The configuration of these external DOs is performed in a similar way like for the internal DOs. Refer to Table 3-13 for the parameter IDs of the parameters for external DOs 1 through 16.

	DO 1	DO 2	DO 3	DO 4	DO 5	DO 6	DO 7	DO 8
Parameter ID	12330	12340	12350	12360	12370	12380	12390	12400
	DO 9	DO 10	DO 11	DO 12	DO 13	DO 14	DO 15	DO 16
Parameter ID	12410	12420	12430	12440	12450	12460	12470	12480

Table 3-13: External discrete outputs - parameter IDs

Counters

Configure Counters: Operation Hours, kWh, and kvarh

EN Counter value preset
DE Zähler-Setzwert
CL2 {0} {1} {2}
2515 ✓ ✓ ✓

Counter: Set point value for counters **0 to 99,999,999**

This value is utilized to set the hours in the following parameters:
- kWh counter
- kvarh counter

The number entered into this parameter is the number that will be set to the parameters listed above when they are enabled.

EN S1 active power [0.00MWh]
DE S1 Wirkarbeit [0,00MWh]
CL2 {0} {1} {2}
2514 ✓ ✓ ✓

Counter: Set Source 1 kWh counter **YES / NO**

YES..... The current value of this counter is overwritten with the value configured in "set point value for counters". After the counter has been (re)set, this parameter changes back to "NO" automatically.
NO ..... The value of this counter is not changed.

EN S1 react. power [0.00Mvarh]
DE S1 Blindarbeit [0,00Mvarh]
CL2 {0} {1} {2}
2516 ✓ ✓ ✓

Counter: Set Source 1 kvarh counter **YES / NO**

YES..... The current value of this counter is overwritten with the value configured in "set point value for counters". After the counter has been (re)set, this parameter changes back to "NO" automatically.
NO ..... The value of this counter is not changed.

EN S2 active power [0.00MWh]
DE S2 Wirkarbeit [0,00MWh]
CL2 {0} {1} {2}
2510 ✓ ✓ ✓

Counter: Set Source 2 kWh counter **YES / NO**

YES..... The current value of this counter is overwritten with the value configured in "set point value for counters". After the counter has been (re)set, this parameter changes back to "NO" automatically.
NO ..... The value of this counter is not changed.

EN S2 react. power [0.00Mvarh]
DE S2 Blindarbeit [0,00Mvarh]
CL2 {0} {1} {2}
2511 ✓ ✓ ✓

Counter: Set Source 2 kvarh counter **YES / NO**

YES..... The current value of this counter is overwritten with the value configured in "set point value for counters". After the counter has been (re)set, this parameter changes back to "NO" automatically.
NO ..... The value of this counter is not changed.

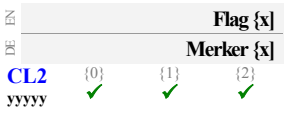
NOTE

Example: The counter value preset (parameter 2515 on page 82) is configured to "3456".
If parameter 2510 will be configured to YES, the S2 active power counter will be set to 34.56MWh.

LogicsManager

LogicsManager: Internal Flags

Internal flags within the *LogicsManager* logical outputs may be programmed and used for multiple functions. For conditions and explanation of programming please refer to page 101 in chapter "*LogicsManager*").



Internal flags: Flag {x} [x = 1 to 8] ***LogicsManager***

The flags may be used as auxiliary flags for complex combinations by using the logical output of these flags as command variable for other logical outputs.

Parameter ID yyyyy	Flag {x}
12230	Flag 1
12240	Flag 2
12250	Flag 3
12260	Flag 4
12270	Flag 5
12280	Flag 6
12290	Flag 7
12300	Flag 8

Table 3-14: Internal flags - parameter IDs

NOTE

Flag 1 is also used as placeholder in other logical combinations. Flag 8 is preset with a timer start.

LogicsManager: Timer

LogicsManager: Daily Time Set Point

Utilizing the *LogicsManager* it is possible to establish specific times of the day that functions (i.e. generator exerciser) can be enabled. The two daily time set points are activated each day at the configured time. Using the *LogicsManager* these set points may be configured individually or combined to create a time range.

EN Setpoint {x}: Hour
DE Setpoint {x}: Stunde
CL2 {0} {1} {2}
1652 ✓ ✓ ✓
1657

Timer: Daily time set point {x} [x = 1/2]: hour **0 to 23 h**

Enter the hour of the daily time set point here. Example:
0 .....0th hour of the day (midnight).
23 .....23rd hour of the day (11pm).

EN Setpoint {x}: Minute
DE Setpoint {x}: Minute
CL2 {0} {1} {2}
1651 ✓ ✓ ✓
1656

Timer: Daily time set point {x} [x = 1/2]: minute **0 to 59 min**

Enter the minute of the daily time set point here. Example:
0 .....0th minute of the hour.
59 .....59th minute of the hour.

EN Setpoint {x}: Second
DE Setpoint {x}: Sekunde
CL2 {0} {1} {2}
1650 ✓ ✓ ✓
1655

Timer: Daily time set point {x} [x = 1/2]: second **0 to 59 s**

Enter the second of the daily time set point here. Example
0 .....0th second of the minute.
59 .....59th second of the minute.

LogicsManager: Active Time Set Point

Utilizing the *LogicsManager* it is possible to establish specific days (or hours, minutes, seconds) that functions (i.e. generator exerciser) can be enabled. The active switching point is activated only on a specified day (or hour, minute, second). The set points may be configured individually or combined via the *LogicsManager*. You may configure monthly, daily, hourly, minutely, or even secondly time set points depending on how you combine the set points in the *LogicsManager*.

EN Active day
DE Aktiver Tag
CL2 {0} {1} {2}
1663 ✓ ✓ ✓

Timer: Active time set point: day **1 to 31**

Enter the day of the active switch point here. Example:
01 .....1st day of the month.
31 .....31st day of the month.
The active time set point is enabled during the indicated day from 0:00:00 hours to 23:59:59 hours.

EN Active hour
DE Aktive Stunde
CL2 {0} {1} {2}
1662 ✓ ✓ ✓

Timer: Active time set point: hour **0 to 23 h**

Enter the hour of the active switch point here. Example:
0 .....0th hour of the day.
23 .....23rd hour if the day.
The active time set point is enabled every day during the indicated hour from minute 0 to minute 59.

EN Active minute
DE Aktive Minute
CL2 {0} {1} {2}
1661 ✓ ✓ ✓

Timer: Active time set point: minute **0 to 59 min**

Enter the minute of the active switch point here. Example:
0 .....0th minute of the hour.
59 .....59th minute of the hour.
The active time set point is enabled every hour during the indicated minute from second 0 to second 59.

EN Active second
DE Aktive Sekunde
CL2 1660 {0} ✓ {1} ✓ {2} ✓

Timer: Active time set point: second **0 to 59 s**

Enter the second of the active switch point here. Example:
0..... 0th second of the minute.
59..... 59th second the minute.
The active time set point is enabled every minute during the indicated second.

LogicsManager: Weekly Time Set Point

Utilizing the *LogicsManager* it is possible to establish specific days of the week that functions (i.e. generator exerciser) can be enabled. The weekly time set point is enabled during the indicated day from 0:00:00 hours to 23:59:59 hours.

EN Monday active
DE Montag aktiv
CL2 1670 {0} ✓ {1} ✓ {2} ✓

Timer: Weekly time set points Monday: days **YES / NO**

Please enter the days of the weekly workdays.
Monday ..... ***YES*** - The switch point is enabled every Monday
NO - The switch point is disabled every Monday

EN Tuesday active
DE Dienstag aktiv
CL2 1671 {0} ✓ {1} ✓ {2} ✓

Timer: Weekly time set points Tuesday: days **YES / NO**

Please enter the days of the weekly workdays.
Tuesday ..... ***YES*** - The switch point is enabled every Tuesday
NO - The switch point is disabled every Tuesday

EN Wednesday active
DE Mittwoch aktiv
CL2 1672 {0} ✓ {1} ✓ {2} ✓

Timer: Weekly time set points Wednesday: days **YES / NO**

Please enter the days of the weekly workdays.
Wednesday..... ***YES*** - The switch point is enabled every Wednesday
NO - The switch point is disabled every Wednesday

EN Thursday active
DE Donnerstag aktiv
CL2 1673 {0} ✓ {1} ✓ {2} ✓

Timer: Weekly time set points Thursday: days **YES / NO**

Please enter the days of the weekly workdays.
Thursday..... ***YES*** - The switch point is enabled every Thursday
NO - The switch point is disabled every Thursday

EN Friday active
DE Freitag aktiv
CL2 1674 {0} ✓ {1} ✓ {2} ✓

Timer: Weekly time set points Friday: days **YES / NO**

Please enter the days of the weekly workdays.
Friday ..... ***YES*** - The switch point is enabled every Friday
NO - The switch point is disabled every Friday

EN Saturday active
DE Samstag aktiv
CL2 1675 {0} ✓ {1} ✓ {2} ✓

Timer: Weekly time set points Saturday: days **YES / NO**

Please enter the days of the weekly workdays.
Saturday..... ***YES*** - The switch point is enabled every Saturday
NO - The switch point is disabled every Saturday

EN Sunday active
DE Sonntag aktiv
CL2 1676 {0} ✓ {1} ✓ {2} ✓

Timer: Weekly time set points Sunday: days **YES / NO**

Please enter the days of the weekly workdays.
Sunday..... ***YES*** - The switch point is enabled every Sunday
NO - The switch point is disabled every Sunday

Interfaces

NOTE

Please refer to the Interface Manual 37389 for a detailed description of the interface parameters.

EN Device number
DE Gerätenummer
CL2 {0} {1} {2}
1702 ✓ ✓ ✓

Interfaces: Device address **1 to 127**

So that this control unit may be positively identified on the CAN bus, the unit address must be set in this parameter. The address may only be represented once on the CAN bus. All other addresses on the CAN bus are calculated on the basis of the address entered in this parameter.

Interfaces: CAN Bus (*FlexCAN*)

NOTE

The CAN bus is a field bus and subject to various disturbances. Therefore, it cannot be guaranteed that every request will be answered. We recommend to repeat a request, which is not answered within reasonable time.

EN Protocol
DE Protokoll
CL2 {0} {1} {2}
3155 ✓ ✓ ✓

CAN bus: Protocol **OFF / CANopen / LeoPC**

The CAN bus of this unit may be operated with different protocols and Baud rates. This parameter defines the protocol to be utilized. Please note, that all participants on the CAN bus must use the same protocol.

OFF .....The CAN bus is disconnected. Values are not sent or received.
CANopen .....The CANopen protocol is used. More information may be found in the interface manual 37262 under CANopen.
LeoPC .....The CAN CAL protocol is used. More information may be found in the interface manual 37262 under CAN (CAL).

EN Baudrate
DE Baudrate
CL2 {0} {1} {2}
3156 ✓ ✓ ✓

CAN bus: Baud rate **20 / 50 / 100 / 125 / 250 / 500 / 800 / 1,000 kBaud**

This parameter defines the used Baud rate. Please note, that all participants on the CAN bus must use the same Baud rate.

Interfaces: CAN BUS: CANopen

EN CAN-Open Master
DE CAN-open Master
CL2 {0} {1} {2}
9000 ✓ ✓ ✓

CANopen Master **YES / NO**

YES..... The DTSC-200 is the CANopen Master.
The unit automatically changes into operational mode and transmits Remote Start messages since Broadcast
Attached external devices were configured from the unit with SDO messages. The unit sends a SYNC message all 20ms on COB ID 80 Hex.
NO..... The DTSC-200 is a CANopen Slave.

EN Producer heartbeat time
DE Producer heartbeat time
CL2 {0} {1} {2}
9120 ✓ ✓ ✓

CAN bus: Producer heartbeat time **20 to 65,530 ms**

Independent from the CANopen Master configuration, the unit transmits a heartbeat message with this configured heartbeat cycle time. If the producer heartbeat time is equal 0, the heartbeat will only be sent as response to a remote frame request. The time configured here will be rounded up to the next 20 ms step.

EN COB-ID SYNC Message
DE COB-ID SYNC Message
CL2 {0} {1} {2}
9100 ✓ ✓ ✓

COB-ID SYNC Message **1 to FFFFFFFF**

This parameter defines whether the unit generates the SYNC message or not.

Complies with CANopen specification: object 1005, subindex 0; defines the COB ID of the synchronization object (SYNC). The structure of this object is shown in the following tables:

UNSIGNED 32		MSB				LSB
bits	bits	31	30	29	28-11	10-0
11 bit ID	11 bit ID	X	0/1	X	00000000000000000	11 bit identifier

bit number	value	meaning
31 (MSB)	X	N/A
30	0 1	Unit does not generate SYNC message Unit generates SYNC message
29	X	N/A
28-11	0	always
10-0 (LSB)	X	bits 10-0 of SYNC COB ID

EN Max. answer time ext. devices
DE Max. Antwortzeit ext. Geräte
CL2 {0} {1} {2}
9010 ✓ ✓ ✓

Max response time ext. devices **0.1 to 9.9 s**

The maximum time that an attached external device has to answer an SDO message. If the external device fails to answer before this time expires, an abort message is sent and the SDO message will be sent again. This is only effective, if DTSC-200 CAN open master is enabled.

EN Time re-init. Ext. devices
DE Zeit Re-init. Ext- Geräte
CL2 {0} {1} {2}
9009 ✓ ✓ ✓

Time re-init (re-initialization) ext. devices **0 to 9,999 s**

An external device will be configured again with SDO messages after the time set for this parameter.
If 0 is input in this parameter, the external device will not be configured again with SDO messages
This only functions if DTSC-200 CAN open master is enabled.

Interfaces: CAN BUS: CANopen: Additional Server SDOs

EN 2nd Client->Server COB-ID (rx)
DE 2. Client->Server COB-ID (rx)
CL2 {0} {1} {2}
9020 ✓ ✓ ✓

CAN bus: Client->Server COB-ID (rx) **1 to FFFFFFFF**

In a multi-master application, each Master needs its own identifier (Node ID) from the unit. In order to send remote signals (i.e. acknowledge) to the unit. The additional SDO channel will be made available by configuring this Node ID to a value different than zero. This is the additional CAN ID for the PLC.

EN 2nd Server->Client COB-ID (tx)
DE 2. Server->Client COB-ID (tx)
CL2 {0} {1} {2}
9022 ✓ ✓ ✓

CAN bus: Server-> Client COB-ID (tx) **1 to FFFFFFFF**

In a multi-master application, each Master needs its own identifier (Node ID) from the unit. In order to receive remote signals (i.e. acknowledge). The additional SDO channel will be made available by configuring this Node ID to a value different than zero. This is the additional CAN ID for the unit.

EN 3rd Client->Server COB-ID (rx)
DE 3. Client->Server COB-ID (rx)
CL2 {0} {1} {2}
9024 ✓ ✓ ✓

CAN bus: Client->Server COB-ID (rx) **1 to FFFFFFFF**

In a multi-master application, each Master needs its own identifier (Node ID) from the unit. In order to send remote signals (i.e. acknowledge) to the unit. The additional SDO channel will be made available by configuring this Node ID to a value different than zero. This is the additional CAN ID for the PLC.

EN 3rd Server->Client COB-ID (tx)
DE 3. Server->Client COB-ID (tx)
CL2 {0} {1} {2}
9026 ✓ ✓ ✓

CAN bus: Server-> Client COB-ID (tx) **1 to FFFFFFFF**

In a multi-master application, each Master needs its own identifier (Node ID) from the unit. In order to receive remote signals (i.e. acknowledge). The additional SDO channel will be made available by configuring this Node ID to a value different than zero. This is the additional CAN ID for the unit.

EN 4th Client->Server COB-ID (rx)
DE 4. Client->Server COB-ID (rx)
CL2 {0} {1} {2}
9028 ✓ ✓ ✓

CAN bus: Client->Server COB-ID (rx) **1 to FFFFFFFF**

In a multi-master application, each Master needs its own identifier (Node ID) from the unit. In order to send remote signals (i.e. acknowledge) to the unit. The additional SDO channel will be made available by configuring this Node ID to a value different than zero. This is the additional CAN ID for the PLC.

EN 4th Server->Client COB-ID (tx)
DE 4. Server->Client COB-ID (tx)
CL2 {0} {1} {2}
9030 ✓ ✓ ✓

CAN bus: Server-> Client COB-ID (tx) **1 to FFFFFFFF**

In a multi-master application, each Master needs its own identifier (Node ID) from the unit. In order to receive remote signals (i.e. acknowledge). The additional SDO channel will be made available by configuring this Node ID to a value different than zero. This is the additional CAN ID for the unit.

EN 5th Client->Server COB-ID (rx)
DE 5. Client->Server COB-ID (rx)
CL2 {0} {1} {2}
9032 ✓ ✓ ✓

CAN bus: Client->Server COB-ID (rx) **1 to FFFFFFFF**

In a multi-master application, each Master needs its own identifier (Node ID) from the unit. In order to send remote signals (i.e. acknowledge) to the unit. The additional SDO channel will be made available by configuring this Node ID to a value different than zero. This is the additional CAN ID for the PLC.

EN 5th Server->Client COB-ID (tx)
DE 5. Server->Client COB-ID (tx)
CL2 {0} {1} {2}
9034 ✓ ✓ ✓

CAN bus: Server-> Client COB-ID (tx) **1 to FFFFFFFF**

In a multi-master application, each Master needs its own identifier (Node ID) from the unit. In order to receive remote signals (i.e. acknowledge). The additional SDO channel will be made available by configuring this Node ID to a value different than zero. This is the additional CAN ID for the unit.

NOTE

The COB IDs must be entered in decimal numbers in LeoPC 1 and in hexadecimal numbers in the unit.
Here are some important conversions:

Hexadecimal value	Decimal value
80h	128
181h	385
201h	513
281h	641
301h	769
381h	897
401h	1025
481h	1153
501h	1281
581h	1409
601h	1537
80000000h	2147483648

Interfaces: CAN BUS: CANopen: Receive PDO (RPDO) {x} ({x} = 1/2)

Figure 3-28 shows the principle of PDO mapping.

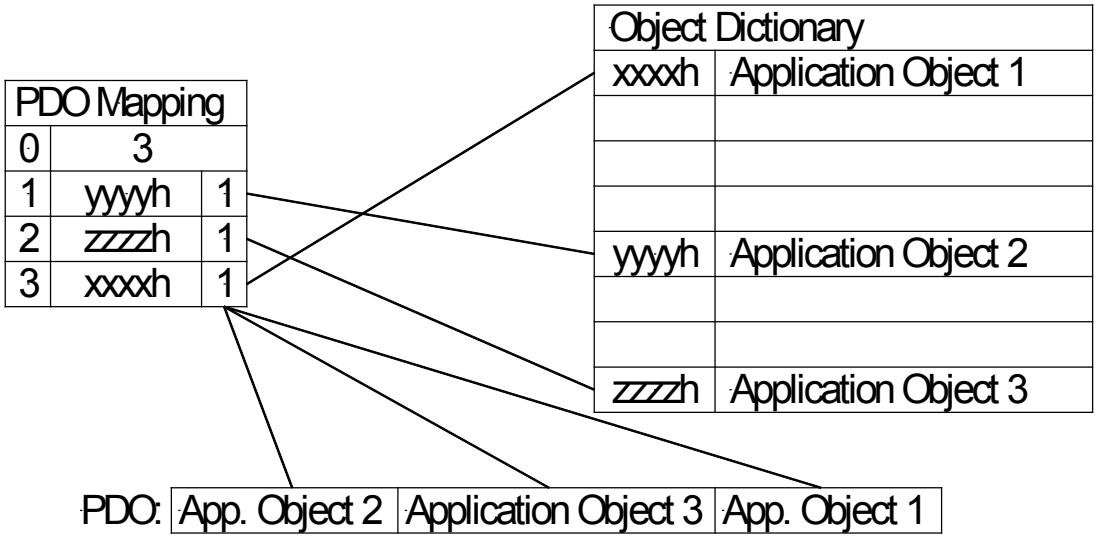


Figure 3-28: Interfaces - Principle of PDO mapping

EN COB-ID
DE COB-ID

CL2 {0} {1} {2}
9300 ✓ ✓ ✓
9310

Receive PDO 1/2 - COB-ID **1 to FFFFFFFF**

This parameter contains the communication parameters for the PDOs, the device is able to receive.

Complies with CANopen specification: object 1400 (for RPDO 1 and 1401 for RPDO 2), subindex 1. The structure of this object is shown in the following tables:

UNSIGNED 32	MSB				LSB
bits	31	30	29	28-11	10-0
11 bit ID	0/1	X	X	00000000000000000	11 bit identifier

bit number	value	meaning
31 (MSB)	0 1	PDO exists / is valid PDO does not exist / is not valid
30	X	N/A
29	X	N/A
28-11	0	always
10-0 (LSB)	X	bits 10-0 of COB ID

PDO valid / not valid allows to select, which PDOs are used in the operational state.

CAUTION

The COB-IDs have to be configured different, even if one RPDO is configured to "no func."2.

EN Function
DE Funktion

CL2 {0} {1} {2}
9050 ✓ ✓ ✓
9051

Function for RPDO 1/2 **no func. / 1st IKD /2nd IKD / Bk 16DIDO / Co 16DIDO**

The unit provides pre-configured CAN bus settings for the connection of different units. The unit to be connected must be selected here.

No func......No external unit is selected for connection. The CAN bus is disabled. Values are not sent or received.
1st IKD.....The unit is pre-configured for the connection of a Woodward IKD 1 expansion board.
2nd IKD.....The unit is pre-configured for the connection of a second Woodward IKD 1 expansion board.
BK 16 DIDO The unit is pre-configured for the connection of a Phoenix Contact BK 16 DIDO expansion board.
Co 16 DIDO.The unit is pre-configured for the connection of a Phoenix Contact Co 16 DIDO expansion board.

The following table shows several possible functional combinations:

PDO1 / PDO2	1st IKD	2nd IKD	OFF
1st IKD	NO	YES	YES
2nd IKD	YES	NO	YES
Bk 16DIDO	NO	NO	YES
Co 16DIDO	NO	NO	YES
no func.	YES	YES	YES

Read: If PDO1 is configured as 1. IKD, then PDO2 can only be configured as either 2. IKD or "no func.".

EN Node-ID of the device
DE Node-ID des Gerätes

CL2 {0} {1} {2}
9060 ✓ ✓ ✓
9061

Node-ID of the device **1 to 127**

Node-ID of the attached device. The SDO messages were sent on the standard SDO-IDs or the answers were expected.

EN RPDO-COP-ID ext. device {x}
DE RPDO-COP-ID ext. Gerät {x}

CL2	{0}	{1}	{2}
9070	✓	✓	✓
9072			

RPDO-COB-ID ext. device 1 **1 to FFFFFFFF**

Value to be written in the object 1800h sub index 1h of the external device.

CAUTION

COB-IDs already used in other PDOs should be used.

COB-IDs in a CANopen device after loading the standard values:
280h + Node-ID = 640 + Node-ID Object 1801h Subindex 1
380h + Node-ID = 896 + Node-ID Object 1802h Subindex 1
480h + Node-ID = 1152 + Node-ID Object 1803h Subindex 1

The receiving COB-IDs are preallocated:
300h + Node-ID = 768 + Node-ID Object 1401h Subindex 1
400h + Node-ID = 1024 + Node-ID Object 1402h Subindex 1
500h + Node-ID = 1280 + Node-ID Object 1403h Subindex 1.

Problems may be encountered if a COB-ID is assigned multiple times.

Interfaces: CAN Bus: CANopen: Transmit PDO (TPDO) {x} ({x} = 1 to 4)

EN COB-ID
DE COB-ID

CL2	{0}	{1}	{2}
9600	✓	✓	✓
9610			
9620			
9630			

CAN bus 1: Transmit PDO 1 - COB ID **1 to FFFFFFFF**

This parameter contains the communication parameters for the PDOs the unit is able to transmit. The unit transmits data (i.e. visualization data) on the CAN ID configured here.

Complies with CANopen specification: object 1800 for (TPDO 1, 1801 for TPDO 2, 1802 for TPDO 3, and 1803 for TPDO 4), subindex 1. The structure of this object is shown in the following tables:

UNSIGNED 32		MSB				LSB
bits	bits	31	30	29	28-11	10-0
11 bit ID	11 bit ID	0/1	X	X	00000000000000000	11 bit identifier

bit number	value	meaning
31 (MSB)	0 1	PDO exists / is valid PDO does not exist / is not valid
30	X	N/A
29	X	N/A
28-11	0	always
10-0 (LSB)	X	bits 10-0 of COB ID

PDO valid / not valid allows to select, which PDOs are used in the operational state.

EN Transmission type
DE Transmission type

CL2	{0}	{1}	{2}
9602	✓	✓	✓
9612			
9622			
9632			

CAN bus 1: Transmit PDO 1 - Transmission type **0 to 255**

This parameter contains the communication parameters for the PDOs the unit is able to transmit. It defines whether the unit broadcasts all data automatically (value 254 or 255) or only upon request with the configured address of the COB ID SYNC message (parameter 9100).

Complies with CANopen specification: object 1800 (for TPDO 1, 1801 for TPDO 2, 1802 for TPDO 3, and 1803 for TPDO 4), subindex 2. The description of the transmission type is shown in the following table:

transmission type	PDO transmission				
	cyclic	acyclic	synchronous	asynchronous	RTR only
0	will not be sent				
1-240	X		X		
241-251	will not be sent				
252	will not be sent				
253	will not be sent				
254				X	
255				X	

A value between 1 and 240 means that the PDO is transferred synchronously and cyclically. The transmission type indicating the number of SYNC, which are necessary to trigger PDO transmissions. Receive PDOs are always triggered by the following SYNC upon reception of data independent of the transmission types 0 to 240. For TPDOs, transmission type 254 and 255 means, the application event is the event timer.

EN Event-timer
DE Event-timer

CL2	{0}	{1}	{2}
9604	✓	✓	✓
9614			
9624			
9634			

CAN bus 1: Transmit PDO 1 – Event timer **0 to 65000 ms**

This parameter contains the communication parameters for the PDOs the unit is able to transmit. The broadcast cycle for the transmitted data is configured here. The time configured here will be rounded up to the next 5 ms step.

Complies with CANopen specification: object 1800 (for TPDO 1, 1801 for TPDO 2, 1802 for TPDO 3, and 1803 for TPDO 4), subindex 5

EN Number of Mapped Objects
DE Anzahl der Mapped Objekte

CL2	{0}	{1}	{2}
9609	✓	✓	✓
9619			
9629			
9639			

CAN bus 1: Transmit PDO 1 - Number of mapped objects **0 to 4**

This parameter contains the mapping for the PDOs the unit is able to transmit. This number is also the number of the application variables, which shall be transmitted with the corresponding PDO.

Complies with CANopen specification: object 1A00 (for TPDO 1, 1A01 for TPDO 2, 1A02 for TPDO 3, and 1A03 for TPDO 4), subindex 0

EN 1. Mapped Object
DE 1. Mapped Objekt

CL2	{0}	{1}	{2}
9605	✓	✓	✓
9615			
9625			
9635			

CAN bus 1: Transmit PDO 1 - 1. Mapped object **0 to 65535**

This parameter contains the information about the mapped application variables. These entries describe the PDO contents by their index. The sub-index is always 1. The length is determined automatically.

Complies with CANopen specification: object 1A00 (for TPDO 1, 1A01 for TPDO 2, 1A02 for TPDO 3, and 1A03 for TPDO 4), subindex 1

EN 2. Mapped Object
DE 2. Mapped Objekt

CL2	{0}	{1}	{2}
9606	✓	✓	✓
9616			
9626			
9636			

CAN bus 1: Transmit PDO 1 - 2. Mapped object **0 to 65535**

This parameter contains the information about the mapped application variables. These entries describe the PDO contents by their index. The sub-index is always 1. The length is determined automatically.

Complies with CANopen specification: object 1A00 (for TPDO 1, 1A01 for TPDO 2, 1A02 for TPDO 3, and 1A03 for TPDO 4), subindex 2

EN	3. Mapped Object
DE	3. Mapped Objekt

CL2	{0}	{1}	{2}
9607	✓	✓	✓
9617			
9627			
9637			

CAN bus 1: Transmit PDO 1 - 3. Mapped object **0 to 65535**

This parameter contains the information about the mapped application variables. These entries describe the PDO contents by their index. The sub-index is always 1. The length is determined automatically.

Complies with CANopen specification: object 1A00 (for TPDO 1, 1A01 for TPDO 2, 1A02 for TPDO 3, and 1A03 for TPDO 4), subindex 3

EN	4. Mapped Object
DE	4. Mapped Objekt

CL2	{0}	{1}	{2}
9608	✓	✓	✓
9618			
9628			
9638			

CAN bus 1: Transmit PDO 1 - 4. Mapped object **0 to 65535**

This parameter contains the information about the mapped application variables. These entries describe the PDO contents by their index. The sub-index is always 1. The length is determined automatically.

Complies with CANopen specification: object 1A00 (for TPDO 1, 1A01 for TPDO 2, 1A02 for TPDO 3, and 1A03 for TPDO 4), subindex 4

NOTE

CANopen allows to send 8 byte of data with each Transmit PDO. These may be defined separately if no pre-defined data protocol is used.

All data protocol parameters with a parameter ID may be sent as an object with a CANopen Transmit PDO.

In this case, the data length will be taken from the data byte column (refer to the Data Protocols section in the Interface Manual 37389):

- **1,2 UNSIGNED16 or SIGNED16**
- **3,4 UNSIGNED16 or SIGNED16**
- **5,6 UNSIGNED16 or SIGNED16**
- **1,2,3,4 UNSIGNED32 or SIGNED32**
- **3,4,5,6 UNSIGNED32 or SIGNED32**
- **etc.**

The object ID is identical with the parameter ID when configuring via front panel or LeoPC 1.

Interfaces: Serial Interface 1 (RS-232)

EN Baudrate
DE Baudrate
CL2 3163 {0} ✓ {1} ✓ {2} ✓

Serial interface: Baud rate **2.4 / 4.8 / 9.6 / 14.4 / 19.2 / 38.4 / 65 / 115 kBaud**

ⓘ A DPC (P/N 5417-557) must be used for connecting the control unit from the service interface to a PC or to another participant.

The serial interface of this unit connects to an RJ45-plug on the side of the housing. This parameter defines the baud rate that communications will be performed. Please note, that all participants on the service interface must use the same Baud rate.

EN Parity
DE Parity
CL2 3161 {0} ✓ {1} ✓ {2} ✓

Serial interface: Parity **no / even / odd**

The used parity of the service interface is set here.

EN Stop Bits
DE Stop Bits
CL2 3162 {0} ✓ {1} ✓ {2} ✓

Serial interface: Stop bits **one / two**

The number of stop bits is set here.

Interfaces: Serial Interface 2 (RS-485)

EN Baudrate
DE Baudrate
CL2 3170 {0} ✓ {1} ✓ {2} ✓

Serial interface 2: Baud rate **2.4 / 4.8 / 9.6 / 14.4 / 19.2 / 38.4 / 56 / 115 kBaud**

This parameter defines the baud rate for communications. Please note, that all participants on the service interface must use the same baud rate.

EN Parity
DE Parity
CL2 3171 {0} ✓ {1} ✓ {2} ✓

Serial interface 2: Parity **no / even / odd**

The used parity of the service interface is set here.

EN Stop bits
DE Stop Bits
CL2 3172 {0} ✓ {1} ✓ {2} ✓

Serial interface 2: Stop bits **one / two**

The number of stop bits is set here.

EN Full-, halfduplex mode
DE Voll-, Halbduplex Modus
CL2 3173 {0} ✓ {1} ✓ {2} ✓

Serial interface 2: Full-/halfduplex mode **Fullduplex / Halfduplex**

Fullduplex ... Fullduplex mode is enabled.
Halfduplex... Halfduplex mode is enabled.

EN ModBus Slave ID
DE ModBus Slave ID
CL2 3185 {0} ✓ {1} ✓ {2} ✓

Serial interface: Modbus Slave ID **0 to 255**

The Modbus device address is entered here, which is used to identify the device via Modbus. If 0 is entered here, the Modbus Slave module is disabled.

EN Modbus Reply delay time
DE Modbus Zeitverzöger. Der Antwort
CL2 3186 {0} ✓ {1} ✓ {2} ✓

Serial interface: Reply delay time **0.00 to 0.20 s**

This is the minimum delay time between a request from the Modbus master and the sent response of the slave. This time is also required if an external interface converter to RS-485 is used for example. Please note that you also need the DPC (refer to page 10) in this case.

System

System: Configure Display Backlight

EN Configure display backlight
DE Konfig. Display Beleuchtung
CL2 {0} {1} {2}
4556 ✓ ✓ ✓

Display backlight **ON / OFF / Auto / Key actv.**

This parameter determines the behavior of the display backlight. The following options are available:

ON..... The display backlight is always enabled.
OFF..... The display backlight is always disabled.
Auto ..... The display backlight will be disabled if no voltage is detected anymore at both connected sources.
Key actv...... The display backlight will be disabled if no softkey has been pressed for the time configured in parameter 4557. It will be enabled again after any softkey of the unit has been pressed.

EN Time until backlight shutdown
DE Zeit bis Abschaltung
CL2 {0} {1} {2}
4557 ✓ ✓ ✓

Time until backlight shutdown **1 to 999 s**

ⓘ This parameter is only visible if parameter 4556 has been configured to "Key actv.".

If no softkey has been pressed for the time configured here, the display backlight will be disabled.

System: Configure Daylight Saving Time

It is possible to configure the real-time clock for an automatic change to daylight saving time. Start and end date/time of the daylight saving time period have to be entered for this.

Example: If daylight saving time starts at 2:00 am on the 2nd Sunday in March and ends at 2:00 am on the 1st Sunday in November, the unit has to be configured like shown in Table 3-15 to enable an automatic change to daylight saving time and back to standard time.

ID	Parameter	Setting
4591	Daylight saving time	ON
4593	DST begin month	3
4592	DST begin Sunday	2
4594	DST begin time	2
4596	DST end month	11
4595	DST end Sunday	1
4597	DST end time	2

Table 3-15: Daylight saving time - configuration example

EN Daylight saving time
DE Sommer-Winterzeit Erkennung
CL2 {0} {1} {2}
4591 ✓ ✓ ✓

Daylight saving time **ON / OFF**

This parameter enables or disables daylight saving time.

ON ..... Daylight saving time is performed according to the following parameters.
OFF ..... Daylight saving time is disabled.

EN DST begin month
DE Monat für Sommerzeitbeginn
CL2 {0} {1} {2}
4593 ✓ ✓ ✓

Daylight saving time start month **1 to 12**

Daylight saving time starts in the month configured here.

EN DST begin Sunday
DE Sonntag für Sommerzeitbeginn
CL2 {0} {1} {2}
4592 ✓ ✓ ✓

Daylight saving time start Sunday **1 to 4**

Daylight saving time starts on the Sunday configured here of the month configured in parameter 4593.

EN DST begin time
DE Uhrzeit für Sommerzeitbeginn
CL2 {0} {1} {2}
4594 ✓ ✓ ✓

Daylight saving time start time **0 to 23 h**

Daylight saving time starts at this time on the Sunday configured in parameter 4592.

EN DST end month
DE Monat für Sommerzeitende
CL2 {0} {1} {2}
4596 ✓ ✓ ✓

Daylight saving time end month **1 to 12**

Daylight saving time ends in the month configured here.

EN DST end Sunday
DE Sonntag für Sommerzeitende
CL2 {0} {1} {2}
4595 ✓ ✓ ✓

Daylight saving time end Sunday **1 to 4**

Daylight saving time ends on the Sunday configured here of the month configured in parameter 4596.

EN DST end time
DE Uhrzeit für Sommerzeitende
CL2 {0} {1} {2}
4597 ✓ ✓ ✓

Daylight saving time end time **0 to 23 h**

Daylight saving time ends at this time on the Sunday configured in parameter 4595.

System: Password System

Refer to the Password section on page 16 for a detailed description of the password system.

EN Code level display
DE Codeebene Display
CL2 10405 {0} ✓ {1} ✓ {2} ✓

Password system: Code level via display **Info**

This value displays the code level, which is currently enabled for access via the front panel display.

EN Code level CAN port
DE Codeebene CAN Schnittstelle
CL2 10407 {0} ✓ {1} ✓ {2} ✓

Password system: Code level via CAN-Bus **Info**

This value displays the code level, which is currently enabled for access via the CAN interface.

EN Code level serial port/DPC
DE Codeebene RS232/DPC
CL2 10406 {0} ✓ {1} ✓ {2} ✓

Password system: Code level via serial RS-232 (DPC) interface **Info**

This value displays the code level, which is currently enabled for access via RS-232 serial interface #1.

EN Supercommissioning level code
DE Code Supercommissioning Ebene
CL5 10411 {0} ✓ {1} ✓ {2} ✓

Password system: Password "Supercommissioning" (CL5) **0000 to 9999**

The password for the code level "Supercommissioning" is defined in this parameter. Refer to the Password section on page 16 for default values.

EN Temp. supercomm. Level code
DE Code temp. Supercomm. Ebene
CL5 10412 {0} ✓ {1} ✓ {2} ✓

Password system: Password "Temporary Supercommissioning" (CL4) **0000 to 9999**

The algorithm for calculating the password for the code level "Temporary Supercommissioning" is defined in this parameter.

EN Commissioning level code
DE Code Inbetriebnahme Ebene
CL3 10413 {0} ✓ {1} ✓ {2} ✓

Password system: Password "Commission" (CL3) **0000 to 9999**

The password for the code level "Commission" is defined in this parameter. Refer to the Password section on page 16 for default values.

EN Temp. commissioning level code
DE Code temp. Inbetriebn. Ebene
CL3 10414 {0} ✓ {1} ✓ {2} ✓

Password system: Password "Temporary Commission" (CL2) **0000 to 9999**

The algorithm for calculating the password for the code level "Temporary Commissioning" is defined in this parameter.

EN Basic level code
DE Code Serviceebene
CL1 10415 {0} ✓ {1} ✓ {2} ✓

Password system: Password "Service Level" (CL1) **0000 to 9999**

The password for the code level "Service" is defined in this parameter. Refer to the Password section on page 16 for default values.

EN Password
DE Passwort
CS0 10416 {0} ✓ {1} ✓ {2} ✓

Password system: Entry via front panel **0000 to 9999**

To configure the control via the front panel bus enter the password.

EN Password CAN
DE Passwort CAN
CS0 10402 {0} ✓ {1} ✓ {2} ✓

Password system: Entry via CAN bus **0000 to 9999**

To configure the control via CAN bus enter "password CAN".

EN Password DPC
DE Passwort RS232 / DPC
CS0 10401 {0} ✓ {1} ✓ {2} ✓

Password system: Entry via DPC **0000 to 9999**

To configure the control via DPC please enter "password DPC".

EN Factory Settings
DE Werkseinstellung
CL2 {0} {1} {2}
1703 ✓ ✓ ✓

Factory settings: Factory settings CAN **YES / NO**

YES .....The resetting of the factory settings via CAN bus will be enabled.
NO .....The resetting of the factory settings via CAN bus will not be enabled.

EN Factory Settings DPC/RS232
DE Werkseinstellung DPC/RS232
L {0} {1} {2}
1704 ✓ ✓ ✓

Factory settings: Factory settings DPC/RS-232 **YES / NO**

YES .....The resetting of the factory settings via DPC/RS-232 will be enabled.
NO .....The resetting of the factory settings via DPC/RS-232 will not be enabled.

EN Factory Settings CAN
DE Werkseinstellung CAN
L {0} {1} {2}
1705 ✓ ✓ ✓

Factory settings: Factory settings CAN **YES / NO**

YES .....The resetting of the factory settings via CAN bus will be enabled.
NO .....The resetting of the factory settings via CAN bus will not be enabled.

EN Set default values
DE Standardwerte
CL2 {0} {1} {2}
1701 ✓ ✓ ✓

Factory settings: Set default values **YES / NO**

YES .....The default values, which have been enabled with parameter 1703, 1704 or parameter 1705, will be loaded by the unit.
NO .....The factory settings will not be loaded by the unit.

EN Start Bootloader
DE Bootloader starten
CL3 {0} {1} {2}
10500 ✓ ✓ ✓

Factory settings: Start Bootloader **00000**

This function may be used to start the Bootloader. In order to do this, the correct code must be entered here while the unit is in the code level required for this.

CAUTION

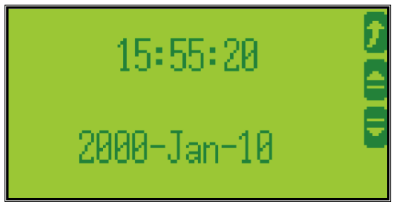
The Start Bootloader function is used to flash the software and may only be used by authorized Woodward technicians!

NOTE

If the DTSC-200 parameters are read out via CAN / DPC and stored as standard values, all parameters behind parameter 1701 (Set default values) will not be overwritten when writing back the standard value file via CAN / DPC.

This prevents an unintentional start of the Bootloader or an overwriting of the time or date in the unit with a wrong (old) value. The following version information is only for info anyway and cannot be overwritten.

System: Real-Time Clock Set



This screen shows the current date and time. The clock is implemented as real time clock. In case of a voltage supply failure an internal battery guarantees that the information is not lost. The data stand for:

XX:YY:ZZ..... hour:minute:second.
AAAA-BBB-CC..... Year-month-day.

System: Adjust Clock

EN Hour
DE Stunden
CL2 1762 {0} ✓ {1} ✓ {2} ✓

Adjust clock: hour **0 to 23 h**

The current hour of the clock time is set here. Example:
0..... 0th hour of the day.
23..... 23th hour of the day.

EN Minute
DE Minuten
CL2 1761 {0} ✓ {1} ✓ {2} ✓

Adjust clock: minute **0 to 59 min**

The current minute of the clock time is set here. Example:
0..... 0th minute of the hour.
59..... 59th minute of the hour.

EN Second
DE Sekunden
CL2 1760 {0} ✓ {1} ✓ {2} ✓

Adjust clock: second **0 to 59 s**

The current second of the clock time is set here. Example:
0..... 0th second of the minute.
59..... 59th second of the minute.

System: Adjust Date

EN Day
DE Tag
CL2 1763 {0} ✓ {1} ✓ {2} ✓

Adjust clock: day **1 to 31**

The current day of the date is set here. Example:
1..... 1st day of the month.
31..... 31st day of the month.

EN Month
DE Monat
CL2 1764 {0} ✓ {1} ✓ {2} ✓

Adjust clock: month **1 to 12**

The current month of the date is set here. Example:
1..... 1st month of the year.
12..... 12th month of the year.

EN Year
DE Jahr
CL2 1765 {0} ✓ {1} ✓ {2} ✓

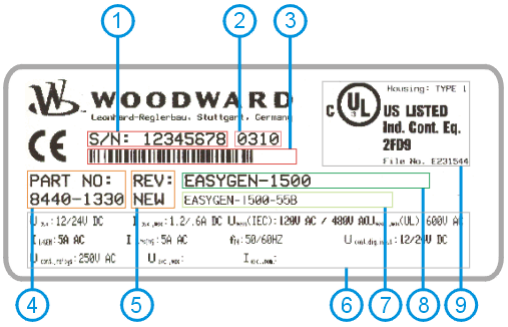
Adjust clock: year **0 to 99**

The current year of the date is set here. Example:
0..... Year 2000.
99..... Year 2099.

System: Versions

The parameters in this section are informational only and cannot be modified.

The control unit may be identified from the numbers located on the unit and in the software. The most important technical information is located on the unit data plate. Technical data can be located in manual 37385.



1	S/N	serial number (numeric)
2	S/N	manufactured date (YYMM)
3	S/N	serial number (as Barcode)
4	P/N	part number
5	REV	part number revision
6	Details	technical data
7	Type	description (long)
8	Type	Description (short)
9	UL	UL sign

EN Serial number
DE Seriennummer
900 {0} ✓ {1} ✓ {2} ✓

Version: Serial number (S/N) **info**

The serial number (S/N) is utilized to identify individual control units. The number can also be found on the data plate (items #**1** & #**3**).

EN Boot item number
DE Boot Artikelnummer
950 {0} ✓ {1} ✓ {2} ✓

Version: Part number of the firmware (P/N) **info**

The part number (P/N) is the firmware in the control unit.

EN Boot revision
DE Boot Revision
960 {0} ✓ {1} ✓ {2} ✓

Version: Revision of the item number of the firmware (REV) **info**

The revision number (REV) is the revision of the control unit firmware.

EN Boot version
DE Boot Version
965 {0} ✓ {1} ✓ {2} ✓

Version: Version of the firmware **info**

This number (Vx.xxxx) represents the version of the control unit firmware.

EN Program item number
DE Programm Artikelnummer
930 {0} ✓ {1} ✓ {2} ✓

Version: Item number of the application software (P/N) **info**

The part number (P/N) is the application software running the control unit.

EN Program revision
DE Programm Revision
940 {0} ✓ {1} ✓ {2} ✓

Version: Revision of the item number of the software (REV) **info**

The revision number (REV) is the revision of the application software running the control unit.

EN Program version
DE Programm Version
945 {0} ✓ {1} ✓ {2} ✓

Version: Version of the application software **info**

This number (Vx.xxxx) represents the version of the application software running the control unit.

Appendix A.
LogicsManager

The *LogicsManager* is used to customize the sequence of events in the control **unit** such as the start command of the engine or the operation of control unit relay outputs. For example, the start routine may be programmed so that it requires the closing of a discrete input or a preset time of day. Two independent time delays are provided for the configured action to take place and be reset. The following table shows the function of each relay in each of the application modes.

Starting the engine can be carried out externally via a discrete input. With it the *LogicsManager* is used whose conditions and programming is defined as follows.

Table 3-11 on page 80 shows the assignment of different functions to various discrete outputs.

Structure and description of the *LogicsManager*

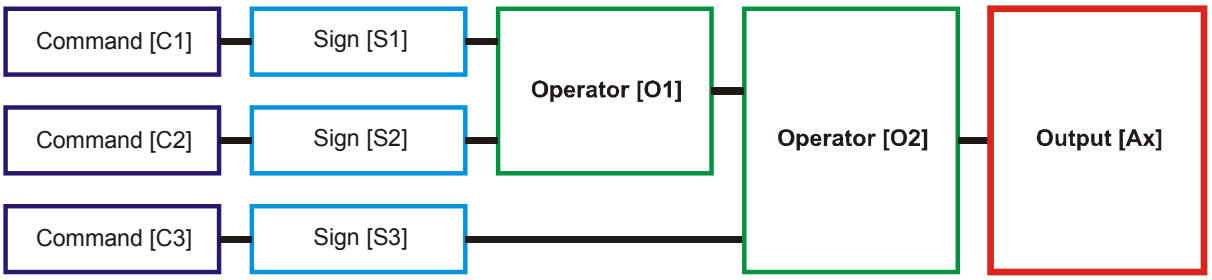


Figure 3-29: *LogicsManager* - function overview

- **Command (variable)** - A list of over 100 parameters and functions is provided for the command inputs. Examples of the parameters that may be configured into these commands are Source 1 undervoltage, Start fail, and Cool down. These command variables are used to control the output function or relay. Refer to Logical Command Variables starting on page 106 for a complete list of all command variables.
- **Sign** - The sign field can be used to invert the state of the command or to fix its output to a logical true or false if the command is not needed. Setting the sign to the NOT state changes the output of the command variable from true to false or vise versa.
- **Operator** - A logical device such as AND or OR.
- **(Logical) output** - The action or control sequence that occurs when all parameters set into the *LogicsManager* are met.

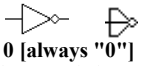
[Cx] - Command {x}	[Sx] - Sign {x}	[Ox] - Operator {x}	[Ax] - Output {x}
The description and the tables of all values, flags, and internal functions that are able to combine via the *LogicsManager* can be found in the Logical Command Variables section starting on page 106.	**Value {[Cx]}** The value [Cx] is passed 1:1. —— **NOT VALUE {[Cx]}** The opposite of the value [Cx] is passed.  **0 [always "0"]** The value [Cx] is ignored and this logic path will always be FALSE. **1 [always "1"]** The value [Cx] is ignored and this logic path will always be TRUE. 	**AND** Logical AND **NAND** Logical negated AND **OR** Logical OR **NOR** Logical negated OR **XOR** Exclusive OR **NXOR** Exclusive negated OR (See Table 3-17 for symbols)	The description and the tables of all logical outputs, flags, and functions that are able to combine via the *LogicsManager* can be found in the Logical Outputs section starting on page 104.

Table 3-16: *LogicsManager* - command overview

NOTE

A logical output may either be delayed when switching on or switching off. The time starts when all logical functions of the operation have been met.

Configuration of the chain of commands

Using the values specified in the above table, the chain of commands of the *LogicsManager* (for example: operating the relays, setting the flags, specification of the automatic functions) is configured as follows:

[Ax] = (([C1] & [S1]) & [O1] & ([C2] & [S2])) & [O2] & ([C3] & [S3])

Programming example for the *LogicsManager*:
Flag 8 shall become TRUE, whenever "Setpoint 1" is TRUE "AND" "Setpoint 2" is "NOT" TRUE "AND" the "Active week day" is TRUE ⇨

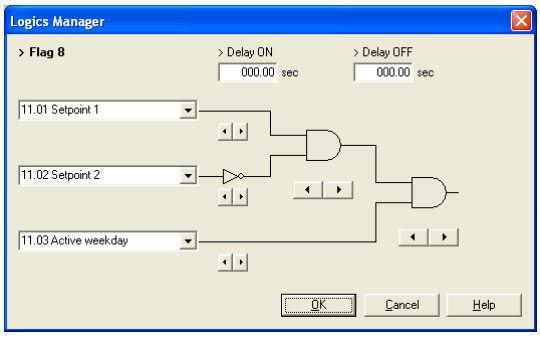


Figure 3-30: *LogicsManager* - display in LeoPC

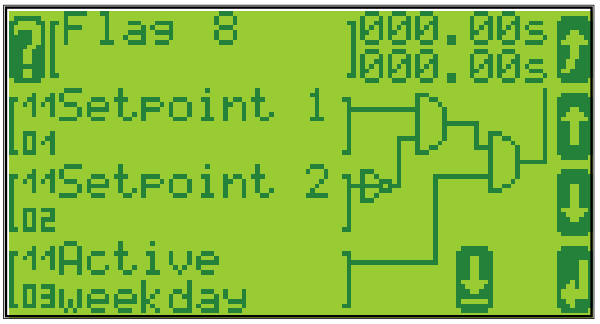
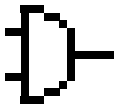
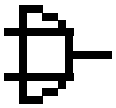
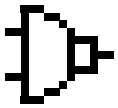
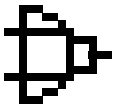
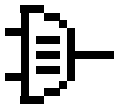
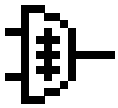
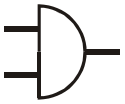
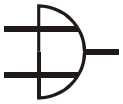
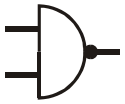
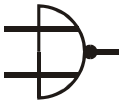
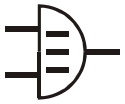
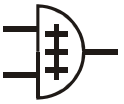
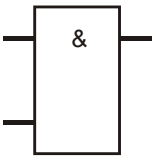
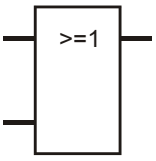
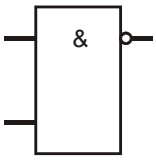
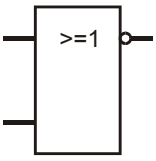
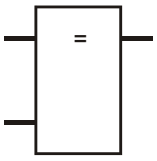
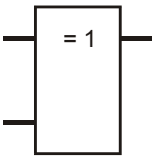


Figure 3-31: *LogicsManager* - display in LCD

Logical Symbols

The following symbols are used for the graphical programming of the *LogicsManager*.

	AND	OR	NAND	NOR	NXOR	XOR
DTSC						
DIN 40 700						
LeoPC1 ASA US MIL						
IEC617-12						

Truth table	x1	x2	y	x1	x2	y	x1	x2	y	x1	x2	y	x1	x2	y	x1	x2	y
	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0
	0	1	0	0	1	1	0	1	1	0	1	0	0	1	0	0	1	1
	1	0	0	1	0	1	1	0	1	1	0	0	1	0	0	1	0	1
	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	0

Table 3-17: *LogicsManager* - logical symbols

Logical Outputs

The logical outputs or combinations may be grouped into three categories:

- internal logical flags
- Internal functions
- relay outputs

NOTE

The numbers of the logical outputs in the third column may again be used as input variable for other outputs in the *LogicsManager*.

Logical Outputs: Internal Flags

8 internal logical flags may be programmed to activate/deactivate functions. This permits more than 3 commands to be included in a logical function. The may be used like "auxiliary flags".

Name	Function	Number
Flag 1	Internal flag 1	00.01
Flag 2	Internal flag 2	00.02
Flag 3	Internal flag 3	00.03
Flag 4	Internal flag 4	00.04
Flag 5	Internal flag 5	00.05
Flag 6	Internal flag 6	00.06
Flag 7	Internal flag 7	00.07
Flag 8	Internal flag 8	00.08

Logical Outputs: Internal functions

The following logical functions may be used to activate/deactivate functions.

Name	Function	Number
External acknowledge	The alarm acknowledgement is performed from an external source (refer to parameter 12490 on page 51)	00.15
Operation mode AUTO	Activation of the AUTOMATIC operating mode (always TRUE)	00.16

Logical Outputs: Relay Outputs

All relays may be controlled directly by the *LogicsManager* depending on the respective application mode.

Name	Function	Number
Relay 1	If this logical output becomes true, the relay output 1 will be activated	13.01
Relay 2	If this logical output becomes true, the relay output 2 will be activated	13.02
Relay 3	If this logical output becomes true, the relay output 3 will be activated	13.03
Relay 4	If this logical output becomes true, the relay output 4 will be activated	13.04
Relay 5	If this logical output becomes true, the relay output 5 will be activated	13.05
Relay 6	If this logical output becomes true, the relay output 6 will be activated	13.06
Relay 7	If this logical output becomes true, the relay output 7 will be activated	13.07
Relay 8	If this logical output becomes true, the relay output 8 will be activated	13.08
Relay 9	If this logical output becomes true, the relay output 9 will be activated	13.09
External DO 1	If this logical output becomes true, the external relay output 1 will be activated	14.01
External DO 2	If this logical output becomes true, the external relay output 2 will be activated	14.02
External DO 3	If this logical output becomes true, the external relay output 3 will be activated	14.03
External DO 4	If this logical output becomes true, the external relay output 4 will be activated	14.04
External DO 5	If this logical output becomes true, the external relay output 5 will be activated	14.05
External DO 6	If this logical output becomes true, the external relay output 6 will be activated	14.06
External DO 7	If this logical output becomes true, the external relay output 7 will be activated	14.07
External DO 8	If this logical output becomes true, the external relay output 8 will be activated	14.08
External DO 9	If this logical output becomes true, the external relay output 9 will be activated	14.09
External DO 10	If this logical output becomes true, the external relay output 10 will be activated	14.10
External DO 11	If this logical output becomes true, the external relay output 11 will be activated	14.11
External DO 12	If this logical output becomes true, the external relay output 12 will be activated	14.12
External DO 13	If this logical output becomes true, the external relay output 13 will be activated	14.13
External DO 14	If this logical output becomes true, the external relay output 14 will be activated	14.14
External DO 15	If this logical output becomes true, the external relay output 15 will be activated	14.15
External DO 16	If this logical output becomes true, the external relay output 16 will be activated	14.16

Logical Command Variables

The logical command variables are grouped into 14 categories:

- [00.00] Internal flags
- [01.00] Alarm classes
- [03.00] Engine control
- [04.00] Operating status
- [05.00] Alarms of the engine
- [08.00] Alarms of the system
- [09.00] Discrete inputs
- [11.00] Time functions
- [12.00] External discrete inputs
- [13.00] Status of the internal relay outputs
- [14.00] Status of the external relay outputs
- [19.00] ATS status flags
- [20.00] ATS status flags

Logical Command Variables: [00.00] - Internal Flags

Internal flag, Logic command variables 00.01-00.20
Internal Flags are the result of the output of the logic ladders from Flag 1 to 8. Flags are internal logic that can be sent to other flags or Command variables.

No.	Name	Function	Note
00.01	Flag 1	Internal flag 1	Internal calculation; 106escry. Page 104
00.02	Flag 2	Internal flag 2	Internal calculation; 106escry. Page 104
00.03	Flag 3	Internal flag 3	Internal calculation; 106escry. Page 104
00.04	Flag 4	Internal flag 4	Internal calculation; 106escry. Page 104
00.05	Flag 5	Internal flag 5	Internal calculation; 106escry. Page 104
00.06	Flag 6	Internal flag 6	Internal calculation; 106escry. Page 104
00.07	Flag 7	Internal flag 7	Internal calculation; 106escry. Page 104
00.08	Flag 8	Internal flag 8	Internal calculation; 106escry. Page 104
00.09	-	-	not used
00.10	-	-	not used
00.11	-	-	not used
00.12	-	-	not used
00.13	-	-	not used
00.14	-	-	not used
00.15	External acknowledge	The alarm acknowledgement is performed from an external source	Internal calculation; 106escry. Page 51
00.16	Operation mode AUTO	Activation of the AUTOMATIC operating mode	always TRUE
00.18	-	-	not used
00.19	-	-	not used
00.20	-	-	not used

Logical Command Variables: [01.00] - Alarm Classes

Alarm class commands, Logic command variables 01.01-01.10
Alarm classes may be configured as command variables for all logical outputs in the *LogicsManager*.

Number	Name / Function	Note
-	-	not used
-	-	not used
-	-	not used
-	-	not used
-	-	not used
-	-	not used
-	-	not used
-	-	not used
-	-	not used
01.10	Centralized alarm	TRUE as long as at least one of the alarm classes B/C/D/E/F is active

Logical Command Variables: [03.00] - Engine Control

Engine control commands, Logic command variables 03.01-03.14
These variables may be used as command variable in a logical output to set parameters for customized operations.

Number	Name / Function	Note
03.01	-	not used
03.02	-	not used
03.03	-	not used
03.04	-	not used
03.05	Horn (active)	TRUE if alarm class B to F is activated until the time until horn reset is expired or it is acknowledged for the first time.
03.06	-	not used
03.07	-	not used
03.08	-	not used
03.09	-	not used
03.10	-	not used
03.11	-	not used
03.12	-	not used
03.13	-	not used
03.14	-	not used
03.15	-	not used
03.16	-	not used
03.17	-	not used
03.18	-	not used
03.19	-	not used
03.20	-	not used

Logical Command Variables: [04.00] - Operating Status

Operating status commands, 4.01-04.15
These operating statuses may be used as command variable in a logical output to set parameters for customized operations.

No.	Name	Function	Note
04.01	Auto mode	AUTOMATIC operating mode active	
04.02	-	-	not used
04.03	Manual mode	MANUAL operating mode active	
04.04	Lamp test	A lamp test is being performed	TRUE if the lamp test is active
04.05	Acknowledge	"Acknowledge" push button has been pressed or an external acknowledgment via *LogicsManager*	Note: this condition is TRUE for approx. 40 ms and must be extended utilizing a delay time
04.06	-	-	not used
04.07	-	-	not used
04.08	-	-	not used
04.09	-	-	not used
04.10	-	-	not used
04.11	-	-	not used
04.12	-	-	not used
04.13	-	-	not used
04.14	Remote acknowledge	Request over remote control to acknowledge	TRUE if the acknowledgement bit is set
04.15	-	-	not used
04.16	-	-	not used
04.17	-	-	not used
04.18	-	-	not used
04.19	-	-	not used
04.20	-	-	not used

Logical Command Variables: [06.00] - Alarms of the Load

Load alarm status commands, 06.01-06.15
These engine alarms may be used as command variable in a logical output to set parameters for customized operations.

Number	Name / Function	Note
06.01	-	not used
06.02	-	not used
06.03	-	not used
06.04	-	not used
06.05	-	not used
06.06	-	not used
06.07	-	not used
06.08	-	not used
06.09	Overcurrent 1	
06.10	Overcurrent 2	
06.11	Overcurrent 3	
06.12	-	not used
06.13	-	not used
06.14	Overload 1	
06.15	Overload 2	
06.16	-	not used
06.17	-	not used
06.18	-	not used
06.19	-	not used
06.20	-	not used

Logical Command Variables: [08.00] - Alarms of the System

System alarms status commands, 08.01-08.10
These system alarms may be used as command variable in a logical output n to set parameters for customized operations.

Number	Function	Note
08.01	Battery overvoltage (limit) 1	TRUE = limit value reached FALSE = alarm acknowledged
08.02	Battery overvoltage (limit) 2	
08.03	Battery undervoltage (limit) 1	
08.04	Battery undervoltage (limit) 2	
08.05	-	
08.06	-	
08.07	-	
08.08	-	
08.09	CANopen fault	
08.10	-	not used
08.11	-	not used
08.12	-	not used
08.13	-	not used
08.14	-	not used
08.15	-	not used
08.16	-	not used
08.17	-	not used
08.18	-	not used
08.19	-	not used
08.20	-	not used

Logical Command Variables: [09.00] - Discrete Inputs

Control discrete input commands, 09.01-09.08
The discrete inputs may be used as command variable in a logical output to set parameters for customized operations.

Number	Function	Note
09.01	DI 1 (Discrete input [D1])	TRUE = logical "1" (delay times and NO/NC parameters are ignored) FALSE = logical "0" (alarm has been acknowledged or immediately after TRUE condition is not present anymore, if Control is configured as alarm class)
09.02	DI 2 (Discrete input [D2])	
09.03	DI 3 (Discrete input [D3])	
09.04	DI 4 (Discrete input [D4])	
09.05	DI 5 (Discrete input [D5])	
09.06	DI 6 (Discrete input [D6])	
09.07	DI 7 (Discrete input [D7])	
09.08	DI 8 (Discrete input [D8])	
09.09	DI 9 (Discrete input [D9])	
09.10	DI 10 (Discrete input [D10])	
09.11	DI 11 (Discrete input [D11])	
09.12	DI 12 (Discrete input [D12])	
09.13	-	not used
09.14	-	not used
09.15	-	not used
09.16	-	not used
09.17	-	not used
09.18	-	not used
09.19	-	not used
09.20	-	not used

Logical Command Variables: [11.00] - Time Functions

Time function commands, 11.01-11.10
Time functions may be used as command variable in a logical output.

Number	Name / Function	Note
11.01	Set point 1 (exceeded)	see page 84
11.02	Set point 2 (exceeded)	see page 84
11.03	Active weekday (equal to setting)	see page 84
11.04	Active day (equal to setting)	see page 84
11.05	Active hour (equal to setting)	see page 84
11.06	Active minute (equal to setting)	see page 84
11.07	Active second (equal to setting)	see page 84
11.08	-	not used
11.09	-	not used
11.10	-	not used
11.11	-	not used
11.12	-	not used
11.13	-	not used
11.14	-	not used
11.15	-	not used
11.16	-	not used
11.17	-	not used
11.18	-	not used
11.19	-	not used
11.20	-	not used

Logical Command Variables: [12.00] - External Discrete Inputs (Expansion Board)

External discrete input commands, 12.01-12.16
Additional discrete inputs from an expansion board (i.e. IKD 1 extension board) may be used as command variable in a logical output.

Number	Name / Function	Note
12.01	External discrete input 1 [D.E01]	TRUE = logical "1" (delay times and NO/NC parameters are ignored) FALSE = logical "0" (alarm has been acknowledged, or immediately after TRUE condition is not present anymore, if Control is configured as alarm class)
12.02	External discrete input 2 [D.E02]	
12.03	External discrete input 3 [D.E03]	
12.04	External discrete input 4 [D.E04]	
12.05	External discrete input 5 [D.E05]	
12.06	External discrete input 6 [D.E06]	
12.07	External discrete input 7 [D.E07]	
12.08	External discrete input 8 [D.E08]	
12.09	External discrete input 9 [D.E09]	
12.10	External discrete input 10 [D.E10]	
12.11	External discrete input 11 [D.E11]	
12.12	External discrete input 12 [D.E12]	
12.13	External discrete input 13 [D.E13]	
12.14	External discrete input 14 [D.E14]	
12.15	External discrete input 15 [D.E15]	
12.16	External discrete input 16 [D.E16]	
12.17	-	not used
12.18	-	not used
12.19	-	not used
12.20	-	not used

Logical Command Variables: [13.00] - Status Of The Internal Relay Outputs

Discrete output commands, 13.01-13.08
The discrete outputs may be used as command variable in a logical output.

Number	Name / Function	Note
13.01	Digital output DO1 [R01]	TRUE = logical "1" (this condition indicates the logical status of the internal relays) FALSE = logical "0" (this condition indicates the logical status of the internal relays)
13.02	Digital output DO2 [R02]	
13.03	Digital output DO3 [R03]	
13.04	Digital output DO4 [R04]	
13.05	Digital output DO5 [R05]	
13.06	Digital output DO6 [R06]	
13.07	Digital output DO7 [R07]	
13.08	Digital output DO8 [R08]	
13.09	Digital output DO9 [R09]	
13.10	-	not used
13.11	-	not used
13.12	-	not used
13.13	-	not used
13.14	-	not used
13.15	-	not used
13.16	-	not used
13.17	-	not used
13.18	-	not used
13.19	-	not used
13.20	-	not used

Logical Command Variables: [14.00] - Status Of The External Relay Outputs

Discrete output commands, 14.01-14.16
The external discrete outputs may be used as command variable in a logical output.

Number	Name / Function	Note
14.01	External digital output DO1 [R01]	TRUE = logical "1" (this condition indicates the logical status of the relays, which are connected via external expansion boards) FALSE = logical "0" (this condition indicates the logical status of the relays, which are connected via external expansion boards)
14.02	External digital output DO2 [R02]	
14.03	External digital output DO3 [R03]	
14.04	External digital output DO4 [R04]	
14.05	External digital output DO5 [R05]	
14.06	External digital output DO6 [R06]	
14.07	External digital output DO7 [R07]	
14.08	External digital output DO8 [R08]	
14.09	External digital output DO9 [R09]	
14.10	External digital output DO10 [R10]	
14.11	External digital output DO11 [R11]	
14.12	External digital output DO12 [R12]	
14.13	External digital output DO13 [R13]	
14.14	External digital output DO14 [R14]	
14.15	External digital output DO15 [R15]	
14.16	External digital output DO16 [R16]	
14.17	-	not used
14.18	-	not used
14.19	-	not used
14.20	-	not used

Logical Command Variables: [19.00] - ATS Status Flags

ATS status flags, 19.01-19.20
The external discrete outputs may be used as command variable in a logical output.

No.	Name / Function	Note
19.01	Source 1 OK (voltage and frequency are in range)	
19.02	Source 1 voltage OK (in range)	
19.03	Source 1 overvoltage (“fail” level exceeded)	
19.04	Source 1 undervoltage (“fail” level exceeded)	
19.05	Source 1 frequency OK (in range)	
19.06	Source 1 overfrequency (“fail” level exceeded)	
19.07	Source 1 underfrequency (“fail” level exceeded)	
19.08	Source 1 voltage imbalance (“fail” level exceeded)	
19.09	Source 1 rotation (field =) CCW	
19.10	Source 1 rotation (field =) CW	
19.11	Source 2 OK (voltage and frequency are in range)	
19.12	Source 2 voltage OK (in range)	
19.13	Source 2 overvoltage (“fail” level exceeded)	
19.14	Source 2 undervoltage (“fail” level exceeded)	
19.15	Source 2 frequency OK (in range)	
19.16	Source 2 overfrequency (“fail” level exceeded)	
19.17	Source 2 underfrequency (“fail” level exceeded)	
19.18	Source 2 voltage imbalance (“fail” level exceeded)	
19.19	Source 2 rotation (field =) CCW	
19.20	Source 2 rotation (field =) CW	

Logical Command Variables: [20.00] - ATS Status Flags

ATS status flags, 20.01-20.21
The external discrete outputs may be used as command variable in a logical output.

No.	Name / Function	Note
20.01	Status Flag: Elevator Pre Signal (is active)	
20.02	Status Flag: Motor Load Disconnect (signal is active)	
20.03	Status Flag: Load Test (is) active	
20.04	Status Flag: No Load Test (is) active	
20.05	Status Flag: S1 start signal	
20.06	Status Flag: S2 start signal	
20.07	Command: Close to S1	
20.08	Command: Open from S1	
20.09	Command: Close to S2	
20.10	Command: Open from S2	
20.11	Status Flag: Load shed (is active)	
20.12	Status Flag: Shunt trip enable (is active)	
20.13	Status Flag: S1 closed	TRUE if S1 is closed and S2 is open
20.14	Status Flag: S2 closed	TRUE if S2 is closed and S1 is open
20.15	Status Flag: S1 and S2 open	
20.16	Status Flag: S1 and S2 closed	
20.17	Status Flag: S1 is stabling (at the moment)	
20.18	Status Flag: S2 is stabling (at the moment)	
20.19	-	not used
20.20	-	not used
20.21	-	not used
20.22	Sync Check active	This flag is set as soon as the DTSC-200 starts to do In-phase checking, and resets after the In-Phase transfer to the other source has been accomplished.

Logical Command Variables: [21.00] - ATS Alarms

ATS alarms, 21.01-21.20
The external discrete outputs may be used as command variable in a logical output.

No.	Name / Function	Note
21.01	Engine Alarm: Start fail S1	
21.02	Engine Alarm: Start fail S2	
21.03	Engine Alarm: Unintended Stop S1	
21.04	Engine Alarm: Unintended Stop S2	
21.05	Alarm: S1 phase rotation mismatch (failure present)	
21.06	Alarm: S2 phase rotation mismatch (failure present)	
21.07	Switch alarm: Fail to open (from switch position) S1	
21.08	Switch alarm: Fail to open (from switch position) S2	
21.09	Switch alarm: Fail to close (to switch position) S1	
21.10	Switch alarm: Fail to close (to switch position) S2	
21.11	Switch alarm: Mechanical fail (not plausible limit switch feedbacks have been detected by the DTSC-200)	
21.12	In-Phase monitor alarm: In-phase timeout (the system was not able to establish a "Sync" situation within the configured time)	
21.13	Switch alarm: Overlap timeout (the contacts have been in a "parallel" position for longer than the configured time)	
21.14	-	not used
21.15	-	not used
21.16	-	not used
21.17	-	not used
21.18	-	not used
21.19	-	not used
21.20	-	not used

Logical Command Variables: [98.00] - *LogicsManager* Outputs

LogicsManager output**s, 98.01-98.20**
The external discrete outputs may be used as command variable in a logical output.

No.	Name / Function	Note
98.01	*LogicsManager* "Inhibit ATS" is TRUE	
98.02	*LogicsManager* "Inhibit transfer to S1" is TRUE	
98.03	*LogicsManager* "Inhibit transfer to S2" is TRUE	
98.04	*LogicsManager* "Remote peak shave" is TRUE	
98.05	*LogicsManager* "Interruptible power rate provisions" is TRUE	
98.06	*LogicsManager* "Gen-Gen enable" is TRUE	
98.07	*LogicsManager* "Delayed mode activation" is TRUE	
98.08	*LogicsManager* "Extended parallel time" is TRUE	
98.09	*LogicsManager* "Load Test" is TRUE	
98.10	*LogicsManager* "No Load Test" is TRUE	
98.11	*LogicsManager* "Source 1 priority" is TRUE	
98.12	*LogicsManager* "Source 2 priority" is TRUE	
98.13	*LogicsManager* "External bypass" is TRUE	
98.14	*LogicsManager* "Load shed" is TRUE	
98.15	-	not used
98.16	-	not used
98.17	-	not used
98.18	-	not used
98.19	-	not used
98.20	-	not used

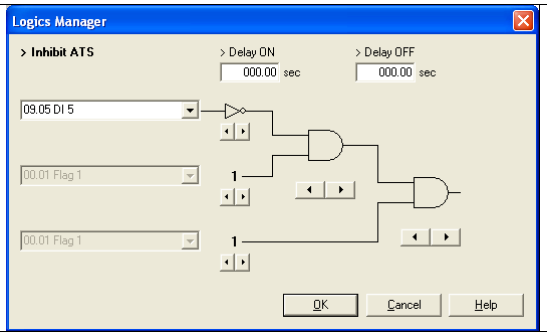
Factory Setting

The inputs, outputs, and internal flags, which may be programmed via the *LogicsManager* have the following factory default settings when delivered:

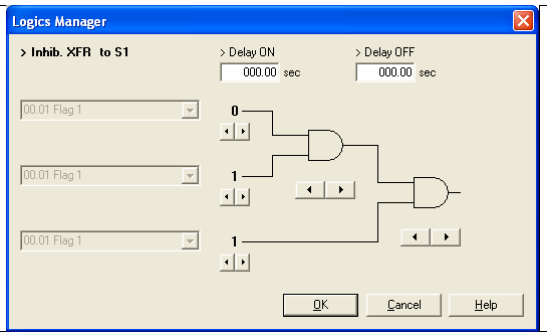
simple (function)	extended (configuration)	result

Factory Setting: Functions

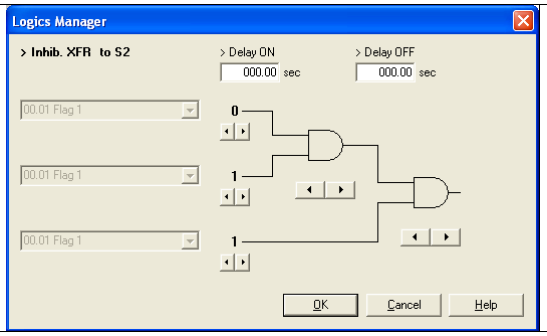
Inhibit ATS
(parameter 12600 on page 29)

{0}	✓	If TRUE, the unit is blocked against automatic transfers. TRUE, if DI 5 is NOT energized		dependent on DI 5
{1}	✓			
{2}	✓			

Inhibit XFR to Source 1
(parameter 12610 on page 30)

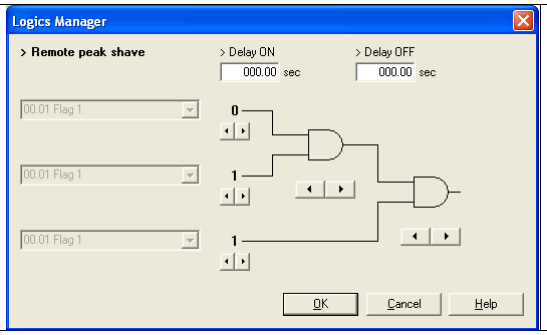
{0}	✓	If TRUE, the unit is blocked against a transfer to source 1. Prepared for: - Deactivated by default		FALSE
{1}	✓			
{2}	✓			

Inhibit XFR to Source 2
(parameter 12620 on page 30)

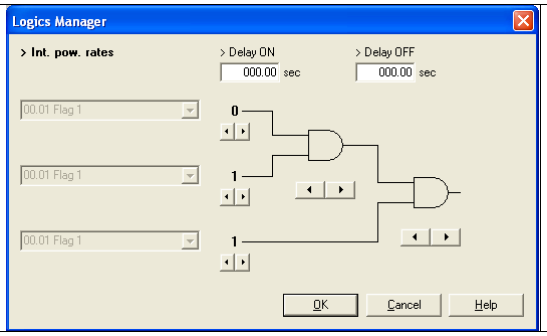
{0}	✓	If TRUE, the unit is blocked against a transfer to source 2. Prepared for: - Deactivated by default		FALSE
{1}	✓			
{2}	✓			

simple (function)		extended (configuration)		result

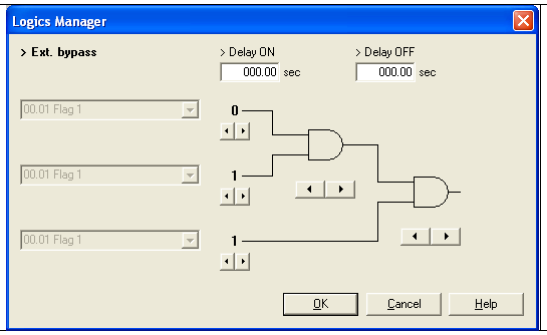
Remote peak shave
(parameter 12630 on page 30)

{0}	✓	If TRUE, the remote peak shave function will be performed. Prepared for: - Deactivated by default		FALSE
{1}	✓			
{2}	✓			

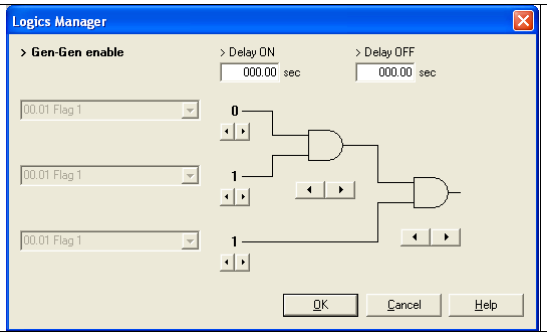
Interruptible power rates
(parameter 12660 on page 31)

{0}	✓	If TRUE, the interruptible power rate provision function will be performed. Prepared for: - Deactivated by default		FALSE
{1}	✓			
{2}	✓			

External timer bypass
(parameter 12820 on page 31)

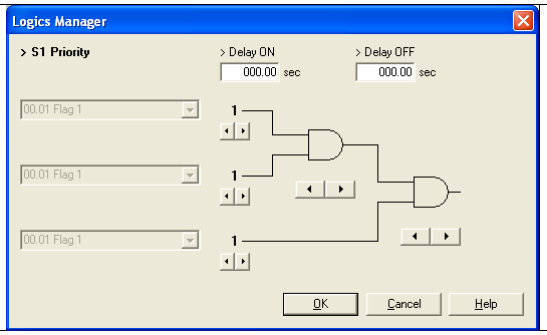
{0}	✓	If TRUE, all timers, which are currently in progress, will be bypassed. Prepared for: - Deactivated by default		FALSE
{1}	✓			
{2}	✓			

Gen-Gen enable
(parameter 12830 on page 32)

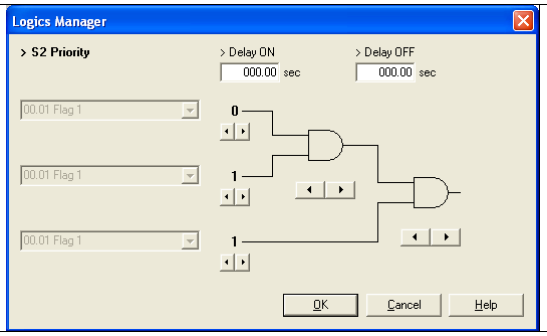
{0}	---	If TRUE, the gen-gen mode will be enabled. Prepared for: - Deactivated by default		FALSE
{1}	---			
{2}	✓			

simple (function)	extended (configuration)	result

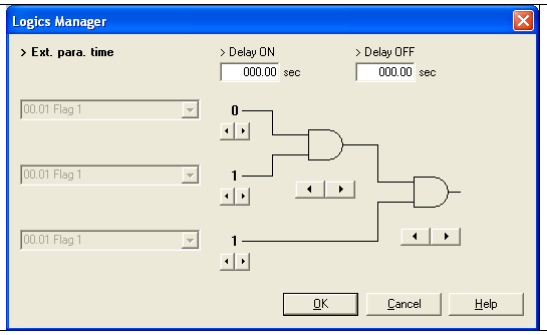
Source 1 priority
(parameter 12680 on page 36)

{0}	✓	If TRUE, source 1 is preferred. Prepared for: - Activated by default		**TRUE**
{1}	✓			
{2}	✓			

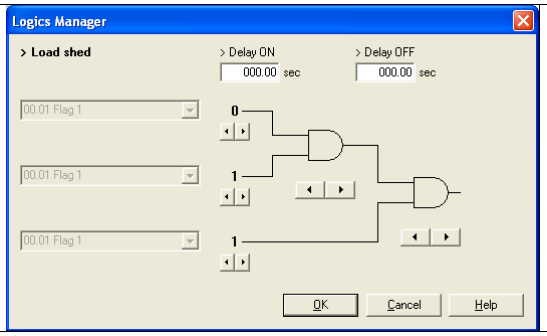
Source 2 priority
(parameter 12810 on page 36)

{0}	✓	If TRUE, source 2 is preferred. Prepared for: - Deactivated by default		**FALSE**
{1}	✓			
{2}	✓			

Extended parallel time
(parameter 12860 on page 38)

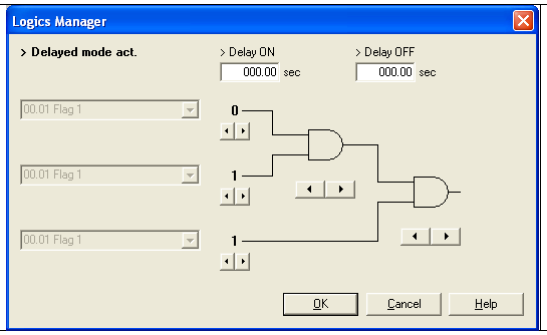
{0}	✓	If TRUE, the transfer switch remains in overlap position. Prepared for: - Deactivated by default		**FALSE**
{1}	---			
{2}	✓			

Load shed
(parameter 12870 on page 40)

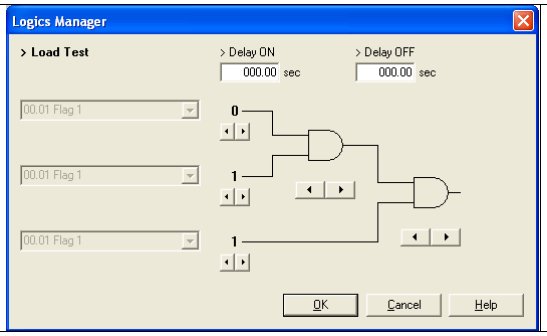
{0}	✓	If TRUE, a load shed from the non-preferred source will be performed. Prepared for: - Deactivated by default		**FALSE**
{1}	---			
{2}	✓			

	simple (function)	extended (configuration)	result

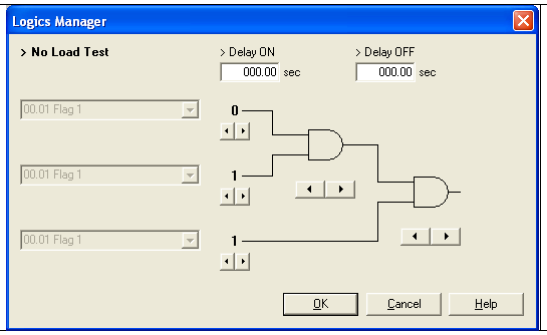
Delayed mode active
(parameter 12850 on page 45)

{0}	✓	If TRUE, the transfer switch type will be set to Delayed. Prepared for: - Deactivated by default		FALSE
{1}	✓			
{2}	✓			

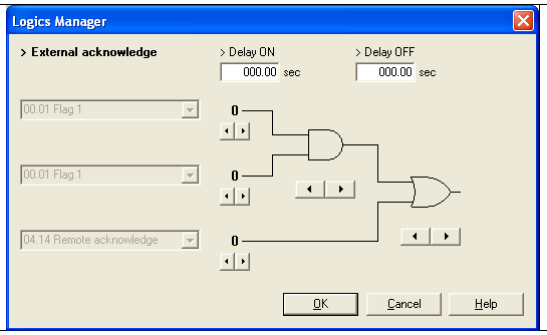
Load test
(parameter 12640 on page 50)

{0}	✓	If TRUE, a load test will be performed. Prepared for: - Deactivated by default		FALSE
{1}	✓			
{2}	✓			

No load test
(parameter 12650 on page 50)

{0}	✓	If TRUE, a no-load test will be performed. Prepared for: - Deactivated by default		FALSE
{1}	✓			
{2}	✓			

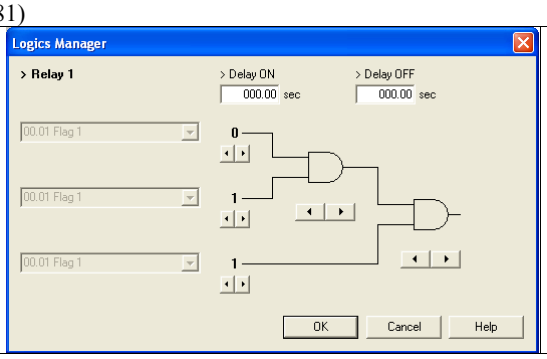
simple (function)	extended (configuration)	result

External acknowledge (parameter 12490 on page 51)				
{0}	✓	If TRUE, alarms are acknowledged from an external source. Prepared for: - Remote acknowledgement		**FALSE**
{1}	✓			
{2}	✓			

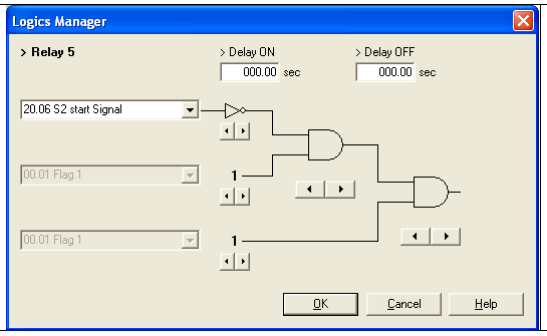
simple (function)	extended (configuration)	result

Factory Setting: Relay Outputs

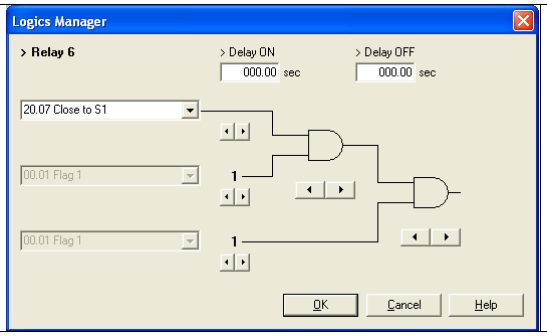
Relay {x} [R0x]; {x} = 1 to 4
(parameters 12100, 12110, 12310, and 12320 on page 81)

{0}	✓	If TRUE, relay 1 will be energized. Prepared for: - Deactivated by default		FALSE
{1}	✓			
{2}	✓			

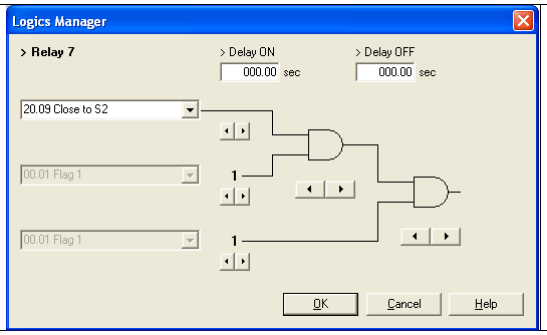
Relay 5 [R05]
(parameter 12130 on page 81)

{0}	✓	If TRUE, relay 5 will be energized. True, if the Source 2 start signal is issued		dependent on Logics Command Variable [20.06]
{1}	✓			
{2}	✓			

Relay 6 [R06]
(parameter 12140 on page 81)

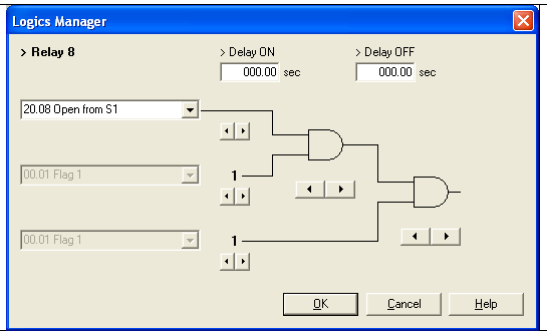
{0}	✓	If TRUE, relay 6 will be energized. True, if the command: Close to Source 1 is issued		dependent on Logics Command Variable [20.07]
{1}	✓			
{2}	✓			

Relay 7 [R07]
(parameter 12150 on page 81)

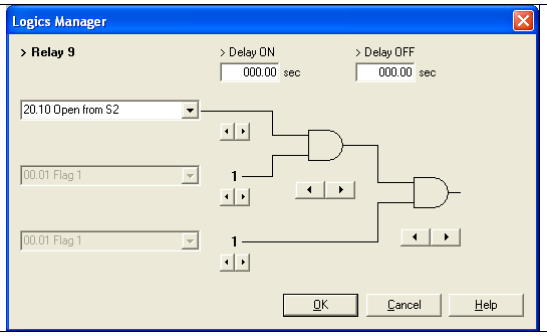
{0}	✓	If TRUE, relay 7 will be energized. True, if the command: Close to Source 2 is issued		dependent on Logics Command Variable [20.09]
{1}	✓			
{2}	✓			

simple (function)	extended (configuration)	result

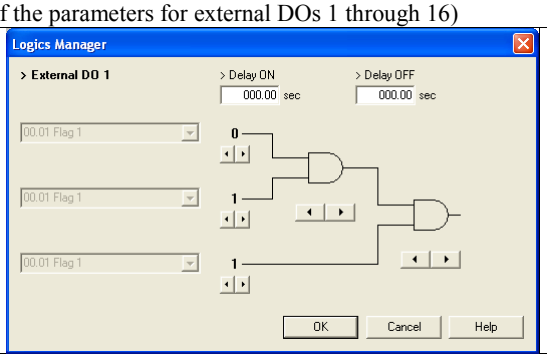
Relay 8 [R08]
(parameter 12160 on page 81)

{0}	✓	If TRUE, relay 8 will be energized. True, if the command: Open from Source 1 is issued		dependent on Logics Command Variable [20.08]
{1}	✓			
{2}	✓			

Relay 9 [R09]
(parameter 12170 on page 81)

{0}	✓	If TRUE, relay 9 will be energized. True, if the command: Open from Source 2 is issued		dependent on Logics Command Variable [20.10]
{1}	✓			
{2}	✓			

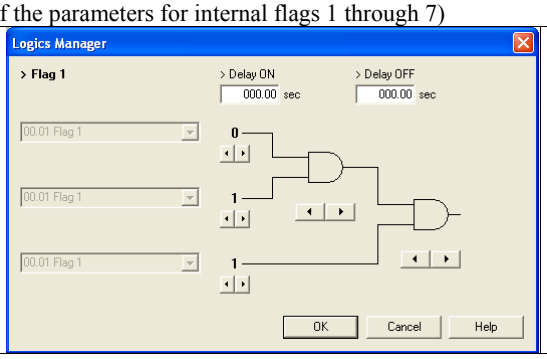
External digital output {x] [REx{x}] - free (external expansion card, if connected; {x} = 1-16)
(refer to Table 3-13 on page 81 for the parameter IDs of the parameters for external DOs 1 through 16)

{0}	✓	If TRUE, the external relay {x} will be energized, if this is connected Prepared for: - Deactivated by default		**FALSE**
{1}	✓			
{2}	✓			

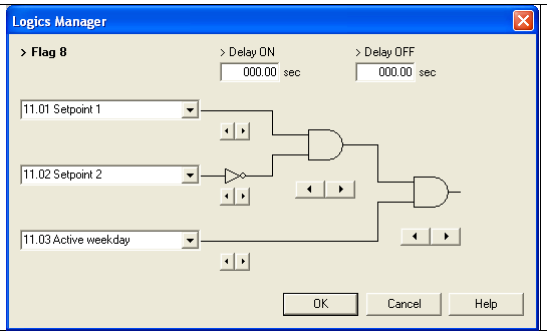
simple (function)	extended (configuration)	result

Factory Setting: Internal Flags

Internal flag {x}; {x} = 1 to 7
(refer to Table 3-14 on page 83 for the parameter IDs of the parameters for internal flags 1 through 7)

{0}	✓	If TRUE, the internal flag {x} will be enabled. Prepared for: - Deactivated by default **Note:** Internal flag 1 is used as default setting in all logical outputs.		FALSE
{1}	✓			
{2}	✓			

Internal flag 8
(parameter 12300 on page 83)

{0}	✓	If TRUE, the internal flag 8 will be enabled. TRUE, once the configured time 1 has been reached [11.01], and the configured time 2 [11.02] has not been reached as well, if the current day is the configured day [11.03]		dependent on Logics Command Variables [11.01], [11.02], and [11.03]
{1}	✓			
{2}	✓			

Discrete Inputs

[D1]	{0} {1} {2}	Reply from ATS switch: Breaker in source 1 position
[D2]	{0} {1} {2}	Reply from ATS switch: Breaker in source 2 position
[D3]	{0} {1} {2}	Reply from ATS switch: Breaker in source 1 open position
[D4]	{0} {1} {2}	Reply from ATS switch: Breaker in source 2 open position
[D5]	{0} {1} {2}	freely configurable discrete input (pre-configured to Inhibit ATS)
[D6]	{0} {1} {2}	freely configurable discrete input (unassigned)
[D7]	{0} {1} {2}	freely configurable discrete input (unassigned)
[D8]	{0} {1} {2}	freely configurable discrete input (unassigned)
[D9]	{0} {1} {2}	freely configurable discrete input (unassigned)
[D10]	{0} {1} {2}	freely configurable discrete input (unassigned)
[D11]	{0} {1} {2}	freely configurable discrete input (unassigned)
[D12]	{0} {1} {2}	freely configurable discrete input (unassigned)

NOTE

The discrete inputs for the breaker position reply messages (DIs 1 through 4) are fixed to N.C. and are evaluated as N.C., i.e. the breaker is considered as "in position" if the respective DI is de-energized.

Appendix B. GetEventLog

The event logger is a 300-entry FIFO (First In/First Out) memory for logging alarm events and operation states of the unit. Refer to the Event History section on page 17 for more info about the event logger.

It is possible to read out the event logger using the direct configuration cable DPC and the GetEventLog software tool.

GetEventLog Software

Installing GetEventLog

GetEventLog can either be used as a stand alone or within LeoPC1. In order to call it up from LeoPC1, it must be installed into the LeoPC1 installation path.

To install GetEventLog, start GetEventLog_vxxxxx.exe from the GetEventLog directory on the CD delivered with the unit.
If you want to use GetEventLog from inside LeoPC1, it must be installed into the LeoPC1 installation directory.

Starting GetEventLog

Connect the DTSC to a free COM port on your computer using the DPC as described under Configuration Using The PC on page 10.
Start GetEventLog directly or call it up by selecting GetEventLog from the menu Tools in LeoPC1.
After starting GetEventLog for the first time, you must configure the communication settings. To do this, select the Interface tab, configure the COM port according to the port, to which you have connected the DPC, and enter the other settings as represented in figure Figure 3-32 since these are the default settings of the DTSC.

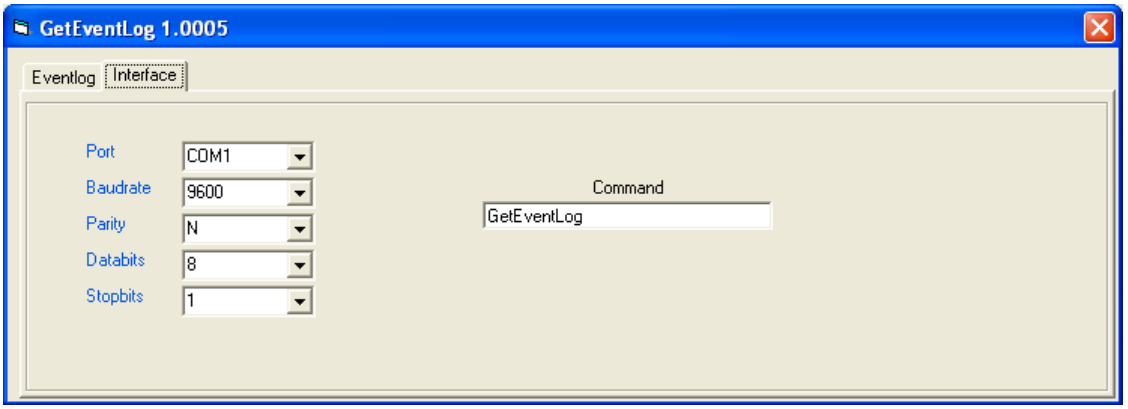


Figure 3-32: GetEventLog - interface configuration

Reading Out GetEventLog

On the Eventlog tab of GetEventLog, click the Request Eventlog button to read out the content of the event logger memory. The content of the event logger is displayed as shown in Figure 3-33.

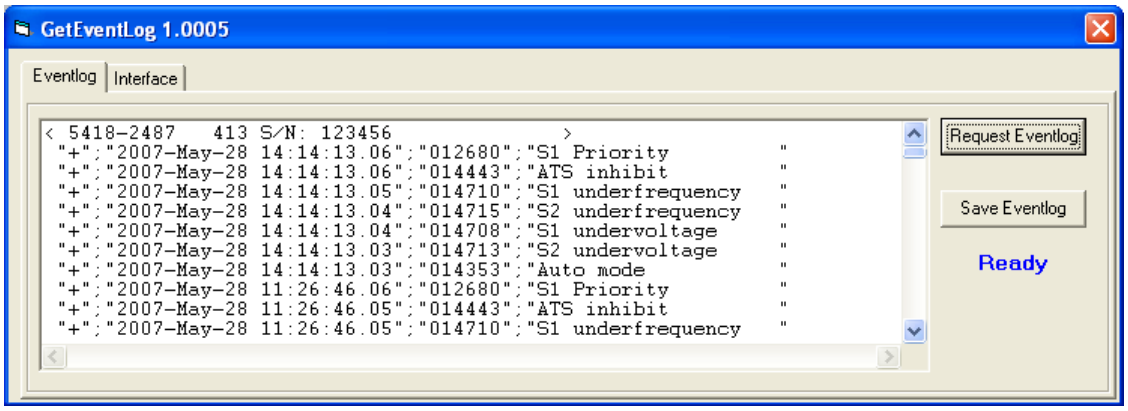


Figure 3-33: GetEventLog - event logger content

The 300 latest events are displayed in chronological order and each entry is composed like this:

"sign";"event date and time";"event no.";"event text"

whereas the **"sign"** **"+"** indicates the occurrence and **"-"** indicates the disappearance or acknowledgement of the alarm or state

"event date and time" serves as a timestamp and indicates the date and time of the event occurred

"event no." indicates the event number that occurred

"event text" indicates the event that occurred in clear text

The event text is read out in the language, which is selected in the DTSC, like English or French. Some languages may not be supported by LeoPC1, like Japanese or Chinese. Then you may change the language in the unit.
The event numbers are indicated in Table 3-18 at the end of this section. Please note that some event texts may be configured freely (like analog inputs, etc.) and may not correspond with the original text. The event numbers are unambiguous.

Example: The entry **"+";"2005-June-15 13:23:05.69";"014710";"S1 underfrequency"** means that an Source 1 underfrequency condition **"014710"** occurred **"+"** at June 15, 2005 at 23 minutes, 5 seconds and 69 hundredths of a second after 1 o'clock in the afternoon **"2005-June-15 13:23:05.69"**.

Storing Event Logger Data

Using the Save Eventlog button on the Eventlog tab, you are able to save the content of the event logger in CSV format (comma separated values). You may open the saved file within Excel for example.

	A	B	C	D
1	< 5418-2487 413 S/N: 123456 >			
2	"+"	2007-May-28	12680	S1 Priority
3	"+"	2007-May-28	14443	ATS inhibit
4	"+"	2007-May-28	14710	S1 underfrequency
5	"+"	2007-May-28	14715	S2 underfrequency
6	"+"	2007-May-28	14708	S1 undervoltage
7	"+"	2007-May-28	14713	S2 undervoltage
8	"+"	2007-May-28	14353	Auto mode
9	"+"	2007-May-28	12680	S1 Priority
10	"+"	2007-May-28	14443	ATS inhibit
11	"+"	2007-May-28	14710	S1 underfrequency
12	"+"	2007-May-28	14715	S2 underfrequency
13	"+"	2007-May-28	14708	S1 undervoltage

Figure 3-34: GetEventLog - event logger content in Excel

Resetting the Event Logger

The event logger can be reset using the parameter "Clear event log" via the front panel or LeoPC1 (deleted events or empty entries are represented with a series of dashes in the event logger). To do this, perform the following steps:

Resetting the Event Logger Using the Front Panel

Make sure that you are in code level CL2 (refer to the Password section on page 16).
Set the parameter "Clear event log" to YES (refer to the Event History section on page 17).
The complete event logger is now being cleared (single events may be cleared by pressing the ✓ button).

Resetting the Event Logger Using LeoPC1

Connect the DTSC with your PC and start LeoPC1 as described in Configuration Using The PC on page 10.
Set the parameter "Clear event log" to YES (refer to the Event History section on page 17).
The complete event logger is now being cleared.

Event Texts and Numbers

Event no.	Event text	Description
12680	S1 Priority	Source 1 has priority
12810	S2 Priority	Source 1 has priority
12820	Ext. bypass	External bypass enabled
12830	Gen-Gen enable	Gen-2-Gen mode enabled
12850	Delayed mode act.	Delayed transition mode enabled
12860	Ext. para. time	Extended parallel time enabled
12870	Load shed	Load shed from non-preferred source requested
13226	Pre Signal timer	Elevator pre-signal active
13227	Wait S1 to open	Open transfer switch from S1 position
13228	Wait S2 to open	Open transfer switch from S2 position
13229	Wait S1 to close	Close transfer switch to S1 position
13230	Wait S2 to close	Close transfer switch to S2 position
14353	Auto mode	Auto mode is active
14418	Load test	Load test active
14419	No load test	No Load test active
14434	Rem. peak shave	Remote peak shave active
14435	Motor Load Disc.	Motor load disconnect signal active
14439	Inhib. XFR to S1	Inhibit transfer to Source 1
14440	Inhib. XFR to S2	Inhibit transfer to Source 2
14442	Pwr. rate. prov.	Interruptible power rates active
14443	ATS inhibit	ATS inhibit
14708	S1 undervoltage	Source 1 undervoltage
14709	S1 overvoltage	Source 1 overvoltage
14710	S1 underfrequency	Source 1 underfrequency
14711	S1 overfrequency	Source 1 overfrequency
14712	S1 voltage imbalance	Source 1 voltage imbalance
14713	S2 undervoltage	Source 2 undervoltage
14714	S2 overvoltage	Source 2 overvoltage
14715	S2 underfrequency	Source 2 underfrequency
14716	S2 overfrequency	Source 2 overfrequency
14717	S2 voltage imbalance	Source 2 voltage imbalance

Table 3-18: Event logger - event texts and numbers

Appendix C.
List Of Parameters

Unit number P/N _____ Rev _____

Version DTSC- _____

Project _____

Serial number S/N _____ Date _____

Par. ID.	Parameter	Setting range	Default value	Customer setting		Data type
MAIN MENU						
1700	Language	English / Deutsch	English			UNSIGNED 16
10416	Password	0000 to 9999	---			UNSIGNED 16
EVENT LOG						
1706	Clear event log	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
MEASUREMENT						
1750	Rated system frequency	50/60 Hz	50 Hz			UNSIGNED 16
1774	Rated voltage S1	50 to 650000 V	400 V			UNSIGNED 32
1772	Rated voltage S2	50 to 650000 V	400 V			UNSIGNED 32
1862	S1 voltage measuring	3Ph 4W 3Ph 3W 1Ph 2W 1Ph 3W	3Ph 4W	☐ 3Ph4W ☐ 3Ph3W ☐ 1Ph2W ☐ 1Ph3W	☐ 3Ph4W ☐ 3Ph3W ☐ 1Ph2W ☐ 1Ph3W	UNSIGNED 16
1861	S2 voltage measuring	3Ph 4W 3Ph 3W 1Ph 2W 1Ph 3W	3Ph 4W	☐ 3Ph4W ☐ 3Ph3W ☐ 1Ph2W ☐ 1Ph3W	☐ 3Ph4W ☐ 3Ph3W ☐ 1Ph2W ☐ 1Ph3W	UNSIGNED 16
1858	1Ph2W voltage measuring	Phase - N Ph - Ph	Ph - Ph	☐ p-n ☐ p-p	☐ p-n ☐ p-p	UNSIGNED 16
1859	1Ph2W phase rotation	CW / CCW	CW	☐ CW ☐ CCW	☐ CW ☐ CCW	UNSIGNED 16
1863	S1 Load current measuring	L1 L2 L3 Phase L1 Phase L2 Phase L3	L1 L2 L3	☐ L123 ☐ Ph.L1 ☐ Ph.L2 ☐ Ph.L3	☐ L123 ☐ Ph.L1 ☐ Ph.L2 ☐ Ph.L3	UNSIGNED 16
1860	S2 Load current measuring	L1 L2 L3 Phase L1 Phase L2 Phase L3	L1 L2 L3	☐ L123 ☐ Ph.L1 ☐ Ph.L2 ☐ Ph.L3	☐ L123 ☐ Ph.L1 ☐ Ph.L2 ☐ Ph.L3	UNSIGNED 16
1752	Rated active power [kW]	0.5 to 99999.9 kW	200.0 kW			UNSIGNED 32
1754	Rated current	5 to 32000 A	300 A			UNSIGNED 16
	Transformer					
1819	S1 voltage transf. primary	50 to 650000 V	400 V			UNSIGNED 32
1818	S1 voltage transf. secondary	50 to 480 V	400 V			UNSIGNED 16
1816	S2 voltage transf. primary	50 to 650000 V	400 V			UNSIGNED 32
1815	S2 voltage transf. secondary	50 to 480 V	400 V			UNSIGNED 16
1821	Load current transformer	1 to 32000/5 A	500/5 A			UNSIGNED 16
1822	Load current transformer	1 to 32000/1 A	500/1 A			UNSIGNED 16

Par. ID.	Parameter	Setting range	Default value	Customer setting		Data type
APPLICATION						
4148	Application mode	Util-Gen Gen-Gen Util-Util	Util-Gen	☐ Util-Gen ☐ Gen-Gen ☐ Util-Util	☐ Util-Gen ☐ Gen-Gen ☐ Util-Util	UNSIGNED 16
4146	Transfer Commit	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
4149	S1 start delay time	1 to 300 s	10 s			UNSIGNED 16
3330	S2 start delay time	1 to 300 s	10 s			UNSIGNED 16
3333	S1 source stable time	1 to 6500 s	10 s			UNSIGNED 16
3332	S2 source stable time	1 to 6500 s	10 s			UNSIGNED 16
2804	S1 outage delay	0.1 to 10.0 s	1.0 s			UNSIGNED 16
2803	S2 outage delay	0.1 to 10.0 s	1.0 s			UNSIGNED 16
3343	S1 cooldown time	1 to 6500 s	20 s			UNSIGNED 16
3344	S2 cooldown time	1 to 6500 s	20 s			UNSIGNED 16
12600	Inhibit ATS	see descr. in *LogicsManager* chap. starting p. 114; default: (!09.05 & 1) & 1				Logman
12610	Inhib. XFR to S1	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 1) & 1				Logman
12620	Inhib. XFR to S2	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 1) & 1				Logman
12630	Remote peak shave	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 1) & 1				Logman
12660	Int. pow. rates	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 1) & 1				Logman
12820	Ext. bypass	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 1) & 1				Logman
12830	Gen-Gen enable	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 1) & 1				Logman
	Elevator Pre Signal					
4490	Elevator Pre signal	ON / OFF	OFF	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4491	Elevator pre-signal duration	1 to 6500 s	5 s			UNSIGNED 16
	Motor Load Disconnect					
4550	Motor Load Disconnect	ON / OFF	OFF	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4553	Active direction	S1->S2 S2->S1 Both	S1->S2	☐ S1->S2 ☐ S2->S1 ☐ Both	☐ S1->S2 ☐ S2->S1 ☐ Both	UNSIGNED 16
4551	Disconnect time S1->S2	1 to 6500 s	5 s			UNSIGNED 16
4552	Disconnect time S2->S1	1 to 6500 s	5 s			UNSIGNED 16
	Source Priority					
12680	S1 Priority	see descr. in *LogicsManager* chap. starting page 114; default: (1 & 1) & 1				Logman
12810	S2 Priority	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 1) & 1				Logman
12860	Ext. para.time	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 1) & 1				Logman
12870	Load shed	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 1) & 1				Logman
BREAKER						
3424	Transfer switch type	Standard Delayed Closet	Standard	☐ Standard ☐ Delayed ☐ Closed	☐ Standard ☐ Delayed ☐ Closed	UNSIGNED 16
3434	Use limit sw. OPEN replies	YES / NO	YES	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
12850	Delayed mode act.	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 1) & 1				Logman
3426	Neutral time S2->S1	0 to 6500 s	3 s			UNSIGNED 16
3425	Neutral time S1->S2	0 to 6500 s	3 s			UNSIGNED 16
3428	Limit switch reply timeout	0.1 to 99.9 s	1.0 s			UNSIGNED 16
3429	Wait time until next XFR attempt	0.1 to 99.9 s	3.0 s			UNSIGNED 16
3427	Max. of Transfer attempts	1 to 10	2			UNSIGNED 16
TESTMODES						
12640	Load Test	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 1) & 1				Logman
12650	No Load Test	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 1) & 1				Logman

Par. ID.	Parameter	Setting range	Default value	Customer setting		Data type
MONITORING						
1756	Time until horn reset	0 to 1000 s	180 s			UNSIGNED 16
12490	External acknowledge	see descr. in *LogicsManager* chap. starting page 114; default: (0 & 0)+ 0				Logman
3430	Limit switch monitoring	ON / OFF	OFF	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
	S1 Monitoring					
1787	Voltage monitoring S1	Ph – Ph/ Phase - N	Ph - Ph	☐ 3 ☐ 4	☐ 3 ☐ 4	UNSIGNED 16
4450	S1 undervoltage restore	50.0 to 125.0 %	90.0 %			UNSIGNED 16
4451	S1 undervoltage fail	50.0 to 125.0 %	80.0 %			UNSIGNED 16
4452	S1 underfrequency monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4453	S1 underfrequency restore	50.0 to 130.0 %	95.0 %			UNSIGNED 16
4454	S1 underfrequency fail	50.0 to 130.0 %	90.0 %			UNSIGNED 16
4455	S1 overvoltage monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4456	S1 overvoltage restore	50.0 to 125.0 %	105.0 %			UNSIGNED 16
4457	S1 overvoltage fail	50.0 to 125.0 %	110.0 %			UNSIGNED 16
4458	S1 overfrequency monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4459	S1 overfrequency restore	50.0 to 130.0 %	102.0 %			UNSIGNED 16
4460	S1 overfrequency fail	50.0 to 130.0 %	105.0 %			UNSIGNED 16
4461	S1 voltage imbalance monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4462	S1 volt. imbalance restore	0.5 to 99.9 %	8.0 %			UNSIGNED 16
4463	S1 volt. imbalance fail	0.5 to 99.9 %	10.0 %			UNSIGNED V
3914	Delay	0.02 to 99.99 s	5.00 s			UNSIGNED 16
4562	S1 phase rotation	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4563	S1 phase rotation	CW CCW	CW	☐ CW ☐ CCW	☐ CW ☐ CCW	UNSIGNED 16
	S2 Monitoring					
1786	Voltage monitoring S2	Ph - Ph/ Phase - N	Ph - Ph	☐ 3 ☐ 4	☐ 3 ☐ 4	UNSIGNED 16
4465	S2 undervoltage restore	50.0 to 125.0 %	90.0 %			UNSIGNED 16
4466	S2 undervoltage fail	50.0 to 125.0 %	80.0 %			UNSIGNED 16
4467	S2 underfrequency monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4468	S2 underfrequency restore	50.0 to 130.0 %	95.0 %			UNSIGNED 16
4469	S2 underfrequency fail	50.0 to 130.0 %	90.0 %			UNSIGNED 16
4470	S2 overvoltage monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4471	S2 overvoltage restore	50.0 to 125.0 %	105.0 %			UNSIGNED 16
4472	S2 overvoltage fail	50.0 to 125.0 %	110.0 %			UNSIGNED 16
4473	S2 overfrequency monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4474	S2 overfrequency restore	50.0 to 130.0 %	102.0 %			UNSIGNED 16
4475	S2 overfrequency fail	50.0 to 130.0 %	105.0 %			UNSIGNED 16
4476	S2 voltage imbalance monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4477	S2 volt. imbalance restore	0.5 to 99.9 %	8.0 %			UNSIGNED 16
4478	S2 volt. imbalance fail	0.5 to 99.9 %	10.0 %			UNSIGNED 16
3904	Delay	0.02 to 99.99 s	5.00 s			UNSIGNED 16
4566	S2 phase rotation	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4567	S2 phase rotation	CW CCW	CW	☐ CW ☐ CCW	☐ CW ☐ CCW	UNSIGNED 16
	In-Phase Monitoring					
4570	In-Phase monitor	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
4571	Voltage window	0.50 to 9.99 %	1.00 %			UNSIGNED 16
4572	Positive frequency window	0.02 to 0.49 Hz	0.18 Hz			SIGNED 16
4573	Negative frequency window	-0.02 to -0.49 Hz	-0.18 Hz			SIGNED 16
4577	Max. overlap time	0.1 to 9.99 s	0.10 s			UNSIGNED 16
4578	Open trans. switch reac. time	15 to 300 ms	30 ms			UNSIGNED 16
4583	Closed trans. switch reac. time	15 to 300 ms	30 ms			UNSIGNED 16
4581	Vector group angle adjustment	-180° to 180°	0°			SIGNED 16
4576	In-phase timeout after	0 to 6500 s	60 s			UNSIGNED 16
4582	Outcome on In-phase timeout	Abort Delayed	Abort	☐ Abort ☐ Delayed	☐ Abort ☐ Delayed	UNSIGNED 16

Par. ID.	Parameter	Setting range	Default value	Customer setting		Data type
MONITORING						
	Load Monitoring Overcurrent Monitoring level 1					
2200	Monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
2204	Limit	50.0 to 300.0 %	110.0 %			UNSIGNED 16
2205	Delay	0.02 to 99.99 s	30.00 s			UNSIGNED 16
2202	Self acknowledge	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
	Overcurrent Monitoring level 2					
2206	Monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
2210	Limit	50.0 to 300.0 %	150.0 %			UNSIGNED 16
2211	Delay	0.02 to 99.99 s	1.00 s			UNSIGNED 16
2208	Self acknowledge	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
	Overcurrent Monitoring level 3					
2212	Monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
2216	Limit	50.0 to 300.0 %	250.0 %			UNSIGNED 16
2217	Delay	0.02 to 99.99 s	0.40 s			UNSIGNED 16
2214	Self acknowledge	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
	Overload Monitoring level 1					
2300	Monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
2304	Limit	50.0 to 300.0 %	110.0 %			UNSIGNED 16
2305	Delay	0.02 to 99.99 s	11.00 s			UNSIGNED 16
2302	Self acknowledge	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
	Overload Monitoring level 2					
2306	Monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
2310	Limit	50.0 to 300.0 %	120.0 %			UNSIGNED 16
2311	Delay	0.02 to 99.99 s	0.10 s			UNSIGNED 16
2308	Self acknowledge	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
	Engine Monitoring Start Failure S1 Monitoring					
3341	S1 Start fail delay time	1 to 6500 s	8 s			UNSIGNED 16
	Start Failure S2 Monitoring					
3331	S2 Start fail delay time	1 to 6500 s	8 s			UNSIGNED 16
	Battery Voltage Monitoring Overvoltage Monitoring level 1					
3450	Monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
3454	Limit	8.0 to 42.0 V	32.0 V			UNSIGNED 16
3455	Delay	0.02 to 99.99 s	5.00 s			UNSIGNED 16
3452	Self acknowledge level 1	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
	Overvoltage Monitoring level 2					
3456	Monitoring	ON / OFF	OFF	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
3460	Limit	8.0 to 42.0 V	35.0 V			UNSIGNED 16
3461	Delay	0.02 to 99.99 s	1.00 s			UNSIGNED 16
3458	Self acknowledge	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
	Undervoltage Monitoring level 1					
3500	Monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
3504	Limit	8.0 to 42.0 V	24.0 V			UNSIGNED 16
3505	Delay	0.02 to 99.99 s	60.00 s			UNSIGNED 16
3502	Self acknowledge	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
	Undervoltage Monitoring level 2					
3506	Monitoring	ON / OFF	ON	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
3510	Limit	8.0 to 42.0 V	20.0 V			UNSIGNED 16
3511	Delay	0.02 to 99.99 s	10.00 s			UNSIGNED 16
3508	Self acknowledge	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
	CANopen Interface Monitoring					
3150	Monitoring	ON / OFF	OFF	☐ 1 ☐ 0	☐ 1 ☐ 0	UNSIGNED 16
3154	Delay	0.1 to 650.0 s	2.0 s			UNSIGNED 16
3152	Self acknowledge	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16

Par. ID.	Parameter	Setting range	Default value	Customer setting		Data type
DIGITAL INPUTS						
	Digital Input 1					
	DI 1 operation	N.O. N.C.	N.C.			UNSIGNED 16
	DI 1 delay	0.08 to 650.00 s	0.08 s			UNSIGNED 16
	Digital Input 2					
	DI 2 operation	N.O. N.C.	N.C.			UNSIGNED 16
	DI 2 delay	0.08 to 650.00 s	0.08 s			UNSIGNED 16
	Digital Input 3					
	DI 3 operation	N.O. N.C.	N.C.			UNSIGNED 16
	DI 3 delay	0.08 to 650.00 s	0.08 s			UNSIGNED 16
	Digital Input 4					
	DI 4 operation	N.O. N.C.	N.C.			UNSIGNED 16
	DI 4 delay	0.08 to 650.00 s	0.08 s			UNSIGNED 16
	Digital Input 5					
1281	DI 5 operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
1280	DI 5 delay	0.08 to 650.00 s	0.08 s			UNSIGNED 16
	Digital Input 6					
1301	DI 6 operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
1300	DI 6 delay	0.08 to 650.00 s	0.08 s			UNSIGNED 16
	Digital Input 7					
1321	DI 7 operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
1320	DI 7 delay	0.08 to 650.00 s	0.08 s			UNSIGNED 16
	Digital Input 8					
1341	DI 8 operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
1340	DI 8 delay	0.08 to 650.00 s	0.08 s			UNSIGNED 16
	Digital Input 9					
1361	DI 9 operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
1360	DI 9 delay	0.08 to 650.00 s	0.08 s			UNSIGNED 16
	Digital Input 10					
1381	DI 10 operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
1380	DI 10 delay	0.08 to 650.00 s	0.08 s			UNSIGNED 16
	Digital Input 11					
1206	DI 11 operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
1205	DI 11 delay	0.08 to 650.00 s	0.08 s			UNSIGNED 16
	Digital Input 12					
1226	DI 12 operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
1225	DI 12 delay	0.08 to 650.00 s	0.08 s			UNSIGNED 16
	External Digital Input 1					
16001	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16000	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 2					
16011	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16010	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16

Par. ID.	Parameter	Setting range	Default value	Customer setting		Data type
DIGITAL INPUTS						
	External Digital Input 3					
16021	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16020	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 4					
16031	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16030	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 5					
16041	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16040	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 6					
16051	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16050	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 7					
16061	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16060	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 8					
16071	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16070	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 9					
16081	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16080	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 10					
16091	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16090	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 11					
16101	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16100	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 12					
16111	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16110	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 13					
16121	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16120	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 14					
16131	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16130	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 15					
16141	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16140	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16
	External Digital Input 16					
16151	Operation	N.O. N.C.	N.O.	☐ N.O. ☐ N.C.	☐ N.O. ☐ N.C.	UNSIGNED 16
16150	Delay	0.05 to 650.00 s	0.20 s			UNSIGNED 16

Par. ID.	Parameter	Setting range	Default value	Customer setting		Data type
DIGITAL OUTPUTS						
12100	Relay 1	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12110	Relay 2	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12310	Relay 3	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12320	Relay 4	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12130	Relay 5	see descr. in *LogicsManager* chap. starting p. 119; default: (!20.06 & 1) & 1				Logman
12140	Relay 6	see descr. in *LogicsManager* chap. starting page 119; default: (20.07 & 1) & 1				Logman
12150	Relay 7	see descr. in *LogicsManager* chap. starting page 119; default: (20.09 & 1) & 1				Logman
12160	Relay 8	see descr. in *LogicsManager* chap. starting page 119; default: (20.08 & 1) & 1				Logman
12170	Relay 9	see descr. in *LogicsManager* chap. starting page 119; default: (20.10 & 1) & 1				Logman
12330	External DO 1	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12340	External DO 2	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12350	External DO 3	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12360	External DO 4	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12370	External DO 5	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12380	External DO 6	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12390	External DO 7	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12400	External DO 8	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12410	External DO 9	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12420	External DO 10	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12430	External DO 11	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12440	External DO 12	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12450	External DO 13	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12460	External DO 14	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12470	External DO 15	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12480	External DO 16	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
COUNTERS						
2515	Counter value preset	0 to 99999999				UNSIGNED 32
2514	S1 active power [0.00MWh]	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
2516	S1 reactive power [0.00Mvarh]	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
2510	S2 active power [0.00MWh]	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
2511	S2 reactive power [0.00Mvarh]	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
LOGICSMANAGER						
	Internal Flags					
12230	Flag 1	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12240	Flag 2	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12250	Flag 3	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12260	Flag 4	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12270	Flag 5	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12280	Flag 6	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12290	Flag 7	see descr. in *LogicsManager* chap. starting page 119; default: (0 & 1) & 1				Logman
12300	Flag 8	see descr. in *LogicsManager* ch. start. p. 119; def.: (11.01 & !11.02) & 11.03				Logman
	Set Timers					
1652	Setpoint 1: Hour	0 to 23 h	8 h			UNSIGNED 8
1651	Setpoint 1: Minute	0 to 59 min	0 min			UNSIGNED 8
1650	Setpoint 1: Second	0 to 59 s	0 s			UNSIGNED 8
1657	Setpoint 2: Hour	0 to 23 h	17 h			UNSIGNED 8
1656	Setpoint 2: Minute	0 to 59 min	0 min			UNSIGNED 8
1655	Setpoint 2: Second	0 to 59 s	0 s			UNSIGNED 8
1663	Active day	1 to 31	1			UNSIGNED 8
1662	Active hour	0 to 23 h	12 h			UNSIGNED 8
1661	Active minute	0 to 59 min	0 min			UNSIGNED 8
1660	Active second	0 to 59 s	0 s			UNSIGNED 8
1670	Monday active	YES / NO	YES	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
1671	Tuesday active	YES / NO	YES	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
1672	Wednesday active	YES / NO	YES	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
1673	Thursday active	YES / NO	YES	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
1674	Friday active	YES / NO	YES	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
1675	Saturday active	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
1676	Sunday active	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16

Par. ID.	Parameter	Setting range	Default value	Customer setting		Data type
COMMUNICATION INTERFACES						
1702	Device number	1 to 127	1			UNSIGNED 16
	CAN Interfaces					
3155	Protocol	OFF CAN Open LeoPC	CAN Open	☐ OFF ☐ CAN O. ☐ LeoPC	☐ OFF ☐ CAN O. ☐ LeoPC	UNSIGNED 16
3156	Baudrate	20/50/100/125/250/500/ 800/1000 kBd	125 kBd			UNSIGNED 16
	CANopen Interfaces					
9000	CAN-Open Master	YES / NO	YES	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
9120	Producer Heartbeat Time	20 to 65530 ms	2000 ms			UNSIGNED 16
9100	COB-ID SYNC Message	1 to FFFFFFFF	80			UNSIGNED 32
9010	Max. answer time ext. devices	0.1 to 9.9 s	3.0 s			UNSIGNED 16
9009	Time re-init. ext. devices	0 to 9999 s	10 s			UNSIGNED 16
	Additional Server SDOs					
9020	2nd Client->Server COB-ID (rx)	1 to FFFFFFFF	80000601			UNSIGNED 32
9022	2nd Server->Client COB-ID (tx)	1 to FFFFFFFF	80000581			UNSIGNED 32
9024	3rd Client->Server COB-ID (rx)	1 to FFFFFFFF	80000602			UNSIGNED 32
9026	3rd Server->Client COB-ID (tx)	1 to FFFFFFFF	80000582			UNSIGNED 32
9028	4th Client->Server COB-ID (rx)	1 to FFFFFFFF	80000603			UNSIGNED 32
9030	4th Server->Client COB-ID (tx)	1 to FFFFFFFF	80000583			UNSIGNED 32
9032	5th Client->Server COB-ID (rx)	1 to FFFFFFFF	80000604			UNSIGNED 32
9034	5th Server->Client COB-ID (tx)	1 to FFFFFFFF	80000584			UNSIGNED 32
	Receive PDO 1					
9300	COB-ID	1 to FFFFFFFF	201			UNSIGNED 32
9050	Function	no func. 1st IKD 2nd IKD BK 16DIDO Co 16DIDO	no func.	☐ no func. ☐ 1st IKD ☐ 2nd IKD ☐ BK 16 ☐ Co 16	☐ no func. ☐ 1st IKD ☐ 2nd IKD ☐ BK 16 ☐ Co 16	UNSIGNED 16
9060	Node-ID of the device	1 to 127	2			UNSIGNED 16
9070	RPDO-COB-ID ext. device 1	1 to FFFFFFFF	181			UNSIGNED 32
	Receive PDO 2					
9310	COB-ID	1 to FFFFFFFF	202			UNSIGNED 32
9051	Function	no func. 1st IKD 2nd IKD BK 16DIDO Co 16DIDO	no func.	☐ no func. ☐ 1st IKD ☐ 2nd IKD ☐ BK 16 ☐ Co 16	☐ no func. ☐ 1st IKD ☐ 2nd IKD ☐ BK 16 ☐ Co 16	UNSIGNED 16
9061	Node-ID of the device	1 to 127	3			UNSIGNED 16
9072	RPDO-COB-ID ext. device 2	1 to FFFFFFFF	182			UNSIGNED 32
	Transmit PDO 1					
9600	COB-ID	1 to FFFFFFFF	181			UNSIGNED 32
9602	Transmission type	0 to 255	255			UNSIGNED 8
9604	Event-timer	20 to 65000 ms	20 ms			UNSIGNED 16
9609	Number of mapped objects	0 to 4	4			UNSIGNED 8
9605	1.Mapped Object	0 to 65535	8001			UNSIGNED 16
9606	2.Mapped Object	0 to 65535	8000			UNSIGNED 16
9607	3.Mapped Object	0 to 65535	8000			UNSIGNED 16
9608	4.Mapped Object	0 to 65535	8000			UNSIGNED 16
	Transmit PDO 2					
9610	COB-ID	1 to FFFFFFFF	182			UNSIGNED 32
9612	Transmission type	0 to 255	255			UNSIGNED 8
9614	Event-timer	20 to 65000 ms	20 ms			UNSIGNED 16
9619	Number of mapped objects	0 to 4	4			UNSIGNED 8
9615	1.Mapped Object	0 to 65535	8002			UNSIGNED 16
9616	2.Mapped Object	0 to 65535	8000			UNSIGNED 16
9617	3.Mapped Object	0 to 65535	8000			UNSIGNED 16
9618	4.Mapped Object	0 to 65535	8000			UNSIGNED 16

Par. ID.	Parameter	Setting range	Default value	Customer setting		Data type
COMMUNICATION INTERFACES						
	Transmit PDO 3					
9620	COB-ID	1 to FFFFFFFF	381			UNSIGNED 32
9622	Transmission type	0 to 255	255			UNSIGNED 8
9624	Event-timer	20 to 65000 ms	20 ms			UNSIGNED 16
9629	Number of mapped objects	0 to 4	1			UNSIGNED 8
9625	1.Mapped Object	0 to 65535	3196			UNSIGNED 16
9626	2.Mapped Object	0 to 65535	0			UNSIGNED 16
9627	3.Mapped Object	0 to 65535	0			UNSIGNED 16
9628	4.Mapped Object	0 to 65535	0			UNSIGNED 16
	Transmit PDO 4					
9630	COB-ID	1 to FFFFFFFF	481			UNSIGNED 32
9632	Transmission type	0 to 255	255			UNSIGNED 8
9634	Event-timer	20 to 65000 ms	20 ms			UNSIGNED 16
9639	Number of mapped objects	0 to 4	1			UNSIGNED 8
9635	1.Mapped Object	0 to 65535	3190			UNSIGNED 16
9636	2.Mapped Object	0 to 65535	0			UNSIGNED 16
9637	3.Mapped Object	0 to 65535	0			UNSIGNED 16
9638	4.Mapped Object	0 to 65535	0			UNSIGNED 16
	Serial Interface 1					
3163	Baudrate	2400 Bd 4800 Bd 9600 Bd 14.4 kBd 19.2 kBd 38.4 kBd 56 kBd 115 kBd	9600 Bd	☐ 2400 Bd ☐ 4800 Bd ☐ 9600 Bd ☐ 14.4 kBd ☐ 19.2 kBd ☐ 38.4 kBd ☐ 56 kBd ☐ 115 kBd	☐ 2400 Bd ☐ 4800 Bd ☐ 9600 Bd ☐ 14.4 kBd ☐ 19.2 kBd ☐ 38.4 kBd ☐ 56 kBd ☐ 115 kBd	UNSIGNED 16
3161	Parity	No Even Odd	No	☐ No ☐ Even ☐ Odd	☐ No ☐ Even ☐ Odd	UNSIGNED 16
3162	Stop Bits	One Two	One	☐ One ☐ Two	☐ One ☐ Two	UNSIGNED 16
	Serial Interface 2					
3170	Baudrate	2400 Bd 4800 Bd 9600 Bd 14.4 kBd 19.2 kBd 38.4 kBd 56 kBd 115 kBd	19200 Bd	☐ 9600 Bd ☐ 14.4 kBd ☐ 19.2 kBd ☐ 38.4 kBd ☐ 56 kBd ☐ 115 kBd	☐ 9600 Bd ☐ 14.4 kBd ☐ 19.2 kBd ☐ 38.4 kBd ☐ 56 kBd ☐ 115 kBd	UNSIGNED 16
3171	Parity	No Even Odd	No	☐ No ☐ Even ☐ Odd	☐ No ☐ Even ☐ Odd	UNSIGNED 16
3172	Stop Bits	One Two	One	☐ One ☐ Two	☐ One ☐ Two	UNSIGNED 16
3173	Full-, halfduplex mode	Fullduplex Halfduplex	Fullduplex	☐ Full ☐ Half	☐ Full ☐ Half	UNSIGNED 16
3185	ModBus Slave ID	0 to 255	1			UNSIGNED 16
3186	Modbus Reply delay time	0.00 to 0.20 s	0.00 s			UNSIGNED 16

Par. ID.	Parameter	Setting range	Default value	Customer setting		Data type
SYSTEM PARAMETER						
	Display Backlight					
4556	Configure display backlight	On Off Auto Key actv.	On	☐ On ☐ Off ☐ Auto ☐ Key act.	☐ On ☐ Off ☐ Auto ☐ Key act.	UNSIGNED 16
4557	Time until backlight shutdown	1 to 999 s	600 s			UNSIGNED 16
	Daylight saving time					
4591	Daylight saving time	On Off	Off	☐ On ☐ Off	☐ On ☐ Off	UNSIGNED 16
4593	DST begin month	1 to 12	1			UNSIGNED 8
4592	DST begin sunday	1 to 4	1			UNSIGNED 8
4594	DST begin time	1 to 23 h	0 h			UNSIGNED 8
4596	DST end month	1 to 12	1			UNSIGNED 8
4595	DST end sunday	1 to 4	1			UNSIGNED 8
4597	DST end time	1 to 23 h	0 h			UNSIGNED 8
	Password System					
10405	Code level display	0000 to 9999	---			UNSIGNED 16
10407	Code level CAN port	0000 to 9999	---			UNSIGNED 16
10406	Code level serial port / DPC	0000 to 9999	---			UNSIGNED 16
10411	Supercomm. level code	0000 to 9999	---			UNSIGNED 16
10412	Temp. supercomm. level code	0000 to 9999	---			UNSIGNED 16
10413	Commissioning level code	0000 to 9999	---			UNSIGNED 16
10414	Temp. commissioning level code	0000 to 9999	---			UNSIGNED 16
10415	Basic level code	0000 to 9999	---			UNSIGNED 16
1703	Factory settings	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
1704	Factory settings DPC/RS232	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
1705	Factory settings CAN	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
1701	Set default values	YES / NO	NO	☐ Y ☐ N	☐ Y ☐ N	UNSIGNED 16
10500	Start Bootloader	00000 to 99999	---			UNSIGNED 16
	Clock Set					
1762	Hour	0 to 23 h	---			UNSIGNED 8
1761	Minute	0 to 59 min	---			UNSIGNED 8
1760	Second	0 to 59 s	---			UNSIGNED 8
1763	Day	1 to 31	---			UNSIGNED 8
1764	Month	1 to 12	---			UNSIGNED 8
1765	Year	0 to 99	---			UNSIGNED 8
	Version					
900	Serial number	Info	---			UNSIGNED 8
950	Boot item number	Info	---			UNSIGNED 8
960	Boot revision	Info	---			UNSIGNED 8
965	Boot version	Info	---			UNSIGNED 8
930	Program item number	Info	---			UNSIGNED 8
940	Program revision	Info	---			UNSIGNED 8
945	Program version	Info	---			UNSIGNED 8

NOTE

All parameters shaded in gray color are fixed parameters and cannot be configured by the operator.

Appendix D.
Service Options

Product Service Options

The following factory options are available for servicing Woodward equipment, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is purchased from Woodward or the service is performed. If you are experiencing problems with installation or unsatisfactory performance of an installed system, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact Woodward technical assistance (see "How to Contact Woodward" later in this chapter) and discuss your problem. In most cases, your problem can be resolved over the phone. If not, you can select which course of action you wish to pursue based on the available services listed in this section.

Returning Equipment For Repair

If a control (or any part of an electronic control) is to be returned to Woodward for repair, please contact Woodward in advance to obtain a Return Authorization Number. When shipping the unit(s), attach a tag with the following information:

- name and location where the control is installed;
- name and phone number of contact person;
- complete Woodward part numbers (P/N) and serial number (S/N);
- description of the problem;
- instructions describing the desired repair.

CAUTION

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules.*

Packing A Control

Use the following materials when returning a complete control:

- protective caps on any connectors;
- antistatic protective bags on all electronic modules;
- packing materials that will not damage the surface of the unit;
- at least 100 mm (4 inches) of tightly packed, industry-approved packing material;
- a packing carton with double walls;
- a strong tape around the outside of the carton for increased strength.

Return Authorization Number RAN

When returning equipment to Woodward, please telephone and ask for the Customer Service Department in Stuttgart [+49 (0) 711 789 54-0]. They will help expedite the processing of your order through our distributors or local service facility. To expedite the repair process, contact Woodward in advance to obtain a Return Authorization Number, and arrange for issue of a purchase order for the unit(s) to be repaired. No work can be started until a purchase order is received.

NOTE

We highly recommend that you make arrangement in advance for return shipments. Contact a Woodward customer service representative at +49 (0) 711 789 54-0 for instructions and for a Return Authorization Number.

Replacement Parts

When ordering replacement parts for controls, include the following information:

- the part numbers P/N (XXXX-XXX) that is on the enclosure nameplate;
- the unit serial number S/N, which is also on the nameplate.

How To Contact Woodward

Please contact following address if you have questions or if you want to send a product for repair:

Woodward GmbH
Handwerkstrasse 29
70565 Stuttgart - Germany

Phone: +49 (0) 711 789 54-0 (8.00 - 16.30 German time)
Fax: +49 (0) 711 789 54-100
e-mail: stgt-info@woodward.com

For assistance outside Germany, call one of the following international Woodward facilities to obtain the address and phone number of the facility nearest your location where you will be able to get information and service.

Facility	Phone number
USA	+1 (970) 482 5811
India	+91 (129) 409 7100
Brazil	+55 (19) 3708 4800
Japan	+81 (476) 93 4661
The Netherlands	+31 (23) 566 1111

You can also contact the Woodward Customer Service Department or consult our worldwide directory on Woodward's website (**www.woodward.com**) for the name of your nearest Woodward distributor or service facility. [For worldwide directory information, go to **www.woodward.com/ic/locations**.]

Engineering Services

Woodward Industrial Controls Engineering Services offers the following after-sales support for Woodward products. For these services, you can contact us by telephone, by e-mail, or through the Woodward website.

- Technical support
- Product training
- Field service during commissioning

Technical Support is available through our many worldwide locations, through our authorized distributors, or through GE Global Controls Services, depending on the product. This service can assist you with technical questions or problem solving during normal business hours. Emergency assistance is also available during non-business hours by phoning our toll-free number and stating the urgency of your problem. For technical engineering support, please contact us via our toll-free or local phone numbers, e-mail us, or use our website and reference technical support.

Product Training is available on-site from several of our worldwide facilities, at your location, or from GE Global Controls Services, depending on the product. This training, conducted by experienced personnel, will assure that you will be able to maintain system reliability and availability. For information concerning training, please contact us via our toll-free or local phone numbers, e-mail us, or use our website and reference ***customer training***.

Field Service engineering on-site support is available, depending on the product and location, from our facility in Colorado, or from one of many worldwide Woodward offices or authorized distributors. Field engineers are experienced on both Woodward products as well as on much of the non-Woodward equipment with which our products interface. For field service engineering assistance, please contact us via our toll-free or local phone numbers, e-mail us, or use our website and reference ***field service***.

Technical Assistance

If you need to telephone for technical assistance, you will need to provide the following information. Please write it down here before phoning:

Contact

Your company _____

Your name _____

Phone number _____

Fax number _____

Control (see name plate)

Unit no. and revision: P/N: _____ REV: _____

Unit type DTSC-200 _____

Serial number S/N _____

Description of your problem

_____

_____

_____

_____

_____

_____

Please be sure you have a list of all parameters available. You can print this using LeoPC1 Additionally you can save the complete set of parameters (standard values) and send them to our Service department via e-mail.

We appreciate your comments about the content of our publications.

Please send comments to: stgt-documentation@woodward.com

Please include the manual number from the front cover of this publication.

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Homepage

http://www.woodward.com/power

Woodward has company-owned plants, subsidiaries, and branches, as well as authorized distributors and other authorized service and sales facilities throughout the world.

Complete address/phone/fax/e-mail information for all locations is available on our website (www.woodward.com).

2011/06/Stuttgart