Contents *Page*

1 TIME SYNCHRONISATION 2
1.1 Application 2
1.2 Theory of operation 2
1.3 Setting 2
1.4 Appendix 4
1.4.1 Signal list 4
1.4.2 Setting table 5

1 TIME SYNCHRONISATION

1.1 Application

Time-tagging of internal events and disturbances is an excellent help when evaluating faults. Without time synchronisation, the events within the protection terminal can be compared to one another. With time synchronisation, events and disturbances within the whole station, and even between line ends, can be compared at an evaluation.

If external time synchronisation is applied, there are two alternatives. Either the synchronisation pulse is applied via one of the SPA-bus ports (Station Monitoring System (SMS) or Substation Control System (SCS)), or a minute pulse, connected to a binary input.

1.2 Theory of operation

The protection terminal has its own internal clock with date, hour, minute, second and millisecond. It has a resolution of 1 ms. In order to obtain an accuracy of < ±1,5 ms, the accuracy of the synchronisation pulse must be < ±1 ms. Thus the time between two synchronisation pulses shall be 60 000 ms ± 1 ms.

The clock has a built-in calendar for 30 years that handles leap years. Any change between summer and winter time must be handled manually or through external time synchronisation. The clock is powered by a capacitor, to bridge interruptions in power supply without malfunction.

The internal clock is used for time-tagging disturbances, events in SMS and SCS, and internal events.

1.3 Setting

The internal time can be set on the built-in man machine interface (MMI) at:

Settings
InternalTime

The time is set with year, date and time. See “Local man machine communication”, document number 1MRK 580 007-XEN, for more information.

The source of time synchronisation is set at:

Configuration
TimeSyncSource

where the setting alternatives are the following:

- None (i.e. no synchronisation)
- SPA-bus Channel A or Channel B (ChA or ChB)
- Minute pulse, positive or negative flank (BinIn Pos or BinIn Neg).

“ChA” or “ChB” is set when the time synchronisation is performed via SCS or SMS on the SPA-bus. “BinIn Pos” or “BinIn Neg” is set when a binary input is used for minute pulse synchronisation. If the selected binary input is connected to a signal not serving as an external time synchronisation source, the setting for selection of time synchronisation source shall be set to none or SPA.

The function input to be used for minute pulse synchronisation is named SINP-MINSYNC.

In order to guarantee that the time-tagging of events (seconds and milliseconds) is always accurate, there are some restrictions regarding the change of seconds and milliseconds of the calendar clock. If any external time synchronisation is selected, it is possible to set the time down to minute level only. However, the time in the slave is set as close to the distired time as possible. If no external clock synchronisation is active, it is possible to set the time down to milliseconds.

1.4 Appendix

1.4.1 Signal list

CONNECTIONS:	TO:	SETTING:	DESCRIPTION:
SINP-MINSYNC	BI		Minute pulse synchronisation input

IMPORTS:	ORIGIN:	SETTING:	DESCRIPTION:
-	-		

PRODUCTION:	TO:	SETTING:	DESCRIPTION:
-	-		

1.4.2 Setting table

PARAMETER:	SETTING RANGE:	SETTING:	DESCRIPTION:
TimeSyncSource	None ChA ChB BinIn Pos BinIn Neg		SPA-bus Channel A SPA-bus Channel B Minute pulse, positive flank Minute pulse, negative flank If BinIn Pos or BinIn Neg is selected, the synchronisation pulse is connected to the binary input SINP-MINSYNC