

## Coupling Module

### Connection of Process Operator Station to the Station Bus

## 87TS01 – E/R2340

Publication No.

D KWL 6317 92 E, Edition 10/92

Replacing D AT 1721 88 E, Edition 09/90

## Application

The module 87TS01 is a coupling module, which serves to connect computers to the PROCONTROL system. By means of the module version R2340 it is possible to couple a Process Operator Station (POS) to the PROCONTROL station bus via a serial interface type RS 232c. The whole PROCONTROL system is within the module's sphere of action. Data exchange with the PROCONTROL system has to be activated by the Process Operator Station POS.

## Features

The module is designed to load a maximum of 230 addresses of sink telegrams to be received. The addresses of the sink telegrams are assigned to addresses 0...229 of the receiving shared memory.

If the number of addresses to be loaded simultaneously is not sufficient, it is possible to connect in parallel a maximum of 4 modules 87TS01 via standard interfaces RS 422.

The number of the modules which may be used in parallel is determined by the application with the connected Process Operator Station.

## Description

### Processing

The coupling to the Process Operator Station is effected by the processing section of the module in conjunction with the serial interface to standard RS 232c.

The entire data exchange between station bus adaption and processing section is effected via the shared memories.

The connection to the station bus can be accomplished in any PROCONTROL connection station. It is possible to connect up to 4 modules 87TS01/R2340 in parallel and to the Process Operator Station via a serial interface to RS 232c.

All transfer procedures via the V 24 interface are initiated by the Process Operator Station in the form of jobs according to a specified protocol.

With each coupling module it is possible to perform the following data exchange within the entire PROCONTROL system:

- Listening in to a maximum of 230 PROCONTROL telegrams

The listening—in address list provided by the Process Operator Station is secured against data corruption by means of a CRC checksum.

- Modification of threshold values for listening—in telegrams of analog values with individually adjustable time—out.

The threshold of modification is adjustable within 0 % ... 6 % in steps of 0.05 %, the time—out within 0 s ... 10 s in steps of 80 ms.

The basic setting for threshold values is 1 % and for the time—out 1 s.

- Suppression of analog values with frequently changing disturbance bit.

Analog values, whose disturbance bit changes more than n times in m seconds are not transferred to the Process Operator Station.

n and m are specified by the Process Operator Station; n = number of changes from 1 to 127; m is adjustable between 80 ms and 10 s in steps of 80 ms.

Analog value changes exceeding the modification threshold and the time—out are transferred even in case of activated suppression.

After the end of the suppression (the disturbance bit of the corresponding analog value has returned to changing less than n times in m seconds) the current analog value telegram is transferred to the Process Operator Station.

Basic setting: no suppression.

The setting values for the suppression are specified by the Process Operator Station.

- Suppression of binary value signals with frequently changing binary values (disturbance suppression).

Binary value telegrams whose contents changes more than  $i$  times in  $k$  seconds, are not passed on to the Process Operator Station.

$i$  and  $k$  are specified by the Process Operator Station;  $i$  = number of changes from 1 to 127;  $k$  is adjustable between 80 ms and 10 s in steps of 80 ms.

In case of activated suppression the corresponding binary value telegram is, however, transferred once every  $k$  seconds.

After the end of suppression (the contents of the respective binary value telegram has returned to changing less than  $i$  times in  $k$  seconds) the current binary value telegram is transferred to the Process Operator Station.

Basic setting: no suppression.

The setting values of the suppression are specified by the Process Operator Station.

- Reading registers of PROCONTROL modules.
- Writing into registers of PROCONTROL modules, e.g. for command outputs with and without check-back of the transferred data.
- Reading lists of PROCONTROL modules, e.g. limit value lists and parameter lists.
- Writing lists of PROCONTROL modules, e.g. lists of limit values and parameters.
- Display of signals and simulation.

## Addressing

The addressing of the module is carried out in two directions, because of its interface to two systems.

- The addressing in the direction of the PROCONTROL bus system is carried out automatically as a function of the installation slot of the module.
- The addressing in the direction of the serial interface is done by setting the coupling module number at module 87TS01.

If several modules are connected in parallel via interfaces RS 422, different coupling module numbers must be assigned so that the computer is able to distinguish between them. Addressing in the direction of the bus system is still carried out automatically, based on the new different installation slots of the module.

For detailed information on addressing see the chapter “Module Adjustment ” in the 87TS01 module description.

## Initializing

Initialization of the module is carried out in two phases which are both passed through automatically.

In the direction of the bus system the module is initialized automatically when it is connected to the power supply; this happens when the module is plugged into its slot.

While the initialization is under way all light-emitting diodes of the module are on. After successful initialization the LED's go out.

Initialization of the module in the direction of the computer is also automatic; it is carried out by the Process Operator Station via the serial interface.

## Allocation of the shared memory

The module is provided with two shared memories.

A receiving shared memory for telegrams which are to be received and a transferring shared memory for telegrams which are to be transferred.

Due to the use of a standardized station bus adaption, the number of sink telegrams to be received simultaneously is limited to a maximum of 230 at the addresses 0...229 of the receiving shared memory.

In the POS application, only system-internal data – e.g. for diagnostic purposes – are transferred from the transferring shared memory.

### Sink Register Allocation:

- A special feature compared with other station bus modules is that no permanently specified bus addresses stored on an EPROM are used here.
- The bus address list of the module is stored in a RAM and specified by the computer via the processing section.

## Command outputs to the bus system

Commands from the Process Operator Station are transferred to module 87TS01 together with destination address and data. Module 87TS01 passes them on to the bus system as an event.

## Transfer of lists of parameters and limit values

Lists of parameters or limit values can be read and modified from the Process Operator Station in the PROCONTROL modules according to a specified protocol.

## Annunciation Functions and Diagnosis

Malfunctions of the module and of the RS 232c interface are detected and signalled by the diagnosis function (see Module Description 87TS01/R23xx).

### Signals appearing on the module

Two red and two green light-emitting diodes are provided at the front side of the module.

#### – Light-emitting diode ST

The red LED ST emits a steady light signal when a disturbance is detected in the area of the station bus adaption or when the sink time monitoring responds.

#### – Light-emitting diode STV

The red LED STV emits a steady light signal when a malfunction of the processing section of the module is detected.

The light-emitting diodes ST and STV are controlled by the station bus adaption.

The two green light-emitting diodes M1 and M2 indicate the operating status of the processing section:

#### – Light emitting diode M1

The green LED M1 comes on when a data transfer with the Process Operator Station via a serial interface RS 232c takes place.

#### – Light emitting diode M2

The green LED M2 is alight when job processing is under way in the operating section of the module.

In addition, the light emitting diodes M1 and M2 indicate the following statuses:

– M1 and M2 permanently off indicates the idle status.

– M1 and/or M2 emitting a steady light signal indicates a fault status.

– M1 and M2 flashing alternately once every second indicates a fault status during initializing.

The monitoring function of the processing section ensures a re-initialization by the Process Operator Station in the event of disturbances in the processing program. The transfer via the serial interface is safeguarded by a checksum; if transfer errors occur the disturbed telegram is repeated.

The diagnostic functions of the bus adaption are specified in Module Description 87TS01/R23xx.

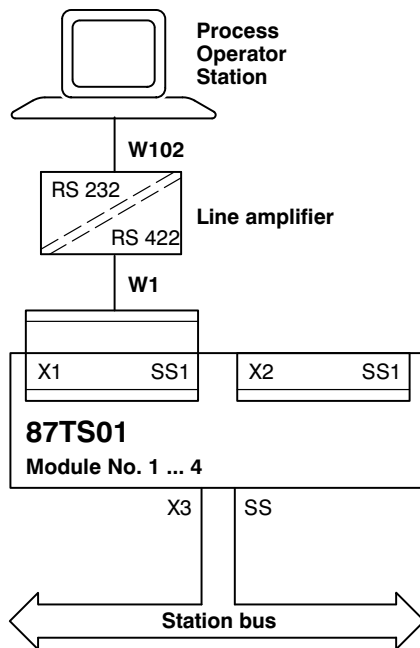
## Connection Diagrams

The specified standard cables shall be used for connection of the module.

### Combination of one module 87TS01 and one Process Operator Station at the station bus

The Process Operator Station can be connected either to connector X1 or to connector X2.

By using standard cable W1 it is ensured that an interface according to RS 422 is present at the connector. For access by the Process Operator Station any of module numbers 1...4 may be selected.



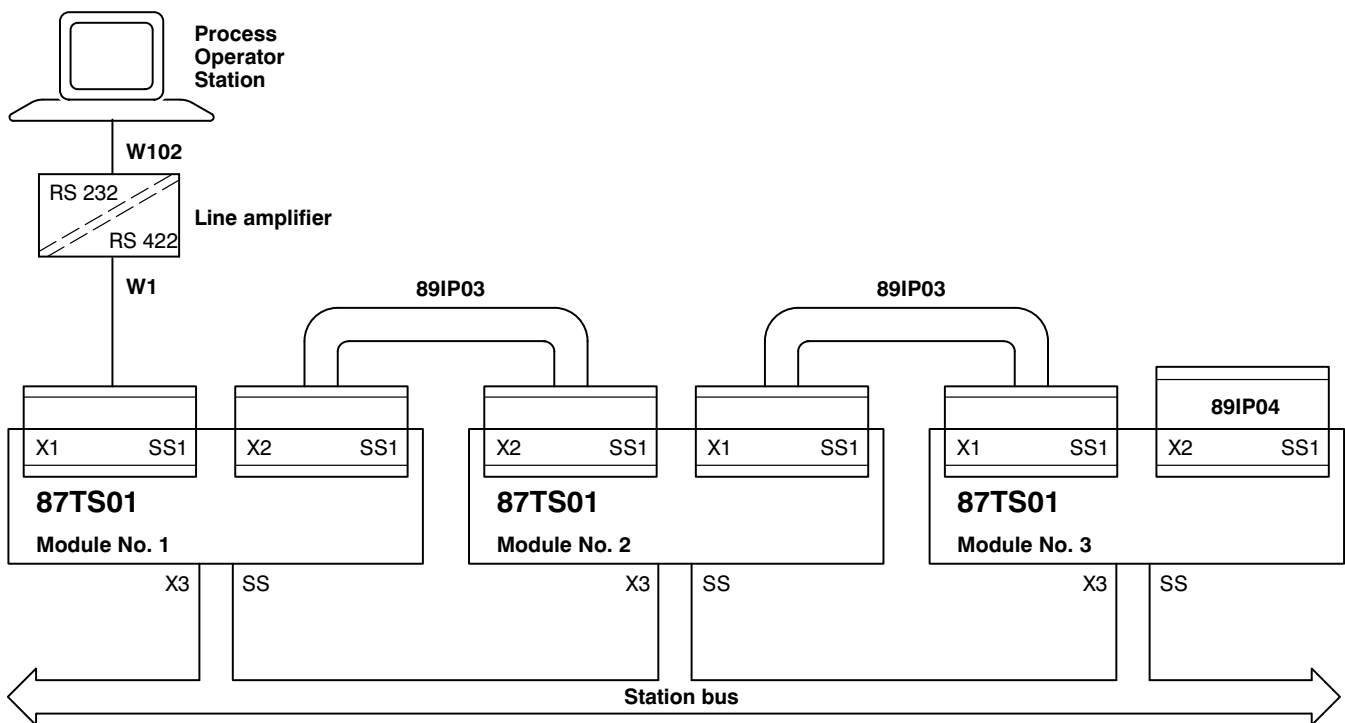
### Combination of several 87TS01 modules with one Process Operator Station at the station bus

The following example shows the connection of three 87TS01 modules in parallel and their common coupling to one Process Operator Station. Up to four 87TS01 modules may be coupled in this way.

For coupling the Process Operator Station with the standard cable W1 connector X1 with interface SS1 is used in this case.

The connection to the next 87TS01 module is established by means of standard cable 89IP03 via connector X2 with the interface SS1. By the use of standard cable 89IP03 it is ensured that an interface according to RS 422 is present at connector X2.

The modules connected in parallel have to be assigned different coupling module numbers (see module description 87TS01/R23xx) in order to enable the Process Operator Station to distinguish between them. If several modules are connected in parallel the last free connector of this combination must be fitted with a bus termination module in the form of plug 89IP04. This plug includes the necessary resistor network.



## Ordering Data

### Ordering data of complete module

Type: 87TS01–E/R2340 Order No.: GJR2368900R2340

### Ordering data of the plug–in memory modules

(Basic firmware Rxx40)

Memory module	Item	Order number
Bus adaption section	A401	GJR2352816Pxxxx
Processing section low	A106	GJR2352812Pxxxx
Processing section high	A108	GJR2352813Pxxxx

Pxxxx = Position number according to the respective valid revision status.

### Ordering data of standard accessories

#### Connecting cable 89IP03

Type: 89IP03/R0040 Order No.: GJR2363100R0040

#### Resistor network 89IP04

Type: 89IP04/R0100 Order No.: GJR2363200R0100

#### Signal cable W1 max. length 500 m

Type: W1 (RS 422) Order No.: GKWE601527R... \*

#### Signal cable W102 max. length 50 m

Type: W102 (RS 232) Order No.: GKWE602052R... \*

\* Version number = cable length in cm.

For ordering prefabricated cable longer than 99.99 m = 9999 cm, the length of the cable concerned has to be indicated in clear text.

#### Line amplifier MFI

Type: MFI–G/V24/  
RS422/2/D/O/U/S Order No.: GKWN000203R0001

Technical data are subject to change without notice!



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