

Bus Coupling Module Coupling to Protection System PROCONTROL–PS

88QT03–E/R2011

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Application

The 88QT03 bus coupling module is used to connect PROCONTROL P to the bus of the PROCONTROL–PS protection system. The following PROCONTROL–PS modules can be connected:

- 70EA01–ES/R1 Analog input module
(one data telegram per function unit)
- 70EA02–ES/R1 Analog input module
(one data telegram per function unit)
- 70EB02–ES/R4 Binary input module
(one data telegram per module)
- 70AB01–ES/R2 Binary output module
(one data telegram per module)
- 70PR03–ES/R2 Computing module
- 70BK03–ES/R2 Bus coupling module
(RS485 interface)
- 70BT01/R1 Bus isolation amplifier
- 70BV01–ES/R1 Bus control module

Connected to the station bus, the module behaves like a combined input/output module that is able to receive up to 255 telegrams from the station bus and send up to a maximum of 200 telegrams to the station bus.

In relation to the PROCONTROL–PS bus, the module acts as a processing module receiving and sending a total of up to 256 telegrams.

Features

This module can be plugged into any multi-purpose processing station of the PROCONTROL bus system. It requires a space of 2 divisions.

It uses:

- One SS standard interface for the station bus,
- One SEA standard interface for the PROCONTROL–PS bus,
- Connections provided for hardware inputs.

As with all the other station bus modules, the station bus address of this module is related to its place of installation.

However, the module may only be plugged onto even-numbered module addresses. The next higher (uneven) module address will be used automatically by the module, and needs not be wired. However, it must not be assigned to another station bus module.

It transfers data from PROCONTROL–PS station modules to the station bus.

It transfers data received from the station bus to modules connected to the PROCONTROL–PS bus.

The connected PROCONTROL–PS modules are monitored for proper functioning.

Disturbances are signalled to the PROCONTROL system in the form of diagnosis telegrams. They are annunciated additionally on the module front by means of light-emitting diodes (see "Annunciation functions").

The module is able to simulate output data destined for the PROCONTROL–PS bus (only admissible for servicing).

The module merely requires a 24V supply (voltages needed additionally, are generated inside the module itself).

With the help of the PDDS, user lists are loaded into an EEPROM.

Initialization

Initialization puts the bus in a defined starting condition.

Initialization is initiated

- By voltage connection (when the module is plugged in),
- Upon reception of a "Reset processing" instruction telegram.

During the initialization phase the STEA disturbance light-emitting diode is flashing for approx. 4 seconds.

Loading and saving user lists

By use of the PDDS, the user loads the desired marshalling, limit-value, and measuring-range expansion lists into the RAM of the module using the bus connection. The relatedness of the lists is checked by the PDDS. After further plausibility checks, the module begins to process the user data from the RAM.

On the PDDS, the type designations of the modules belonging to the PROCONTROL-PS protection system are indicated without an "S". Modules 70BT01 and 70BV01 are not configurable from the PDDS.

In order to file the user data in the nonvolatile EEPROM, a "Save" (SAV) instruction is used on the PDDS for transferring the user program from the RAM into the EEPROM. Then, the module continues working with the lists filed in the EEPROM. Now, it is possible to make changes or additions in the RAM.

Connecting modules to the PROCONTROL-PS bus

The 88QT03 bus coupling module as well as the modules of the PROCONTROL-PS bus may be plugged in during operation.

When the bus coupling is plugged in, it is initialized automatically (if user lists have already been loaded into the EEPROM), and the PROCONTROL-PS bus is coupled to the station bus after initialization is completed.

Processing

The processing section is the central part of the module, employing microprocessor II. The station bus shared memory and the shared memory of the PROCONTROL-PS bus serve as internal interface. Transmission time between the two memories is ≤ 20 ms (≤ 10 ms without limit-value generation or measuring range expansion).

For data transfer between the two shared memories, generally the following applies:

- The station bus receiving shared memory (for data transfer from station bus to PROCONTROL-PS bus) uses 255 free registers.
- The station bus sending shared memory (for data transfer from PROCONTROL-PS bus to station bus) uses 200 free registers.
- The shared memory of the PROCONTROL-PS bus uses (for both directions of transfer) a total of 256 free registers.

The addresses of the PROCONTROL-PS bus (input and output) telegrams and the register addresses of the shared memory of the PROCONTROL-PS bus are identical. Use, however, is arbitrary.

Additionally, the processing section performs the following (user-specific) functions:

- a) In the input direction
(from PROCONTROL-PS bus to station bus)
 - Binary-value telegrams:

Marshalling, in telegrams, from shared memory of the PROCONTROL-PS bus to an arbitrary register of the station bus sending shared memory; event processing. Marshalling may be either in telegrams or in bits.
 - Analog-value telegrams:

Marshalling from the shared memory of the PROCONTROL-PS bus to an arbitrary register of the station bus sending shared memory; input signal monitoring; limit-value generation; modification of plausibility limits; event processing.
- b) In the output direction
(from station bus to PROCONTROL-PS bus)
 - Binary-value telegrams:

Marshalling from the station bus receiving shared memory to an arbitrary register of the shared memory of the PROCONTROL-PS bus (= output address of PROCONTROL-PS bus). Marshalling may either be in telegrams or in bits.
 - Analog-value telegrams:

Marshalling from the station bus receiving shared memory to an arbitrary register of the shared memory of the PROCONTROL-PS bus (= output address of PROCONTROL-PS bus). A measuring-range expansion may be programmed for each analog value.

A data telegram (analog or binary) received from the station bus may be put out on several PROCONTROL-PS bus outputs (= output addresses of PROCONTROL-PS bus) at the same time, depending on user-specific programming.

Diagnosis and annunciation functions

Disturbance annunciations on the module

Light-emitting diodes on the module front are intended for the following annunciations:

	Designation of LED
– Disturbance	ST
– Disturbance Input/output station	STEA

Light-emitting diode ST signals all disturbances of the module and of data transfer with the module.

The red light-emitting diode STEA may either be on, emitting a steady light or a flashing light the significance of which is:

- Steady light: Disturbances of the PROCONTROL–PS bus or of the PROCONTROL–PS bus interface inside the module.
- Flashing light: For approx. 4 s, either when voltage is connected or when data is copied internally from the EEPROM into the working memory (RAM). When STEA is off after approx. 4 s, the module is ready for operation. In case STEA continues to flash, a disturbance is present.

Disturbance annunciation signal to the alarm annunciation system

From the bus, the alarm annunciation system and the CDS control diagnostic system receive disturbance signals issued by the bus coupling module.

Disturbance signals are stored and are indicated to the bus system, using the SS interface (SST data line), in the form of a general disturbance signal. In that event, the internal diagnosis registers of the module are read out by the bus system for further evaluation.

Status signals

Yellow light-emitting diode SIM will emit a steady light if at least one PROCONTROL–PS bus output value is simulated. It is also energized, in case user data (e.g. address list, limit values) have been changed on-line from the PDDS or when the module is using the lists filed in the RAM.

Green light-emitting diode EAVE emits a steady light as long as the 88QT03 module participates in the PROCONTROL–PS bus data transfer.

Diagnosis

Internally, the module can make use of a number of diagnostic functions which form part of the (cyclically operating) basic module program (firmware). These include:

- Function testing of the PROCONTROL–PS bus including the internal PROCONTROL–PS bus interface as well as monitoring of received PROCONTROL–PS bus telegrams.
- Mutual checking of microprocessors I and II.
- Checking of internally generated data lists by means of parity bits (internal data protection)
- Sink time monitoring function checking whether all station bus telegrams needed by the module (acc. to the bus address list) are received on a regular basis. In the event of absence of such telegrams, the sink time monitoring function is activated (as is the case with all other station bus modules).
- Annunciation of external disturbances.
The disturbance signal inputs SME1, SME2, SME3, SMS, and STX at the X21 connector are used for diagnosing external disturbance signals and are filed in the diagnosis register (register address 211) (see also figure 3).

When a disturbance occurs, the type of defect is filed in the diagnosis register and a disturbance annunciation signal is sent to the PROCONTROL system at the same time.

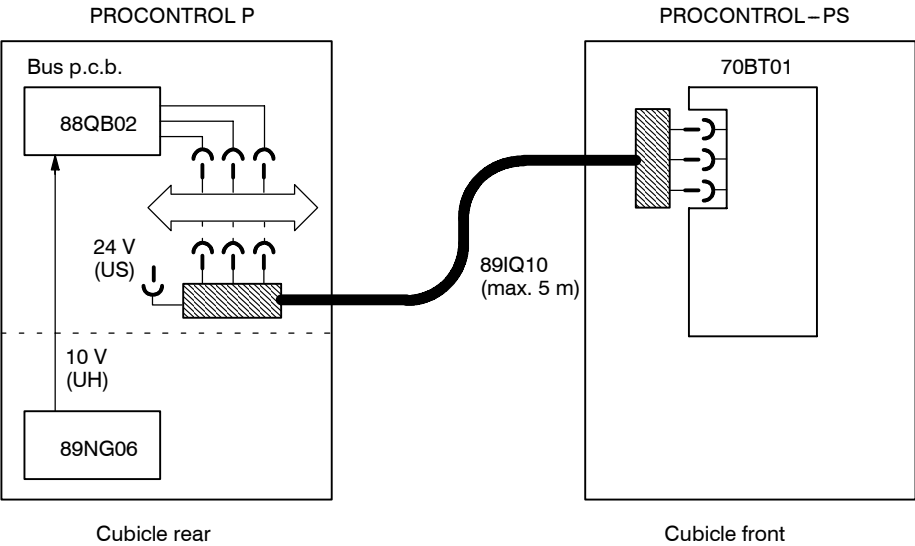
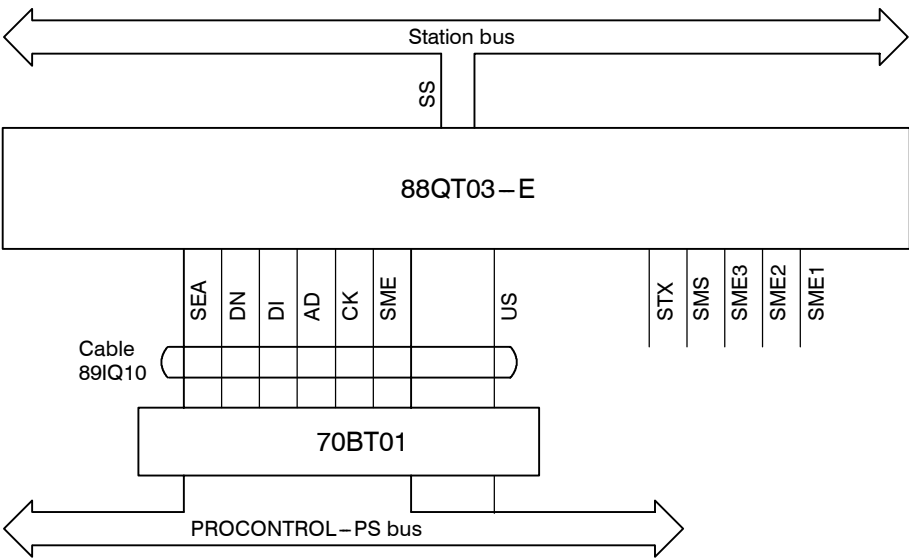
Upon request, the module sends a telegram containing the data stored in the diagnosis register (register 246) (see figure 2).

The contents of the diagnosis register, the signals from the general disturbance line, the annunciations on the CDS diagnostic system, and annunciation ST are shown in figures 2 to 4.

Connection of PROCONTROL–PS bus using 70BT01

The bus coupling module is connected to the PROCONTROL–PS protection system by means of the 70BT01 bus isolation amplifier. In this case the 89IQ10 connecting cable (of a max. length of 5 m) shall be used according to the connection diagram.

Connection diagram



Mechanical design

Board size: 6 units, 2 divisions, 160 mm deep

Connector: 1 x for connecting station bus and PROCONTROL-PS bus
48-pole, edge-connector type F (connector X11)

1 x for external disturbance signals
32-pole, edge-connector type F (connector X21)

Weight: approx. 0.83 kg

Both boards are mechanically and electrically connected.

View of connector side:

