**Application**

The station-bus cabinet including communication controller is designed to house the electronic equipment of the PROCONTROL P power plant control system including power distribution and remote-bus connection for the station concerned.

This cabinet is intended for redundant power supply (see Figure 4).

Redundant connection of the station to the remote bus is established with the help of modules 88FK05, 88FT05, and 88TK05 in the form of single- or dual-channel circuitry. Sub-rack G houses modules fed by a 5 V supply (Figure 1, 4).

Two versions of the station-bus cabinet are available:
- 89MS01/R1300 equipped with communication controller module set VSA
- 89MS01/R1400 equipped with communication controller module set VSB

The distributing station can be fitted for a maximum of three remote-bus lines.

Except for sub-rack A for the communication controller module set, both versions are of identical design.

For the installation of a redundant bus system, a 89MS01/R1300 as well as a 89MS01/R1400 station-bus cabinet is necessary.

**Description**

The mechanical structure of this station-bus cabinet is shown in Figure 1.

For installation, maintenance, and operation purposes, the cabinet is accessible from the front and the rear. The cabinet is designed for natural cooling. The cooling air enters the cabinet from the front through ventilation grids with filter mats and leaves it again through the roof plate which is of grid-type design (protection type IP30).

Each cabinet has a partition wall on the left side. For single-cabinet or row-type installations, the cabinet on the left end needs an additional side wall and the one on the right end needs a partition wall and a side wall.

The lock on the door is a built-in 3 mm two-way rod-type locking mechanism.

The cabinet is equipped with 4 sub-racks (BGT) A to K for user modules with processing, binary control and input/output functions, and for the modules of the communication controller, the 88TK05 station-bus coupling modules, a 89NG08 supply module for power distribution, a built-in section with two 88FK05 (A3, A4) remote-bus junction modules for connecting the redundant remote bus, and a sub-rack ("Z") for the 88FT05 remote-bus coupling modules.

Sub-rack A in the 89MS01/R1300 cabinet is equipped with communication controller module set VSA, and sub-rack A in the 89MS01/R1400 cabinet is equipped with communication controller module set VSB. The specified equipment is shown in Figure 2 (plug-in electronic modules are not part of the standard cabinet supply).

The station-bus cabinet is intended to be installed in dry, clean and vibration-free areas of normal industrial design.

On the right side of the roof facing strips (front and rear), 4 borings are provided for attaching the cabinet designation plates. The plates are attached by means of 2.5 x 6 mm grooved drive studs.
Cabinet design

Figure 1: PROCONTROL P station-bus cabinet with 4 sub-racks, 19”/24”, 160/220 mm deep
Sub-rack A with one 89NG03 power supply module equipped for the communication controller,
Sub-rack G with one 89NG03 power supply module equipped,
Sub-racks D, K mechanically prepared for one 89NG03 power supply module.
Equipment specifications

Figure 2: Equipment

Mechanical design

Cabinet design

The station-bus cabinet design is based on ABB's MNS system. The cabinet is provided with double-wing doors in the front and in the back, a roof plate, and a partition wall. The cabinets are suitable for row installations.

A 50 x 75 cable duct on the bottom frame on the cabinet rear allows cross-cabling from cabinet to cabinet. The partition wall has a suitable cutout.

Accessory parts

For each cabinet in the case of single-cabinet installations or for each end cabinet in the case of cabinet-row installations, the following accessory parts need to be ordered additionally:
- 1 side wall for left end cabinet
- 1 side wall and 1 partition wall for right end cabinet
- 2 side walls and 1 partition wall for single cabinet

Cabinet installation

The cabinet is installed on a base frame where the cables are introduced from below.

Floor mounting is in the form of screw-type mounting. For this purpose, there is one boring provided per corner in the transverse sections.

In the case of natural cabinet ventilation, free outlet of air from the roof plate is to be ensured; 20 cm minimum space required between roof plate and ceiling.

Figure 3: Floor mounting
Figure 4: Power supply, cabinet annunciations, and remote-bus coupling
Power supply

The station-bus cabinet receives a redundant 24 V D.C. supply from two separate power supply systems. Power supply module 89NG08 is responsible for supply voltage monitoring, voltage limitation, circuit formation, and power distribution. For selective cabinet connection and disconnection, 2 high-capacity m.c.b.s are provided. As protective devices, they merely fulfill a back-up function and can respond selectively with respect to the external cabinet fuses.

The power supply module is prepared for a maximum of one plus three 24 V/5 V 89NG03 power supply modules. Sub-rack “G” is wired for a 89NG03 power supply module, a central 5 V supply. Sub-rack “K” can subsequently be equipped with an additional power supply module.

Sub-rack G can be rewired for the decentralized 2 x 24 V D.C. supply.

The redundant 24 V D.C. power supplies are kept separate and non-interfering up to each individual electronic module and up to the fusing of the 89NG03 power supply module.

System settings

<table>
<thead>
<tr>
<th>Module slot</th>
<th>21</th>
<th>20</th>
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</tbody>
</table>

Figure 5: Address setting

Rear view of sub-rack
Address setting

Throughout the PROCONTROL P system, each electronic module is assigned a specific module address. This module address is determined by the mounting location of the module. For each sub-rack, the module addresses are set by means of jumpers X203, X218, X219, and X222 on the identical station-bus p.c.b.s, see Figure 5.

Remote-bus termination settings

In the last processing station, the remote-bus needs to be connected to the remote-bus termination on module 88FK05. Settings see module and application description for remote-bus junction module 88FK05-E/R0100.

Settings on the 89IL06 p.c.b. on sub-rack "Z", seen from cabinet rear:

```
X104  X103  X102  X101
A  o  C  o  A  A  o  C  o  A
B  o  D  o  B  B  o  D  o  B
```

This standard setting must not be changed.

Screen and PE conductor

In addition to the connections of the redundant power supply, each cabinet is equipped with a connection for the earthing of the casing (protective earthing).

For process cables with foil screens, screen connection elements are provided which are connected directly to the cabinet frame. The tracing wires of the screens are to be connected to these elements in the shortest possible way (max. 5 cm).

Annunciation system

See Figure 1 and 4.

Monitoring modules 89NU01 H10 and H20 in the 89NG08 power supply module scan all cabinet signals and put them out as general signals for further annunciation purposes. On the front side of the monitoring modules, the following annunciations are provided:

- Cabinet temperature too high MTE
- Cabinet door open MTK
- Power supply A missing MSA
- Power supply B missing MSB
- Power supply disturbed MSP
- Electronic module disturbed MST

For evaluation in the annunciation system, monitoring module H10 of the PROCONTROL station puts out the following general annunciation signals to the bus via the 88TK05 bus coupling module:

- Cabinet temperature too high MTEG
- Cabinet door open (optional) MTKG
- Power supply okay MW (closed circuit)

Monitoring module H20 of communication controller module sets A and B puts out the following general annunciation signals for floating contact output to the 89NU04 output module in communication controller module set VSA:

- Cabinet temperature too high MTEG
- Cabinet door open (optional) MTKG
- Power supply okay MW (closed circuit)

Disturbances are annunciated by light-emitting diodes on the front of the disturbed module. Signaling for bus terminations 88TB03 is done by light-emitting diodes H11 and H12 on the front of the power supply module.

Cabinet disturbance lamp H20 and/or cabinet row disturbance lamp H21 can be activated optionally.
Terminal assignments

**Power supply**

Supply A, terminal strip X1, (Figure 4)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>USA</th>
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</thead>
<tbody>
<tr>
<td>3</td>
<td>4</td>
<td>ZA</td>
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</table>

Supply B, terminal strip X1 (Figure 4)

<table>
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</thead>
<tbody>
<tr>
<td>7</td>
<td>8</td>
<td>USB</td>
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</table>

PE conductor, screw-type connection (Figure 4)

PE

**Remote bus, station**

Line A, remote-bus coupling module A3 (Figure 1)

<table>
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<tr>
<th>X1.1</th>
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<tbody>
<tr>
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<td>coming</td>
</tr>
<tr>
<td>.3</td>
<td>signal β</td>
<td>coming</td>
</tr>
<tr>
<td>X2.1</td>
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<td>going</td>
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<td>.2</td>
<td>signal α</td>
<td>going</td>
</tr>
<tr>
<td>.3</td>
<td>signal β</td>
<td>going</td>
</tr>
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</table>

Line B, remote-bus coupling module A4 (Figure 1 and 4) as for connection of line A

**Remote bus, communication controller**

Line 1, AA45:

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</thead>
<tbody>
<tr>
<td>.2</td>
<td>signal α</td>
</tr>
<tr>
<td>.3</td>
<td>signal β</td>
</tr>
</tbody>
</table>

Line 2, AA53: as for line 1

Line 3, AA61: as for line 1

**Process cables**

The process cables are connected directly to the female connectors of the modules in the sub-racks. The terminal assignments are given in the respective module descriptions.

**Options**

Door contact, connector X3 (Figure 1 and 4)

<table>
<thead>
<tr>
<th>20</th>
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</thead>
<tbody>
<tr>
<td>25</td>
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<td>UM</td>
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</tbody>
</table>

Cabinet lamp, connector X3 (Figure 1 and 4)

<table>
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<th>26</th>
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<th>UM</th>
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<tr>
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<td>3</td>
<td>LMF1</td>
</tr>
<tr>
<td>27</td>
<td>3</td>
<td>Z</td>
</tr>
</tbody>
</table>

Cabinet row lamp, connector X3 (Figure 1 and 4)

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<th>22</th>
<th>3</th>
<th>LMRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>4</td>
<td>Z</td>
</tr>
<tr>
<td>26</td>
<td>3</td>
<td>UM</td>
</tr>
</tbody>
</table>

Connection plan

Communication controller module set VSA in cabinet 89MS01/R0300 has to be connected through cables with communication controller module set VSB in cabinet 89MS01/R0400 according to a predefined system. The cabling and connection schematic is shown in Figure 6.

In output module 89NU04 in the VSA communication controller module set, the following isolated signals SOE (sequence of events) are available for connection to an annunciation system, and the following isolated signals CDS are available for connection to the CDS (control diagnosis system):

- CDS Voltage supply VSA A02
- CDS Voltage supply VSB A03
- SOE Voltage supply VSA, VSB A31
- CDS Temperature monitoring VSA A07
- CDS Temperature monitoring VSB A08
- SOE Temperature monitoring VSA, VSB A33
- CDS Cabinet door open VSA A10
- CDS Cabinet door open VSB A11
- SOE Cabinet door open VSA, VSB A34
- CDS Module disturbed US A12
- CDS Module disturbed VSA A13
- CDS Module disturbed VSB A14
- SOE Module disturbed US, VSA, VSB A35
- SOE Prio 1 A fault in VSA, VSB A15
- SOE Prio 1 B fault in VSB A16
- SOE Connection VSA, VSB, US disturbed STÜ A19

**Tests and inspections**

For quality assurance, each cabinet is inspected for completeness and proper mechanical functions.

An unequipped cabinet cannot be checked for proper electrical functions. Instead, a wiring inspection is carried out. The insulation resistance is tested according to the identical standards VDE 0160 or VDE 0660, part 500/IEC 439-1.
Figure 6: Cabling and connection schematic VSA - VSB.
Options

To meet different plant requirements, optional solutions are available.

Protection type and Ventilation

The grid-type roof plate (IP30) can be provided with an additional full-metal protective sheet (IP31) or can be replaced by a full-metal sheet (IP11). The overall height of the cabinet is then 2,290 mm.

For connecting the station-bus cabinet via ducts to a central ventilation system, a specific roof plate is available, suitable for attaching different ventilation ducts:
- Ventilation duct, complete
- Ventilation duct, complete with cloth nozzle
- Ventilation duct, cover
- Ventilation duct, complete cover with cloth nozzle

In that case, the height of the cabinet is 2,450 mm.

Door locks

The 3 mm two-way key lock can be exchanged for a 5 mm two-way key lock, catch-type or T-handle.

The rod-type lock for a 3 mm two-way key may be exchanged for a rod-type lock with a locking cylinder for 3 mm or 5 mm two-way key inserts, catch-type or T-handle.

Cabinet- and cabinet row disturbance lamps

A cabinet lamp can be provided on the station-bus cabinet front annunciating cabinet disturbances.

In addition to the cabinet lamp, a cabinet row lamp can be activated. This cabinet row lamp annunciates disturbances within a cabinet row and is mounted on the front side of a cabinet row.

Coatings

Upon request, special coats of paint in different shades or coat thickness may be applied.

Door contacts

The cabinet can be monitored for open doors by means of additional door limit switches. The limit switches are activated by the right door leaf of the double-wing door.

89NG03 power supply module

If in addition to the slots used on sub-rack G more slots with an external 5 V supply are needed, another 89NG03 power supply module can subsequently be mounted on sub-rack K. This additional power supply module will then be connected to connector X5 (Figure 1 and 4). Miniature circuit breaker F6 has to be bridged. The increase in the power dissipation of the cabinet requires an additional forced ventilation (air suction facility, fans).
Technical data

Mechanical features

Dimensions
- Height: 2200 mm (2290 mm with optional roof plates)
- Width: 900 mm
- Depth: 400 mm

Type of installation
- Single-cabinet or cabinet-row installation with free access from the front and the back

Weight
- approx. 230 kg without modules

Type of protection
- IP30 (IP11, IP31 for optional roof plates)

Connections
- Power supply (X1): Screw-on terminals, 35 mm²
- Process signals: To process modules
- Cable screens of the process cables: Voltage bus ZEP 6.3/2.8 mm plug-type connection flex up to AWG 20
- Cabinet and cabinet row disturbance lamp (X7): 5.08 screw-on terminal 2.5mm² plug is delivered with the cabinet
- Fan set: Plug-in connector at connection pole 0.6 x 0.6 mm on station bus p.c.b.
- Color: Sheets, RAL 7032 Profile sections, matt white
- Surface protection: Profiles and cable compartment zinc-coated.
- Visible outside elements with pulverized coating in addition to EC standard enamel. Minimum coat thickness 60 ... 90µm.
- Cabinet inscription: Inscription area 180 x 30 mm

Ambient conditions
- Storage temperature: -40 °C up to +70 °C
- Operating temperature: 0 - +40 °C, DIN VDE 0160, IEC 68-2-2
- Relative humidity: DIN IEC 721-3-3, code letter 3K3, 5 °C up to 40 °C
- Type of cooling: Natural ventilation up to
  - 35 °C and power dissipation = 385 W
  - 40 °C and power dissipation = 280 W
  - For higher power dissipation (additional 89NG03 power supply modules) forced ventilation with cooling air is required
  - 35 °C and power dissipation = 600 W 150 m³/h
  - 40 °C and power dissipation = 600 W 225 m³/h
Electrical features

**Power supply**

Voltage \[ U_N = 24 \text{ V DC, tolerance at supply terminal } 22.0 \ldots 30.0 \text{ V} \]

Harmonics \[ \leq 5\% \text{ depending on connection to an unfiltered three-phase bridge connection} \]

Over voltage
- \[ 35 \text{ V / 500 msec} \]
- \[ 45 \text{ V / 10 msec} \]
- \[ 2 \times U_N \text{ at } T = 0.4 \text{ msec half-value duration} \]
  (over voltage-strength class 2)

DIN VDE 0160 (draft)

Voltage variation
- during connection and disconnection \[ \geq 0.2 \text{ V/msec} \]
- during operation, 19.5 V up to 30.0 V \[ \text{Arbitrary} \]

Admissible voltage-free interval \[ \leq 1 \text{ msec} \]

Current \[ I_N = 32 \text{ A, depending on equipment installed} \]

Starting current inrush \[ I = 10 \times I_N, \text{ max. 3 msec (capacitor loading)} \]

Back-up fuse \[ \text{Max. 63 A gL} \]

Min. short-circuit current \[ \geq 100 \text{ A at the cabinet supply terminals} \]

Protective measures for power supply and process connections
- Functional extra-low voltage with safety isolation,
- protective conductor connection for local equipotent bonding

Electrical environment

Electrostatic discharge \[ 8 \text{ kV (air discharge)} \]
- \[ 4 \text{ kV (contact discharge)} \]
  DIN EN 61000-4-2, IEC 1000-4-2

Fast transients/pulses (burst) \[ 2 \text{ kV} \]
- for power supply \[ \text{DIN EN 61000-4-4, IEC 1000-4-4} \]

Surge voltage \[ 2/1 \text{ kV} \]
- for power supply \[ \text{DIN EN 61000-4-5, IEC 1000-4-5} \]

The data listed above apply to cabinets with PROCONTROL standard equipment.

Scope of supplies

Station-bus cabinet 89MS02/R1300 and R1400 respectively (order number GKWE 602 344 R1300 and R1400 respectively) is supplied tested and ready for connection.

The scope of supplies does not include:

- The electronic modules to be mounted on the sub-racks,
- Accessory parts and options according to the list given under ‘Ordering data’.

The scope of supplies does include:

- All fixed and wired electrical operational equipment
- Fixing material for cabinet installation
  (screws, bolts, clamping straps, disks) delivered with the cabinet, separately packed
- Bus-terminating resistors
- Plug in the signaling and annunciation circuit for connecting the power supply unit.
ORDERING DATA

Station-bus cabinet, complete, with communication controller module
set A, type 89MS01/R1300
set B, type 89MS01/R1400

Accessory parts
for end cabinet of a cabinet row and for single-cabinets
Partition wall and mounting material
Side wall and mounting material

Options
Door contacts, right door, front and back
including installation and wiring
Cabinet lamp including installation and wiring
Cabinet row lamp including installation and wiring
Special enamelling (shade and layer thickness)

Optional exchange parts
Rod-type lock for two-way key, 5 mm
Rod-type lock, catch-type handle
Rod-type lock, T-handle
Rod-type lock for cylinders for two-way keys, 3 mm
Rod-type lock for cylinders for two-way keys, 5 mm
Rod-type lock for cylinders, catch-type handle
Rod-type lock for cylinders, T-handle
Roof cover (without grid)
Spare filter mat

For optional additional ventilation with air-suction facility
Double-wing door in the back, without door lock
to be exchanged for air-suction application
Roof sheet, complete for ventilation duct
  * Ventilation duct, complete
  * Ventilation duct, complete with cloth nozzle
  * Ventilation duct cover
  * Ventilation duct cover, complete with cloth nozzle
* = accessory parts for roof sheet with ventilation duct

For optional additional ventilation with fan set
Fan set

Technical data subject to change without notice!