Module Description

Procontrol P
Mechanical Components

Station- Bus Cabinet
For 2 Stations
EMC-Version

89MS02/R1100

Application

The Station- bus cabinet is designed to house 2 PROCONTROL stations, each for a maximum of 50 PROCONTROL input, output, or processing modules. 2 sub racks are provided per station.

The arrangement of the modules is shown in Figure 1. The PROCONTROL stations are coupled to the remote bus via remote-bus connection in a separate sub rack.

The two stations are coupled by the RS485 interface to the remote-bus connection.

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

Connection to the redundant remote bus is established with the modules 88FK05, 88FT05, 88TK05 in the form of single- or double-channel circuitry.

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 and rear through ventilation grids with filter mats in the doors 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, 24 inch wide, each for 26 electronic modules, utilization is limited by the maximum power dissipation of the cabinet (see chapter on cabinet equipment) and a power supply module for power distribution.

The EMC – proven 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 2.5x6mm grooved drive studs.
Figure 1: PROCONTROL – Station - bus cabinet with 4 sub racks, 24 inch wide, 160 mm depth with remote bus
Remote-bus coupling

Figure 2: Remote-bus coupling

Mechanical design

Cabinet design

The station-bus cabinet design is based on ABB’s MNS system. The cabinet has double-wing doors in the front and in the back provided with ventilation slots, a roof plate made of expanded metal, and a full-metal partition wall. The cabinets are suitable for row installations.

A 0x75mm cable duct on the bottom frame on the cabinet rear allows cross-cabling from cabinet to cabinet. The partition wall has a suitable cut-out.

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:

- For left-end cabinet
  1 side wall
- For right-end cabinet
  1 side wall and
  1 partition wall
- For single cabinet
  2 side walls and
  1 partition wall

Cabinet installation

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

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

For proper 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
Electrical design

Figure 4: Power supply, cabinet annunciation, and remote-bus coupling
Power supply

The station-bus cabinet receives a redundant 24V DC supply from two separate power supply systems. The power supply module 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 redundant 24V DC power supplies are kept separate and non-interfering up to each individual electronic module.

System settings

<table>
<thead>
<tr>
<th>Module– space</th>
<th>Slot raster element</th>
<th>Address– setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>sub rack A</td>
<td></td>
<td></td>
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<tr>
<td>sub rack B</td>
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<tr>
<td>sub rack C</td>
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<td>sub rack D</td>
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<td>sub rack E</td>
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<td>sub rack I</td>
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<tr>
<td>sub rack J</td>
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<tr>
<td>sub rack K</td>
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<tr>
<td>sub rack L</td>
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<td></td>
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<td>sub rack M</td>
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<td>sub rack N</td>
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<tr>
<td>sub rack O</td>
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<td>sub rack P</td>
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<td>sub rack Q</td>
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<td>sub rack S</td>
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<tr>
<td>sub rack T</td>
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<tr>
<td>sub rack U</td>
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<tr>
<td>sub rack V</td>
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<td>sub rack X</td>
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<tr>
<td>sub rack Y</td>
<td></td>
<td></td>
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<tr>
<td>sub rack Z</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rear view of sub rack * Option

Bild 5: Address– setting
Address setting

Throughout the PROCONTROL 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 SRA and GTA5 on the identical 89IL07 station-bus p.c.b cf. Figure 5.

The setting is done in the factory and must not be changed.

The station addresses are set on station-bus coupling module 88TK05.

Operating mode setting

The operating mode is set on station bus coupling module 88TK05. This setting is done in the factory and must not be changed.

Remote-bus connection settings

In the last stations, the remote bus must be provided with the remote bus termination on remote-bus junction module 88FK05

Screen and protective conductor

In addition to the connections of the redundant power supply, each cabinet is equipped with a screen connection for the earthing of the cable screens of the process cables, and an earth connection for the earthing of the casing.

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 Figures 1 and 4

In the 89NG08 power supply module, the individual cabinet signals are scanned and are put out as general signals for further annunciation purposes. On the front of monitoring unit of the supply module, the following annunciations are provided:

Cabinet annunciation's
- Power supply A available USA
- Power supply B available USB
- Flashing voltage available BLS
- Lamp check TL (not used)
- Cabinet door open MTK (Optional)
- Cabinet temperature too high MTE

Station annunciation's
1 2 3 4
- Supply m.c.b. off MSP1 x x - -
- Power supply disturbed MSP2 - - - -
- Power supply disturbed station-bus termination 1 MSP3 x x - -
- Power supply disturbed station-bus termination 2 MSP4 x x - -
- Electronic module disturbed MST x x - -
- Temperature fault MTE x x - -
optional for additional fans

x = connected
- = not used

For cabinet annunciation's, the following signal outputs are available:
- Cabinet disturbance, optional for cabinet-lamp H20 LMF
- Cabinet disturbance, optional for cabinet-row lamp H21 LMRA

For evaluation in a central annunciation system, for each of the 2 stations, the following general signals are put out on the bus via bus-coupling module 88TK05
- Cabinet door open (optional) MTKG
- Temperature fault MTEG
- Power supply okay (closed-circuit principle) MW

Bus-coupling module 88TK05 puts out signal MST to the power supply module in order to energise the cabinet and/or cabinet row lamp.

Cabinet lamp H20 and/or cabinet row lamp H21 can be activated optionally. The disturbances are annunciated by light-emitting diodes on the front of the disturbed module. Signaling for bus terminations 88TB07 is done by light-emitting diodes of monitoring unit A1 on the front of the power supply module.
Terminal assignments

**Power supply**

Supply A, terminal strip X1, (Figure 4)

| 1,2 | US | 3,4 | Z |

Supply B, terminal strip X1, (Figure 4)

| 7,8 | US | 5,6 | Z |

Protective conductor PE, screw-type connection (Figure 4)

**Remote bus**

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

- X1.1 Screen coming
- X1.2 Signal α coming
- X1.3 Signal β coming

Line B, remote bus coupling module A4 (Figure 1)

Terminal assignment see Line A

**Process cables**

The process cables are connected to signal distribution strips on the rear of the cable compartment. For this purpose, the standard version is provided with 50 rows of 8-pole connectors. The other 50 rows are used for connecting the input and output modules. Additionally, 88 terminal blocks (11 x 8) with screw-type and Termi Point connections are available for connecting solenoid valves.

**Options**

Door contacts, connector X6 (Figure 4)

| 2  | MTK |
| 1  | UM  |

Cabinet lamp, connector X7 (Figure 4)

| 10 | UM |
| 11 | TL |
| 8  | LMF|
| 9  | Z  |

Cabinet row lamp, connector X7 (Figure 4)

| 7  | LMRA|
| 5  | Z   |
| 4  | UM  |

Fan set on sub rack (Figure 4).

The connection is made by means of plug-in poles on station-bus p.c.b. 89IL07

| X203 | USA |
| X202 | USB |
| X201 | Z   |
| X213 | ML2 |
| X214 | UM  |

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.
Cabinet equipment

In case all available slots are used for modules of elevated power dissipation values, the limit value for the permissible power dissipation at a max. ambient temperature for the cabinet may be exceeded. Above the permissible power dissipation values, an additional ventilation facility is required, see under „Options“.

Considering plant-specific factors of simultaneous operation and considering a supply voltage of 27V at the module terminals, the cabinet may be equipped according to the table below without additional ventilation measures being required.

<table>
<thead>
<tr>
<th>Slot</th>
<th>Module Type</th>
<th>No. of Module/Station per cabinet</th>
<th>Room-temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A TK TK</td>
<td>81EU01</td>
<td>25 °C</td>
</tr>
<tr>
<td>2</td>
<td>D x x</td>
<td>83SR04</td>
<td>50/100</td>
</tr>
<tr>
<td>3</td>
<td>G TK TK</td>
<td></td>
<td>30 °C</td>
</tr>
<tr>
<td>4</td>
<td>K x x</td>
<td>83SR04</td>
<td>47/94</td>
</tr>
<tr>
<td>5</td>
<td>A TK TK</td>
<td>81EU01</td>
<td>24/48</td>
</tr>
<tr>
<td>6</td>
<td>D x x</td>
<td>83SR04</td>
<td>38/76</td>
</tr>
<tr>
<td>7</td>
<td>G TK TK</td>
<td></td>
<td>17/34</td>
</tr>
<tr>
<td>8</td>
<td>K x x</td>
<td>83SR04</td>
<td>26/52</td>
</tr>
<tr>
<td>9</td>
<td>x x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>x x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the case of any deviations from the pattern shown above, special attention is to be paid to even equipment arrangement and to the total power dissipation of the cabinet.
Options

To meet specific plant requirements optional solutions are available.

Protection type

The grid-type roof plate (IP30) can be provided with an additional full-metal protective sheet (IP31) or be replaced by another protective sheet (IP11). The height of the cabinet will then be 2,290 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 can 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 protection cabinet front for the annunciation of 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 coatings of 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.

Additional ventilation

To provide for the discharge of elevated power dissipation values, the following possible additional ventilation solutions are available:

Additional ventilation with air suction facility

A roof plate allowing a ventilation duct to be attached, including various accessories, designed to connect the protection cabinet to a central ventilation system:

- Ventilation duct, complete to be attached to a cabinet row
- Ventilation duct, complete to be attached to a cabinet row including cloth nozzle in the top center for connecting a duct system
- Ventilation duct cover complete cover closing off the ventilation duct at the end of a cabinet row
- Ventilation duct cover with cloth nozzle complete cover for the ventilation duct closing off the ventilation duct at the end of a cabinet row plus connection to a duct system.

When the cabinet is retrofitted for being connected to an air suction facility, the rear cabinet doors need to either be sealed off against air inlet or replaced by closed doors with sealing strips.

Additional ventilation by means of a fan set

The fan set is designed to provide ventilation for the individual sub racks. The fan set is installed in the air inlet area of the sub racks. The electrical connection is established via plug-in connections at the 89IL07 station-bus p.c.b.

![Fan set](image)

Figure 6: Fan set

Each fan is fused separately. The fans have an automatic restart function after a blocking has occurred. Standstill of a fan due to voltage failure or blocking of a fan wheel is monitored and signalled via a floating contact.
Technical data

Mechanical features
Dimensions
Height 2200 mm (2290 mm with optional full-metal roof cover)
Width 900 mm
Depth 400 mm
Installation Single-cabinet or cabinet-row installation with free access from the front and the rear side
Weight Approx. 230 kg without modules installed
Protection type IP30 (IP11, IP31 possible with optional roof covers)
Connections
Power supply (X1) Screw-on terminals, 35 mm²
Remote bus Screw-on terminals 4 mm²
Phoenix Company GSTB 3/3-ST-7.62
Process signals To process modules
MTP 2.4 x 0.8 flex. up to AWG 20
MTP = Maxi-Termi-Point
Cable screens Voltage bus ZEP
of the process cables 6.3/2.8 mm plug-type connection
flex up to AWG 20
Cabinet and Combicon plug
Cabinet rows Phönix MSTB 2.5/10-STF-
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.
89IL07. Connecting lines and plug-in connectors are part of the fan set
Color Sheets, RAL 7032
Profile sections, matt white
Surface protection Profiles and cable compartment zinc-coated.
Sheets with EC standard enamel with kiln-dried top coat.
Visible outside elements with pulverized coating in addition to EC standard enamel. Minimum coat thickness 60 ... 90µm.

Ambient conditions
Bearing temperature -40 ... +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 ... 40 °C

Power dissipation
- Per cabinet
when power dissipation is distributed rather evenly in the cabinet
Natural ventilation in the case of room temperature
up to 25 °C power dissipation = 640 W
30 °C power dissipation = 525 W
35 °C power dissipation = 420 W
40 °C power dissipation = 310 W
Additional ventilation with air suction in the case of room temperature
up to 25 °C power dissipation = 950 W, 140 m³/h
30 °C power dissipation = 950 W, 185 m³/h
35 °C power dissipation = 950 W, 265 m³/h
40 °C power dissipation = 950 W, 530 m³/h
- Per sub rack
in the case of unsymmetrical distributed and/or higher power dissipation of the cabinet
Additional ventilation with fan set in naturally ventilated cabinet up to max. 300 W per sub rack
in the case of room temperature
from 25 °C and power dissipation > 150 W in the sub rack
30 °C and power dissipation > 125 W in the sub rack
35 °C and power dissipation > 100 W in the sub rack
40 °C and power dissipation > 75 W in the sub rack
Electrical features

Power supply

Voltage \( U_N = 24 \text{ V DC}, \text{ tolerance at supply terminal 22.0 ... 30.0 V} \)

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

Over voltage

- 35 V / 500 msec
- 45 V / 10 msec
- \( 2 \times U_N \text{ at } T = 0.4 \text{ msec half-value duration} \)

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 \( I_N = 32 \text{ A}, \text{ depending on equipment installed} \)

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 kV (air discharge)
- 4 kV (contact discharge)

Fast transients/pulses (burst)

- 2 kV for power supply

Surge voltage

- 2/1 kV for power supply

Scope of supplies

The Station-bus cabinet 89MS02/R1100 (order number GKWE 602 410 R1100) 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 of cabinet installation (screws, bolts, clamping straps, disks); delivered with the cabinet, separately packed,
- Bus-terminating resistors,
- Plugs in the signalling and annunciation circuit for connecting the power supply unit.

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

Protection cabinet 89MS02/R1100, complete
Order number: GKWE 602 410 R1100

Accessory parts
At the end of a cabinet row
and for single cabinet installations
Partition wall and mounting material
Side wall and mounting material
Partition wall and mounting material
Order number:
Ordering number: GKE 602 306 R0011
Ordering number: GLBK 300 022 R0001

Options
Door contacts for right door, front and back
incl. installation and wiring
Cabinet lamp incl. mounting and wiring
Cabinet row lamp incl. mounting and wiring
Special enamelling (shade and layer thickness)
Order in clear text
Order number:
Ordering number: GKE 602 331 R0003
Ordering number: GKE 602 330 R0003
Ordering number: GKE 602 369 R0003
Ordering number: Order in clear text

Optional exchange parts
Rod-type lock for two-way key 5 mm
Rod-type lock with catch-type handle
Rod-type lock with T-handle
Rod-type lock for lock cylinder, 3 mm two-way key
Rod-type lock for lock cylinder, 5 mm two-way key
Rod-type lock for lock cylinder, catch-type handle
Rod-type lock for lock cylinder, T-handle
Roof cover (without grid)
Spare filter mat
Order number:
Ordering number: GLBK 470 016 R0001
Ordering number: GLBK 470 016 R0003
Ordering number: GLBK 470 016 R0004
Ordering number: GLBK 470 016 R0018
Ordering number: GLBK 470 016 R0017
Ordering number: GLBK 470 016 R0019
Ordering number: GLBK 470 016 R0020
Ordering number: GKE 601 128 R0002
Ordering number: GKE 601 879 P0001

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
Order number:
Ordering number: GKE 602 160 R0022
Ordering number: GKE 602 317 R0011
Ordering number: GKE 600 843 R0001
Ordering number: GKE 600 843 R0002
Ordering number: GKE 600 862 R0001
Ordering number: GKE 600 862 R0002

For optional additional ventilation with fan set
Fan set
Order number:
Ordering number: GKE 602 436 R0100

Technical data are subject to change without notice!
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