

PG-MUX-II user manual

(english)



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1 Description

In the general application field, there are two different models:

- Mini-MUX for Siemens S5
- PG-MUX-II for Siemens S5
- PG-MUX-II for Bosch CL200-CL400
- PG-MUX-II for Mitsubishi FX, A
- PG-MUX-II for AEG A120, A250
- PG-MUX-II for Klöckner-Moeller PS-3, PS-4

The Multiplexer for that named controls, briefly PG-MUX-II, is easy to handle because of its rugged metal casing and is thus especially suitable for the mobile use.

The complete electronics are integrated in an industrial metal casing (which is prepared for the mounting of a switchgear cubicle or a switch board). The device can be fastened directly to the switchboard.

Connection mechanics, pin seizure, and electrical data (Mini-MUX only limited) meet the respective control specification. Thus, users can work directly and without special adapters with the normal cables of the devices they want to connect, like for example PGs and control units.

1.1 PG-MUX-II for Siemens-S5

- compatible with all SIMATIC-S5-controls
- immediately ONLINE with both interfaces to the PLC
- can be operated by all original and compatible programming devices
- all connections 20mA active (also to the PLC)

Take notice:

If you work with the L1 Bus parallel to a PG, you must know that the PLC sets behind a received L1-protokoll the receive-bit. You must query this bit to recognise that something is in the receiver. Then you must clean the receiver. But comes a PG-protocol straight behind the L1-protokoll, the PLC resets the receive-bit (the PLC says that something comes into the PLC, but it wasn't a L1-protokoll). To be sure that the program recognise that something is in the receiver, you must scan the bit at difference places in the PLC-program. So you can be sure that you doesn't miss this bit. That problems can appear, if the PLC is slow or the programs are very big.

If two operation panels are connected to the PG-MUX, both must be differently parameterised, damit beide nicht auf die selben Merker oder DB's zeigen, da sonst das SPS-Programm nicht mehr unterscheiden kann, welches Bedienpult nun was bezwecken wollte.

Bei Bedienpulten sollte man generell ein 'TIME-OUT' einstellen (falls möglich), denn wenn ein PG z.B. einen langen DB überträgt, darf das Bedienpult nicht auf TIME-OUT gehen. Gute Werte liegen bei ca. 3-5 sek.

Arbeitet das Bedienpult mit dem PG-Protokoll, kann es passieren, dass das Bedienpult bei einem DB-Zugriff direkt adressiert. Wenn man nun diesen Daten-DB verändert und dann wieder zurückschreibt kann es vorkommen, dass das Bedienpult dies nicht bemerkt und immer noch auf den alten DB zugreift (das Bedienpult merkt dies nicht). Dies kann auch vorkommen, wenn man einen FB o.ä. tauscht, da sich die Speicheraufteilung in der SPS ändert. In diesem Fall kann man die Störungen mit einem Komprimiervorgang beheben (die SPS organisiert sich frisch).

1.1.1 Important to 115V-variant and 24V-variant

The 115V-variant is also supplied with voltage via the cold-advisory-socket. In this case, however, with 115V AC. Thus, this device can be operated in countries such as the United States. Operation in Germany is also possible if the device is supplied with only 115V AC. The functionality is not different from the other multiplexers for Siemens-S5, so it can always be supplied with 24V DC, if no 115V AC are available.

The pure 24V-device is supplied with 24V DC. Please note the pinning of the Phoenix-plug. The device, like the other devices in the family, has reverse polarity protection, but there is no guarantee of damage to any connected devices. Since the operator of the device is responsible.

Please note the polarity of the Phoenix plug!

1.2 PG-MUX-II for AEG

- compatible with the AEG A120, A250-controls
- all PG connections are the same as a AEG A120, A250
- All components are connected as usual without additional adapters
- compact device in a metal casing: 190 x 110 x 50 mm

Take notice:

The usage with a A120 and with a MICRO AEG (with adapters for the MICRO AEG, but not the TSX MICRO) works correctly. At the work with a A250, the PG can try to conform the PLC. The PLC make changes inside and works with different baudrates for a short time. The MUX will may lost the communication, but will find it a few seconds later. The PG will show an error message. In fact, please confirm the function load program into the PLC' without the MUX.

If two operation panels are connected to the PG-MUX, both must be differently parameterised, , damit beide nicht auf die selben Merker oder DB's zeigen, da sonst das SPS-Programm nicht mehr unterscheiden kann, welches Bedienpult nun was bezwecken wollte.

You should generally enter a `time-out` into your OP (if it is possible), because if a PG transfer a large DB (for example), the OP must wait for the next conversation with the PLC. If you increase the time-out, the OP waits for a longer time, can't go into the `time-out`. A good time is 3-5 sec.

1.3 PG-MUX-II for Bosch

- compatible with all CL200-CL400-controls
- all PG connections are the same as a Bosch CL200-CL400 and can be selected as TTY-passive, TTY-active and RS232.
- All components are connected as usual without additional adapters
- compact device in a metal casing: 190 x 110 x 80 mm

Take note:

The PG-MUX for Bosch PLC's supports baudrates of 9600 baud and 19200 baud. The communicationparameters must be 1 stop-bit, 8 data-bit, even parity, no handshake-signals (must be turned off).

How to set these parameters, please read your user manual of the PLC. For the CL200 (for example) you must set switch S1/1 at ON and switch S1/2 at OFF to get the baudrate of 19200 baud. The communication parameters are set hard at 1 stop-bit, 8 data-bit, even parity, no handshake-signals.

For the CL400 you must set switch S1/1 at ON (1 stop-bit) and switch S1/2 at OFF (8 Databits) switch 1/3 at ON (even parity), switch 1/4 at ON (parity on), switch 1/5, 1/6, 1/7 at ON for 19200 Baud, switch S1/8 at OFF (no handshake-signals). The position of the switches and their functions were printed in the user manual of the Bosch-Central-Unit.

If two operation panels are connected to the PG-MUX, both must be differently parameterised, in case of that the operation panels haven't the same FW's and DB's. If the FW's and DB's are the same, the PLC can not distinguish from what OP the data was transferred.

You should generally enter a `time-out` into your OP (if it is possible), because if a PG transfer a large DB (for example), the OP must wait for the next conversation with the PLC. If you increase the time-out, the OP waits for a longer time, can't go into the `time-out`. A good time is 3-5 sec.

1.4 PG-MUX-II for Klöckner-Moeller

- Compatible with PS3 and PS4-201 PLCs
- The PG-connections are identical to the PS3 and PS4 PLCs
- All components are connected as usual without additional adapters
- When the PS4 all required adapter is supplied
- compact device in a metal casing: 190 x 110 x 50 mm

Take note:

At the PG-software, it may possibly occurs that the COM-port of the PC have wrong entries. You must show into the COM.INI file and check the parameters and may change them. Any-where in that file stands:

```
; (English)
; Baudrate: speed at which SUCOSOFT S30-...
; sends and receives data. Permissible values:
; 110, 150, 300, 600, 1200, 2400, 4800, 9600 baud
; ReceiveTimeout: Time that must elapse after the receipt
; of a character before the transfer is aborted with
; an error message. . The value for this parameter
; must be an integer value entered in seconds.
```

...

```
some lines later:
Baudrate=9600
ReceiveTimeout=1
```

This values must be the same.

For the connection to a PS4-201, the connection cables must be make by yourself, because the operation panels often have a 9-pin-connector, but not the rounded DIN-connectors. The cable must be customised with regarding at the connector assignment of the PG-MUX and the con-connector assignment of your operation panel. The connection cable to the PC must be a 9 pol 1:1 cable. The bridges who were needed by the PG-software are connected internally in the PG-MUX at both PG connectors.

If two operation panels were connected to the PG-MUX, both must be differently configured, in case of that the operation panels haven't the same FW's and DB's. If the FW's and DB's are the same, the PLC can not distinguish from what OP the data was transferred. That prob-lem doesn't appears when you use different FW's and DB's.

You should generally enter a `time-out` into your OP (if it is possible), because if a PG trans-fers a

large DB (for example), the OP must wait for the next conversation with the PLC. If you increase the time-out, the OP waits for a longer time, can't go into the 'time-out'. A good time is 3-5 sec.

1.5 PG-MUX-II for Mitsubishi

- compatible with the Mitsubishi FX, A -controls
- all PG connections are the same as a Mitsubishi FX, A.
- All components are connected as usual without additional adapters
- compact device in a metal casing: 190 x 110 x 80 mm

Take note:

At some operation-panels for a Mitsubishi-PLC it can appear that the OP writes into the agreed FW, but the PG doesn't sign these new changes. The cause is that the OP writes with direct addressing into the PLC. The PG makes changes into this area too. The effect is a collision of the contents in the FW and the PG shows wrong information's.

At the operation-panels MAC 10/12 and MAC 40+ must only be entered 'BR' into commands. This is tested from Beijer and Mitsubishi and works correctly. The OP makes now indirect addressing into the PLC and the PG shows the right entries of the FW's.

If two operation panels are connected to the PG-MUX, both must be differently parameterised, in case of that the operation panels haven't the same FW's and DB's. If the FW's and DB's are the same, the PLC can not distinguish from what OP the data was transferred. That problem doesn't appear when you use different FW's and DB's.

You should generally enter a 'time-out' into your OP (if it is possible), because if a PG transfers a large DB (for example), the OP must wait for the next conversation with the PLC. If you increase the time-out, the OP waits for a longer time, can't go into the 'time-out'. A good time is 3-5 sec.

2 System requirements

2.1 Operating system (s)

- no

2.2 Software

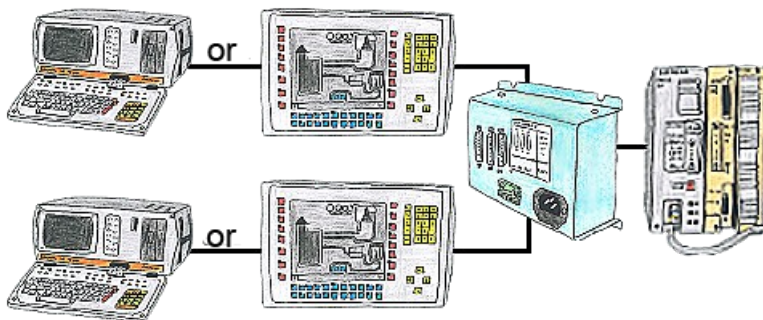
- no

2.3 Hardware

- 230V/AC or 24V/DC power supply
- one to the respective MUX compatible control
- Programming device or operator interface

3 Connecting options

2 Programming devices or operator terminals simultaneously connected to PLC



4 Control elements

4.1 LED

Green LED off: Power OFF / error (Multiplexer is not powered)

Green LED flashes: error (device malfunction or power supply interfere)

Green LED on: Power ON (Multiplexer is supplied with power and runs without error)

5 Installation

5.1 Hardware

To guarantee a service without problems, please lay these devices at the earthing terminal (which is exclusively designed for that) on earth potential!

In order to put the Multiplexers into service, they have to be connected with the voltage supply.

You can connect the PG-MUX-II either to 24V DC or 230V AC. The normal line voltage is connected to the Multiplexer via a cable (which is delivered with the device) at the front of the Multiplexer. If you want to use the 24V DC supply (which is in the switchboard), you must connect it to the green Phoenix-screw terminal next to the 230V voltage part.

The right polarity is printed on the front label. Thus, the MUX-II can be operated independently of its environment with either 24V DCC or 230V AC without any additional appliances.

The Mini-MUX, however, can only be operated with 24V DC. The polarity of this voltage is written down on the label as well.

The connection cable (fifteen-pin, fed through 1to1 of course for the Siemens-control) which is delivered with the PG-MUX-II connects the AG with the Multiplexer. This connection cable is optionally available for the Mini-MUX.

The cable is plugged in on the PG-interface of the plc and is then connected to the AG-interface of the Multiplexer.

From now on, users have two equivalent interfaces at their disposal (except Mini-MUX).

6 Implementing

Connect your module as described in the chapter " Hardware installation " to the PLC and to the programming device or to your computer.



If you want to respond to a PLC via the module you have to comply the requirements as described in the chapter "system requirements" . In addition, please make sure that the module is properly connected

The Multiplexer has two equivalent PG-interfaces (Caution: The Mini-MUX only has one PG- and one OP- interface). These interfaces are AS511- and L1- compatible (Siemens), Buep19/Buep19e (Bosch), Sucom A (Klöckner-Moeller), KS-functions (AEG)..

. After connecting the Multiplexer, it ascertains the necessary identification data of the PLC (slave number, etc.). Both interfaces are now ready. All PG-functions (not Mini-MUX) except "Process Command" can be executed simultaneously at both interfaces.

Either of the two interfaces can be used alternatively for L1. Then, the other interface is available to the programming device or to devices with AS511.

If the MUX works normally, the green LED at the MUX shines. If this light does not shine anymore or if it flashes, a defect has occurred.

6.1 Optimisation of Velocity

- only for the Multiplexers for Siemens-S5 -

In order to achieve a faster Multiplex process between L1 and PG-mode, the Multiplexer sets parameter values with a PG-number to the connected AG when identifying an L1-parameter setting. The PG-number is the same as the L1-slave number.

If now during the operation the S5-user-software sets new parameter values to the AG (for example OB21=Run after Stop) and thus overwrites the PG-number there, a time overflow may occur when the PG is accessed the next time via the Multiplexer.

This problem can be avoided if the S5 programmer always sets parameter values to a PG-number.

In this case, the Multiplex proceedings take place without any problems.

It has to be avoided that the L1-number or the PG-number respectively are changed during the operation since the Multiplexer gets these numbers from the plc only when the connection between the MUX and the plc is established. Thus, the Multiplexer does not recognise it if these numbers have been changed.

The L1- or the PG-number respectively are deposited in word 57 of the operating system.

You can also increase the speed of the operating panels a little, by placing, for the operation required, marker words close together. The access is faster when the control panel can access to FW100-103 without any brake and not to e.g. FW75, then FW106, then FW15 etc.

6.2 Restrictions

For PG-MUX-II for Siemens-S5:

- The operation with L1-protocol is possible only at either of the two PG-interfaces since there is only one master in an L1-system.

- The Multiplexer is the master with reference to the plc.
- The L1-bus is implemented as a slave protocol without interrupt, broadcast, and internet traffic
- In the interest of safety, “Process Command“ has not been and will not be supported.

For PG-MUX-II for Bosch, Mitsubishi, AEG, Klöckner-Moeller:

- At this Multiplexer’s does not work two times status at two PG’s

7 Technical data

Supply voltage:	240V AC 50-60Hz 24V DC +/- 20%
Power consumption:	4 watt
Display:	LED for function and watchdog supervision to the PLC: TTY/20mA current loop (multiplexer active, PLC passiv)
Interfaces:	to the PD/PC: 2 PD x TTY/20mA current loop (multiplexer active, 100 % mechanically and electr. compatible)
Operating temperature:	0 - 55°C
Case:	powder coated metal case with mounting flange
Dimensions:	190 x 110 x 50 mm
<u>Scope of delivery:</u>	PG-MUX-II for Siemens Power-cord PLC-connecting-cable Power connector 2pins big

7.1 Connector assignment PG-MUX-II for Siemens-S5

7.1.1 AG Interface

This Interface should be 1:1 connected with the Siemens-PLC, for a correct work of the Multiplexer. Pin 11, 13 are not connected.

The PG-MUX-II have internally connected active receiver and transmitter. The pins 2, 9, 6, 7 must be connected 1:1 with the PLC.

Pin no.	Notation	Signal name	Direction
1	Mext	external ground	
2	TTY OUT-	transmitter data -	Out
3	+5V	power supply +5V DC	
4	+24V	power supply +24V	
5	GND	internal ground	
6	TTY IN +	receiver data +	In
7	TTY IN -	receiver data -	In

8	Mext	external ground	
9	TTY OUT +	transmitter data +	Out
10	M24V	ground +24V	
11		20mA Transmitter current source	
12	GND	internal ground	
13		20mA Receiver current source	
14	+5V	power supply +5V	
15	GND	internal ground	

7.1.2 PG1/PG2 interface

This pinning is the same pinning of the PG-Interface on a Siemens S5

Pin no.	Notation	Signal name	Direction
1	Mext	external ground	
2	TTY IN –	receiver data –	In
3	+5V	power supply +5V DC	
4	+24V	power supply +24V	
5	GND	internal ground	
6	TTY OUT +	transmitter data +	Out
7	TTY OUT –	transmitter data -	Out
8	Mext	external ground	
9	TTY IN +	receiver data +	In
10	M24V	ground +24V	
11	I-OUT	20mA transmitter current source	
12	GND	internal ground	
13	I-OUT	20mA receiver current source	
14	+5V	power supply +5V	
15	GND	internal ground	

7.2 Connector assignment PG-MUX-II for AEG

7.2.1 AG interface

The Multiplexer should be connected with a 1:1 cable to the AEG A120, A250 PLC

Pin no.	Notation	Signal name	Direction
2	RxD	receiver data	In
3	TxD	transmitter data	Out
5	GND	internal ground	In
7	RTS	request to send	In
8	CTS	clear to send	Out

7.2.2 PG1/PG2 interface

This pinning is the same pinning of the PG-Interface on a AEG A120, A250 PLC

Pin no.	Notation	Signal name	Direction
2	TxD	transmitter data	Out
3	RxD	receiver data	In
5	GND	internal ground	In
7	CTS	clear to send	Out
8	RTS	request to send	In

7.3 Connector assignment PG-MUX-II for Bosch

7.3.1 AG Interface

The Bosch CL200, CL300, CL400 works to the PLC with RS232.
The Multiplexer should be connected with a 1:1 cable to the PLC.

Pin no.	Notation	Signal name	Direction
1	shield	external ground	
2	RxD	receiver data	In
3	TxD	transmitter data	Out
6	DTR	data terminal ready	In
7	GND	internal ground	In
20	DSR	data set ready	Out

7.3.2 PG1/PG2 interface V24

This pinning is the same pinning of the PG-Interface on a Bosch CL200, CL300, CL400.

Pin no.	Notation	Signal name	Direction
1	shield	external ground	
2	TxD	transmitter data	Out
3	RxD	receiver data	In
6	DSR	data set ready	Out
7	GND	internal ground	In
20	DTR	data terminal ready	In

7.3.3 PG1/PG2 interface TTY passive

This pinning is the same pinning of the PG-Interface on a Bosch CL200, CL300, CL400.

Pin no.	Notation	Signal name	Direction
1	shield	external ground	
11	DSR +	data set ready +	Out

12	TTY IN –	receiver data -	In
13	TTY OUT –	transmitter data -	Out
14	DSR –	data set ready -	Out
16	RDRCTL –	data terminal ready -	In
19	RDRCTL +	data terminal ready +	In
22	TTY IN +	receiver data +	In
23	TTY OUT +	transmitter data +	Out

7.3.4 PG1/PG2 interface TTY active

This pinning is the same pinning of the PG-Interface on a Bosch CL200, CL300, CL400.

Pin no.	Notation	Signal name	Direction
1	shield	external ground	
12	TTY IN +	receiver data +	In
13	TTY OUT +	transmitter data +	Out
14	DSR +	data set ready +	Out
16	RDRCTL +	data terminal ready +	In
18	DSR –	data set ready -	Out
21	RDRCTL –	data aterminal -	In
24	TTY IN –	receiver data -	In
25	TTY OUT –	transmitter data -	Out

7.4 Connector assignment PG-MUX-II for Klöckner-Moeller

7.4.1 AG interface PS3 (RS485)

The Multiplexer should be connected with a 1:1 cable to the Klöckner-Moeller PS3 PLC

Pin no.	Notation	Signal name	Direction
1	shield	external ground	In
3	TD/RD+	signal line A	Bi-Di
5	GND	internal ground	In
7	TD/RD-	signal line B	Bi-Di
9	+5V	current supply +5VDC	In

7.4.2 PG1/PG2 interface PS3 (RS485)

This pinning is the same pinning of the PG-Interface on a Klöckner-Moeller PS3-PLC.

Pin no.	Notation	Signal name	Direction
1	shield	external ground	In
3	TD/RD+	signal line A	Bi-Di
5	GND	internal ground	In

7	TD/RD-	signal line B	Bi-Di
9	+5V	current supply +5V DC	In

interface of the PS4-201 (RS232):

This Multiplexer have 3x9-pin ports with Sub-D-connectors. These connectors have at both ports the pinning of an inverted PC-port (its the counterpart of a PC-port). So you can use a 1:1 cable. The PLC port have the same pinning as a PC, so you can use the original PLC cable to connect the MUX with the PLC

For the connection to a PS4-201, the connection cables must be make by yourself, because the operation panels often have a 9-pin-connector, but not the rounded DIN-connectors. The cable must be customised with regarding at the connector assignment of the PG-MUX and the connector assignment of your operation panel. The connection cable to the PC must be a 9 pol 1:1 cable. The bridges who were needed by the PG-software are connected internally in the PG-MUX at both PG connectors.

If you want to make you own cable with the rounded DIN connector, you need a DIN 41524 connector with 8 pins.

7.4.3 AG interface PS4-201 (RS232)

Pin MUX	DIN-male plug	Notation	Signal name	Direction
2	5	RxD	receiver data	In
3	2	TxD	transmitter data	Out
5	3	GND	internal ground	In

7.4.4 PG1/PG2-interface PS4-201 (RS232)

Pin MUX	DIN-male plug	Notation	Signal name	Direction
2	5	TxD	transmitter data	Out
3	2	RxD	receiver data	In
5	3	GND	internal ground	In

7.5 Connector assignment PG-MUX-II for Mitsubishi

7.5.1 AG interface

The Multiplexer should be connected with a 1:1 cable to the Mitsubishi FX, A PLC.

Pin no.	Notation	Signal name	Direction
2	TxD +	transmitter data +	Out
3	RxD +	receiver data +	In
4	RTS +	request to send +	In
5	CTS+	clear to send +	Out
7	GND	internal ground	In
8	GND	internal ground	In
12	+5V	current supply +5VDC	In
13	+5V	current supply +5VDC	In

15	TxD –	transmitter data -	Out
16	RxD –	receiver data -	In
17	RTS –	request to send -	In
18	CTS –	clear to send -	Out
20	0V	ident1	In
21	PWE\	ident2	In
24	+5V	current supply +5VDC	In
25	+5V	current supply +5VDC	In

7.5.2 PG1/PG2 interface

This pinning is the same pinning of the PG-Interface on a Mitsubishi FX, A PLC.

Pin no.	Notation	Signal name	Direction
2	RxD +	receiver data +	In
3	TxD +	transmitter data +	Out
4	CTS+	clear to send +	Out
5	RTS +	request to send +	In
7	GND	internal ground	In
8	GND	internal ground	In
12	+5V	current supply +5VDC	In
13	+5V	current supply +5VDC	In
15	RxD –	receiver data -	In
16	TxD –	transmitter data -	Out
17	CTS –	clear to send -	Out
18	RTS –	request to send-	In
20	0V	ident1	In
21	PWE\	ident2	In
24	+5V	current supply +5VDC	In
25	+5V	current supply +5VDC	In

8 Troubleshooting

8.1 Troubleshooting

LED on MUX is dark

Is the supply voltage not applied or poled correctly?

The MUX operates with troubles

Is the earth-cable connected?

Are some unspecified cables connected?

The OP does not operate at the Mini-MUX

Is the OP passive or does it need voltage from the MUX?

Is it plugged in the PG-socket and does it work with L1?

The OP operates with troubles?

Is it possible to adjust “Time out“ at the OP?

Does it work with a cross protocol?

Are the power sources of the OP alright (when operating with the Mini-MUX)?

The L1-bus operates with troubles

Is the receive buffer bit enquired too slowly?

(this bit disappears with a following PG-access, so please enquire several times)

The L1-BUS does not operate at all

Has the PG/L1-number in the plc changed?