

11.1 Prerequisites, settings

11.1.1 Complement

PLC 130 WB, Central controller unit 6ES5 921-3WB with receptacles for two EPROM submodules with maximum 16 K user program instructions. Furthermore, a RAM memory of 2.9 K instructions is provided on the module. Hereof, the basic interface program occupies:

with 1 NC : 950 words RAM (DB 10, 14, 15, 21)

with 2 NCs : 1130 words RAM (DB 10, 14, 21, 23)

with 3 NCs: 1310 words RAM (DB 10, 14, 15, 21, 23, 25)

with 4 NCs: 1490 words RAM (DB 10, 14, 15, 21, 23, 25, 27)

The remaining RAM memory is available for the user program (DB 9 for PLC machine data, standard function block package 0 to 7, machine control program and others).

EPROM submodules

1st submodule is for the basic interface program (always included when delivered).

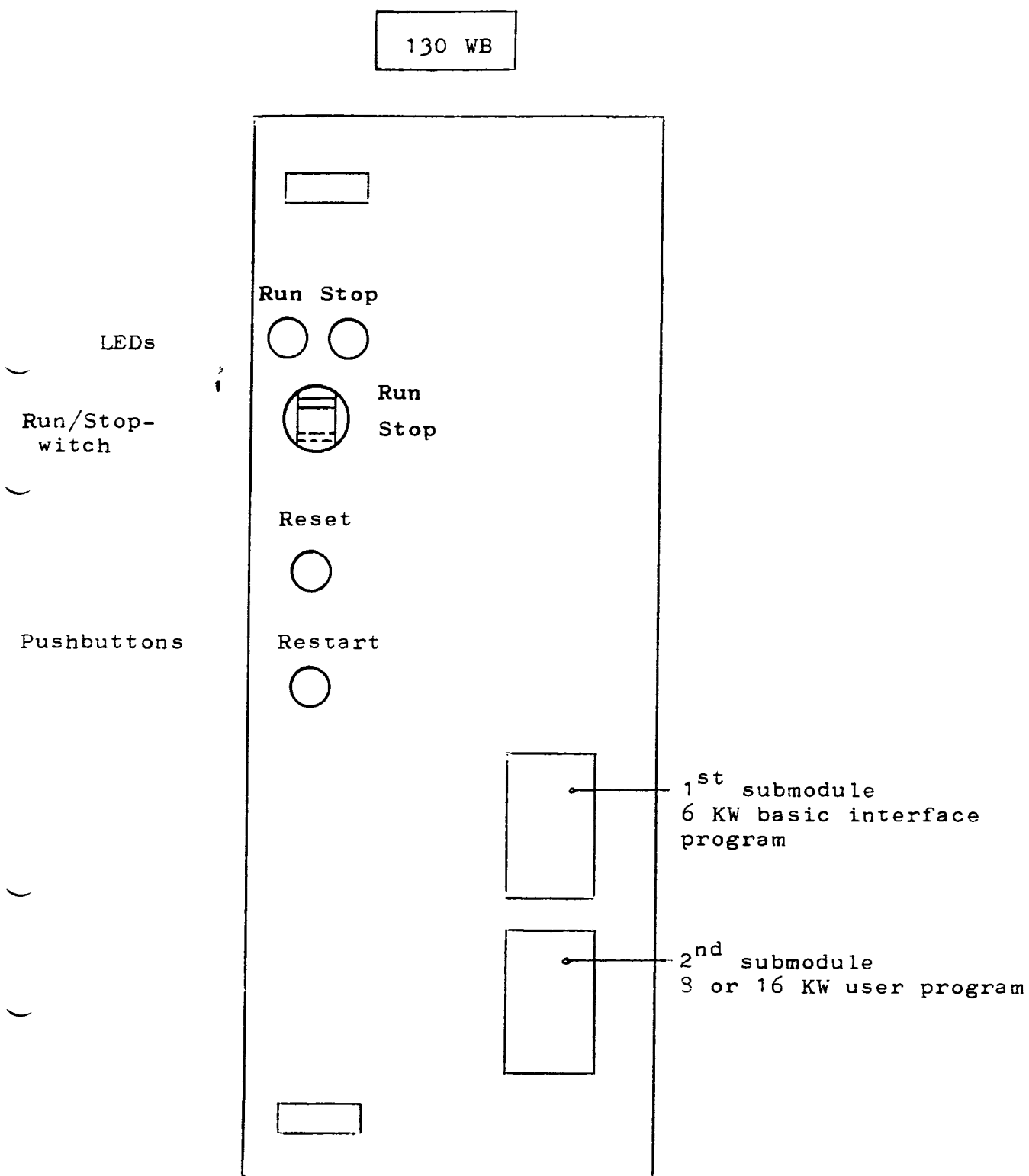
Type 01210 AA, with 3 EPROMs type 2732 fitted or
Type 01210 BA, with 2 EPROMs type 2764 fitted.

2nd submodule is for the user program

8 KW for user option N32, type 01210 BA
with 2 EPROMs type 2764

16 KW for user option N32, type 01210 BA
with 4 EPROMs type 2764

11.1.2 Front view of the central controller unit 6ES5921-3WB



11.1.3 Function of the pushbuttons, switches and LEDs

- Manual system cold restart (new start): OB 20
is performed by switching the run/stop switch on the CPU from run to stop and back to run.
- Manual system cold restart with reset of the retentive flags/timers/counters: OB 20.

Switch the run/stop switch from stop to run while keeping the "reset" pushbutton simultaneously actuated.
- Manual warm start (restart): OB 21
Switch the run/stop switch from stop to run while keeping the "reset" pushbutton actuated simultaneously:
- Automatic warm restart after power-off: OB 22
Run/stop switch remains in "run" position while the PLC power supply is switched on.
- Initial clear of the PLC-RAM: Refer to Section 11.5.2.
- Green LED is on: PLC runs.
- Red LED is on: PLC circles in the stop loop.
- Green and red LEDs on: PLC is in the cold restart routine.

11.2 System start-up routines of the 130 WB

11.2.1 System cold restart (OB 20)

11.2.1.1 System cold restart without reset

If no organization block OB 22 is entered in the address list on automatic restart (power-on after mains failure), a system cold start OB 20 is performed. The system cold restart of the PLC is carried out when the run /stop switch is switched from STOP position to RUN position.

Prior to branching into the user program the following functions are performed on system cold start:

- Checking the system program memory (sum check)
- Checking the user memory
- Establishing the address lists: Only those blocks are entered into the address list which are identified as valid.
- Clearing (reset) of the following components:
 - Non-retentive flags (FB 128 to FB 255)
 - Process image of inputs
 - Process image of outputs
 - Input- and output modules
 - Analog peripheral modules
- Establishing a module check list. All fitted and functioning input- and output modules are registered in this check list.
- OB 20 is called up during the system cold restart prior to the start of the cyclic processing of the user program. This organization block can be used to default the control in a defined starting condition.
- Periphery check
- Sum check via the user memory.

The system cold restart is indicated by the green and red LED on the CPU of the PLC, which are both on simultaneously.

11.2.1.2 System cold restart with reset

An additional reset of the PLC is performed, if the RESET pushbutton is actuated during initialization of a system cold restart (Run /stop switch is switched from STOP to RUN position). Stored results and operating conditions are no longer taken into account. System cold restart with reset causes the additional clearing (reset) of the following components:

- Counters
- Timers
- Retentive flags (FB 0 to FB 127)

All other functions of the system cold restart are the same as above.

11.2.2 Warm restart; OB 21, OB 22

Warm restart is a start-up routine which takes results and operational conditions prior to the interrupt into account. In comparison to a system cold restart, the following functions are dealt with differently:

- Counters, timers and flags remain unchanged.
 - No address list is established.
 - The process image of the inputs is not updated with the status of the input modules.
 - The module check list is not updated prior to calling up organization blocks OB 21, OB 22. (No new scanning of the peripheral modules.)
 - The outputs on the modules are reset.
 - The cycle time monitor is retriggered for the remaining part of the interrupted cycle.
 - Program processing is continued from the point of the interruption. The necessary data are stored in the interrupt stack. The interrupted cycle is continued from the point of interruption on, in order to complete calculations, for example, before a new cycle is started again.
 - Process image of the outputs: The process image of outputs must not be transferred to the output modules at the end of the interrupted cycle, because, due to the interruption, it may be out of step with the machine conditions.
- Both the process image and the outputs on the output modules are reset at the end of the interrupted cycle. Subsequently, the command output disable is removed and the driver stages of the output modules become operational again. Afterwards, regular cyclic operation is resumed.
- As with system cold restart, a sum check covering the operating system and the user program is carried out.

If a warm restart is permitted, the user can default operating data machine specifically by using organization block OB 22 (warm restart after power failure) or organization block OB 21 (warm restart).

If a warm restart is interrupted at any point, the operating system branches into the stop loop if a warm restart is reattempted. The "NEUSTART" and "NIWIED" interrupt flags are set.

11.2.2.1 Manual warm restart (OB 21)

A manual warm restart is performed if the run/stop switch is switched from STOP to RUN position while the restart pushbutton is actuated simultaneously. A manual warm restart is carried out irrespective of the existence of organization block OB 21 or OB 22.

If the "NEUSTART" interrupt flag (SD 6 H5) is set, a manual warm restart attempt is suppressed. The operating system then branches into the stop loop. The "NIWIED" interrupt flag (SD 7 L4) is set. Regular operation can only be achieved by system cold start.

11.2.2.2 Automatic warm restart (OB 22)

An automatic warm restart is only carried out on power-on after mains failure. No interrupt flags may be set which inhibit the automatic warm restart. An automatic warm restart is carried out successfully if the following conditions are satisfied:

- The run/stop switch must be in RUN position.
- The back-up battery must be in good condition.
- Organization block OB 22 must be entered in the address list (DB 0). If not, OB 20 is processed.

12.1 PLC central unit 130-WB (6ES5921-3WB)

PLC-CPU with slots for two EPROM submodules.

One EPROM submodule for the basic PLC program.

One EPROM submodule for maximum 16 k user program

9 kByte RAM, there of 2,9 k words for PLC user program.

Microprocessor 8 x 305.

The 130 WB module consists of 2 boards:

CPU-130 W and memory board 01200. Both are connected electrically via a flat ribbon cable.

For significance of switches and LEDs on the front plate refer to Section 11.

Fixed jumpers for CPU-130 W (U1):

Type	Designation	Signal	Closed/open	Remark
Individual link	F-G		closed	
Individual link	K-L		closed	

P1 to P5 are test sockets

Fixed jumpers for memory module 01200 (U2):

Type	Designation	Signal	Closed/open	Remark
Individual link	W1		open	Address RAM
Individual link	W2		open	
Individual link	W3		closed	
Individual link	W4		open	
Individual link	W5		closed	
Individual link	A-B		open	

Address decoder: D2 8032 002.00

D6 8032 006.00

Operating system program: D1 548803.2001.00

With 130 WB12, the link W1 on U2 is closed on delivery.

W1 closed: Data exchange with AS512 via flags

W1 open: Data exchange with AS512 via the system transfer area