

WF 470
Video Display Module

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up to HW Version 6FM1470- ... 25

Edition August 1991

1 Application

The automation of manufacturing equipment cannot completely prevent disruption to the process caused by faults and breakdowns. The efficiency and profitability of a plant is heavily dependent on its availability. It is therefore essential that faults are quickly and accurately located and then displayed to the relevant personnel, so that machine down time is kept to a minimum.

The WF 470 is a diagnostics and display system designed for this purpose. It is one part of a range of intelligent peripheral modules which may be used in conjunction with SIMATIC S5 programmable controllers. The WF 470 module is directly connected to its colour monitor. The module has its own "on board" micro-processor and memory, allowing it to construct, to store and to display process pictures.

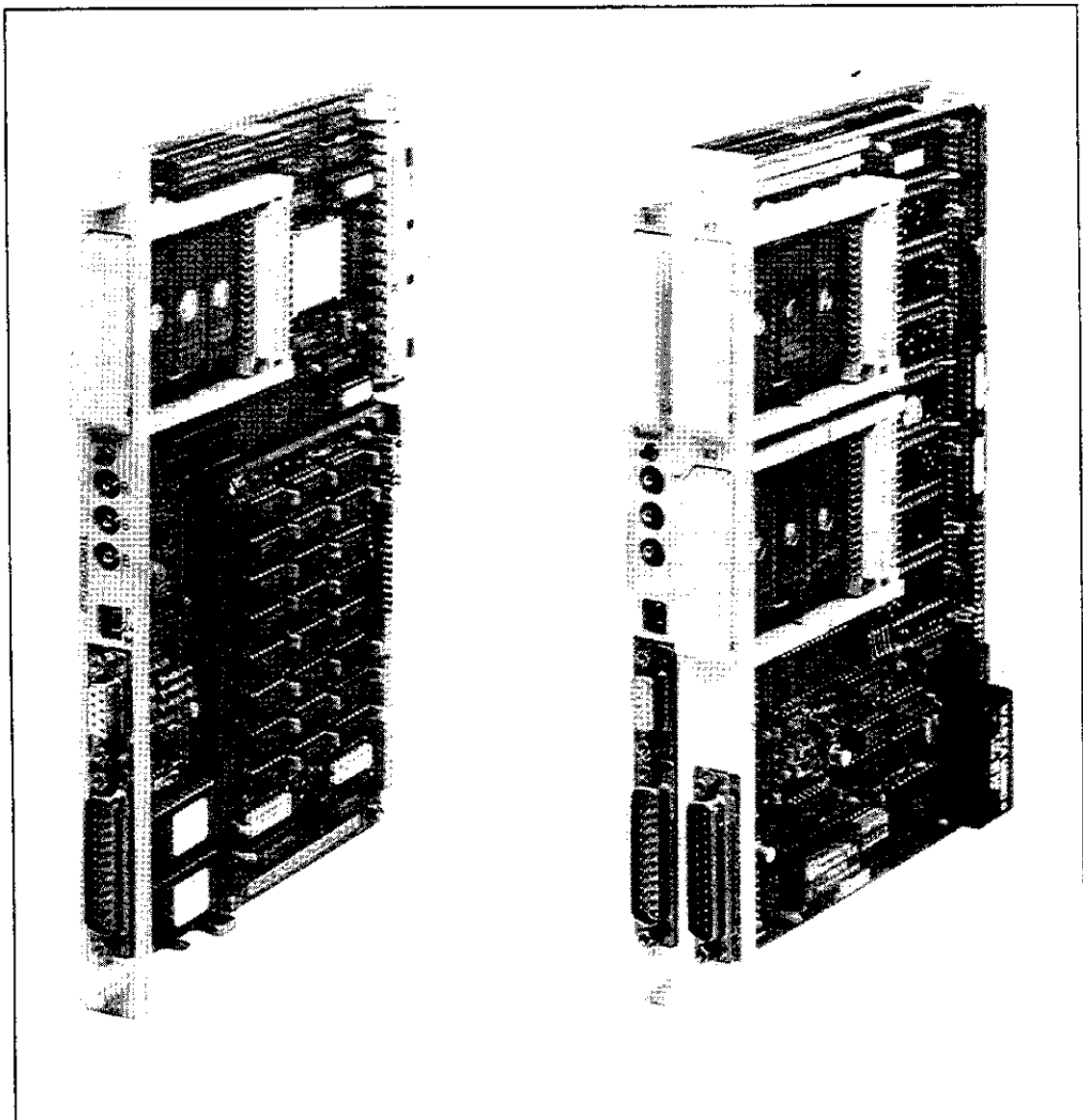


Fig 1.1 WF 470 A.

Fig. 1.2 WF 470B/C Two additional slots for memory submodules, second serial interface port for printer-computer link)

The WF 470 can automatically provide information about the

- Type of fault
- Location of the fault
- Cause of the fault
- Remedy of the fault

The WF 470 has additional options for the display of sequence information and service data. The sequence analyser option is used to monitor and display the condition of the sequence programs' inputs, outputs, and flags etc. in the PLC. The service module allows PLC status information to be displayed without the need to connect a programming unit.

The WF 470 can also simplify the start-up and operation of a machine. The machine start sequence and operating modes can not only be displayed graphically but also in descriptive text. The interaction of the operating personnel with the production machinery is thereby also improved.

Main features of the WF 470:

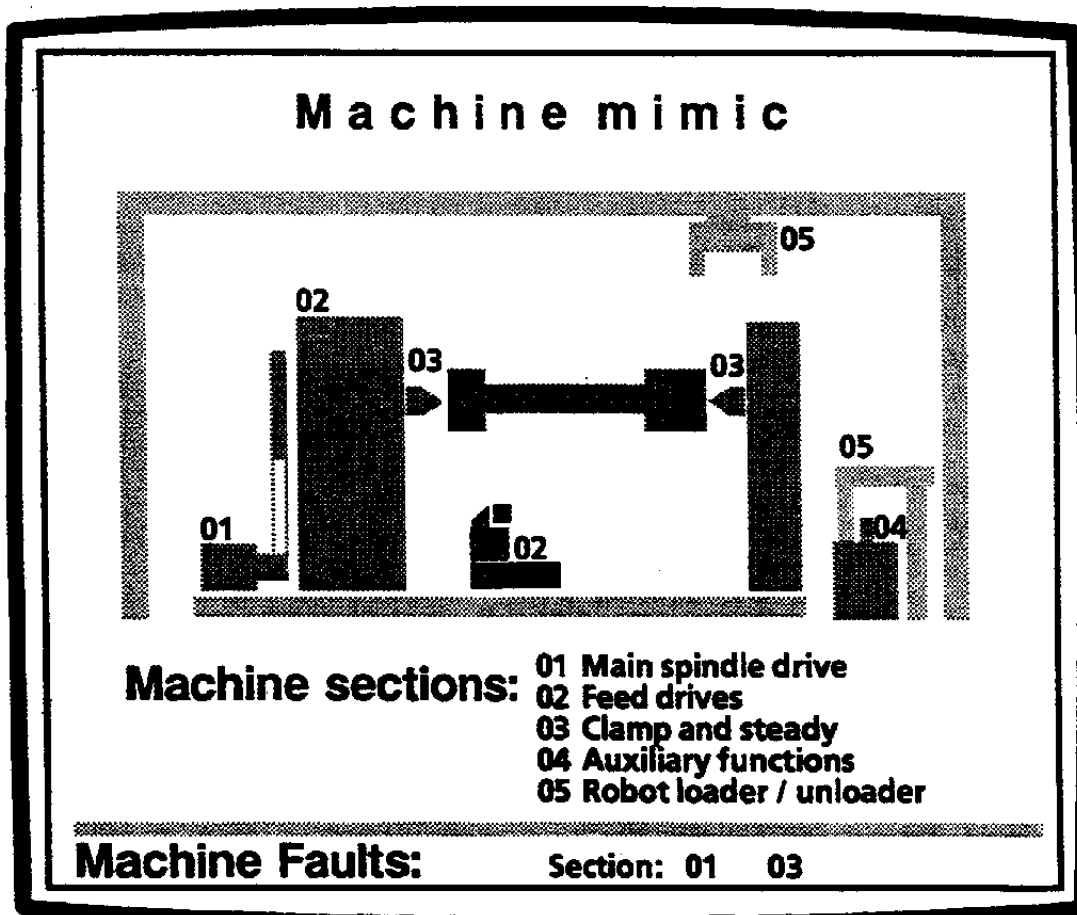
- The pictures and text fields are constructed using a PG 675, PG 685 or PG 750 programming unit, which provides user-friendly softkey operation with full help texts and prompting.
- The good range of graphical and text functions available permit clear and accurate mimics of the machines and processes to be produced.
- The pictures and texts are stored and controlled by the module, thus releasing the SIMATIC PLC to perform the control task.
- Error messages and status reports can be output directly from the WF 470 module to a printer or supervisory computer.
- Sequence programs running in the PLC can be monitored and their status displayed on the WF 470 screen and printer.

The process mimic pictures and data displays are constructed from the following elements. Each element can be magnified up to a factor of 16 times normal size independently in both the X and Y directions. Eight different fore- and background colours may be used.

- Individual symbols
 - 128 pre-defined symbols
 - 128 further user-definable symbols
 - ASCII character set
- Composite symbols (Any combination of individual symbols)
- Text display windows
 - Static text, the colour is changed by control bits in the PLC
 - Dynamic text with scroll and push-up, displayed only when the control bits are high.

- Variable fields
 - Process data entry
 - Process data entry and display
 - Process data display
 - Comment text
 - date
 - time
- Bar graphs, which allow the following to be defined:
 - size (vertical, horizontal) to pixel resolution
 - Direction of increase
 - Colour zones (up to 8)
 - Width
 - Height

Examples of typical pictures and data displays are produced on the following pages.
The WF 470 Brief Description leaflet contains further colour reproductions of typical WF 470 pictures.



WF 470 Graph 5 Sequencer overview 02.11.87 12:45:46

No SB-NoState

Function

17 017 *** Transfer line start up conditions

18 018 * Loader arm and manipulator

ST 1

19 019 First cut component side left

ST 2A

20 020 *** First cut component side right

ST 2B

21 021 Drill holes component side left

ST 3A

22 022 * Drill holes component side right

ST 3A

23 023 *** Fine machining component side left

ST 4A

24 024 Fine machining component side right

ST 4B

25 030 Measuring station - external dimensions

ST 7

26 000

27 000

28 000

29 000

30 000

31 000

32 000

No * = sequence started and running
 * = sequence not started
 *** = sequence fault

F1
DiagnoseF2
Seq. +1F3
Seq. -1F4 Scroll
downF5
Scroll UPF6
Page +1F7
Page -1F8
Index
WF 470 Graph 5 Diagnostic unit

02.11.87 12:45:46

Faulty sequences: 17 20 23

Automatic

Sequencer

SB-No

Transition

Max. step

Branch Step State

1 007

2 011 *

3 017 * > >

4 031

5 34

6 045

7 000

8 000

Transfer line start up sequence

A 021.7 Oil pressure low

A(

A 021.3 Loading station tool missing

A 021.4 Indexing pulse not selected

A 000.3 Coolant on

A 000.6 Station not empty

A 000.5 Index

)

A 021.6 E-stop pressed

A(

O 021.4 Run-out not selected

O 021.3 Loading station tool missing

)

F1 Graph 5
OverviewF2
Chain +1F3
Scroll +1F4
Scroll -1F5 Change
ModeF6
Transit +1F7
Branch +1F8
Index

WF 470			Step sequence analysis Overview		02.11.87 12:45:46	
No.	SB	Step	Function			
*01	012	002	Material loader section 01			
02	015	001	Station 01A			
03	019	002	Station 01B			
*04	022	002	Milling 02A			
05	027	004	Drilling station 02B			
06	035	003	Drilling station 03A			
07	043	003	Measurement station 03B			
08	051	002	Rework station 04			
09	058	004	Milling station 05			
10	070	003	Milling machine 6A			
11	079	006	Measurement station 07			
12	085	004	Washing station 08A			
13	094	006	Washing station 08B			
14	103	003	Washing station 08C			
15	120	008	Washing station 08D			
16	000	000	Reserved			

Maximum length of this text is 50 characters

F1 Mimic	F2 Operate	F3 Pic elem.	F4 Print	F5 WF470 Text	F6 Service fct	F7 Analysis	F8 Index
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WF 470		Step sequence analysis Diagnostic unit								02.11.87 12:45:46	
Faulty sequences: 01 04											
No.	SB	Step	Material loader station 01								
1*01	012	002	06 Transition conditions not fulfilled 01 - 06								
A1000.0 E-Stop pressed A1 AN1000.1 Tool missing (E0.1) _____ A1000.2 Tool not in tolerance O1000.5 Index)											
Maximum length of this text is 50 characters											
F1 Mimic	F2 Operate	F3 Pic elem.	F4 Print	F5 WF470 Text	F6 Service fct	F7 Overview	F8 Index				

WF 470 Service module

CONTROL		n/DL	n+1/DR	HEXA	DEC
IW	000	0000 0110	1100 0000	06C0	01728
QW	000	1000 0100	1100 0000	84C0	33984
FW	100	0000 0001	0000 0000	0100	00256
C	005	0000 0000	0000 0000	0000	0000
T	102	0000 0000	0000 0000	0000	0000
PW	129	1111 1111	1111 1111	FFFF	65535
DB	030				
DW	001	0000 0000	0000 0001	0001	00001
DW	002	0000 0000	0000 0101	0005	00005
DW	003	0100 1000	0010 0000	4820	18464

WF 470 service module option

1=Input word (IW) 2=Output word (OW) 3=Flag word (MW)
 4=Counter (C) 5=Timer (T) 6=Periphery (PW)
 7=DB number (DB) 8=DW number (D1) 0=Delete

F1	F2	F3	F4	F5	F6	F7	F8
Mimic	Operate	Pic elem.	Print	Characteris.	Free	Sequence	Index

LOAD AXIS (AXIS 1)**Machine data****MACHINE DATA INPUT/OUTPUT****⇒ Fault ⇐**

MD 1 5000	MD 17 0	MD 33 0.200
MD 2 6000	MD 18 1	MD 34 2000
MD 3 .. 30000.00	MD 19 1	MD 35 0.000
MD 4 1	MD 20 0	MD 36 0
MD 5 ... 0	MD 21 2	MD 37 0
MD 6 0	MD 22 1.00	MD 38 0.00
MD 7 1	MD 23 9000	MD 39 0.00
MD 8 100	MD 24 40.000	MD 40 0
MD 9 1	MD 25 0.100	MD 41 0
MD 10... 0	MD 26 26.000	MD 42 0
MD 11... -1000.000	MD 27 0	MD 43 0
MD 12... -1100.000	MD 28 1.111	MD 44 0
MD 13... 2100.000	MD 29 0	MD 45 ... 0.000
MD 14... 2110.000	MD 30 1 0000	MD 46 ... 0.000
MD 15..... 2	MD 31000	
MD 16... 1.000	MD 32 0.100	

WF 726 standard III

MD 49 ... 1

RAM**Axis number: 1**

F1	F2	F3	EEPR/RAM F4	F5	F6	DIAGNOSE F7	RETURN F8
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LOAD AXIS (AXIS 1)				Set Up mode			
SET UP MODE				⇒ Fault ⇐			
Reference app speed 1		500000		Zero point offset		500.000	
Reference app speed2		100000		Split-drive offset		0	
Reference app speed3		50000					
Jog speed 1		1000000		TEACH IN:			
Jog speed 2		2000000		Program number		0	
				Block number		0	
MDI:							
G-1 function		0					
G-2 function		0					
X value		0.000		Actual position		0.001	
F rate		0					
				WF 726 standard III			
RAM				Axis number: 1			
ACT.VAL F1	F2	F3	EEPR/RAM F4	F5	TEACH IN F6	DIAGNOSE F7	RETURN F8

AXIS 3				Diagnostics			
SET UP MODE							
				Error in Axis 3			
Faulty Axes:				Following error at standstill			
Axis 3							
				WF 726 standard III			
				Axis number: 3			
F1	F2	F3	F4	F5	F6	F7	RETURN F8

2 Hardware

2.1 System configuration

The WF 470 module resides in the SIMATIC programmable controller rack and is bus-coupled to the central processor. The following units are connected directly onto the WF 470 module.

- Colour monitor
- Logging printer
- Picture construction system (PG 675/PG 685/PG 750 and printer; only required during picture construction and editing)

The operator keyboard can be connected normally via SIMATIC inputs and outputs and/or serially directly onto the WF 470. The complete configuration is shown below:

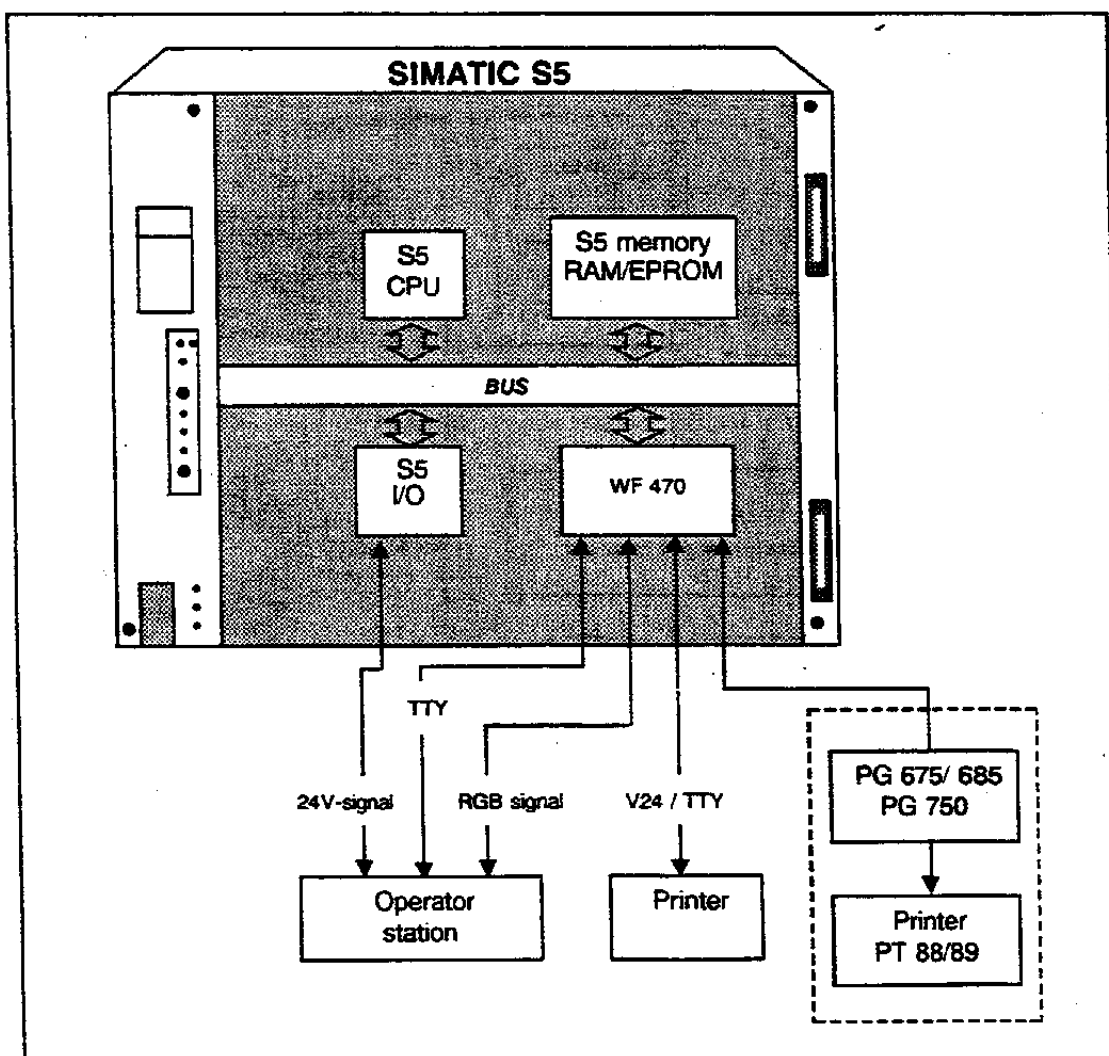


Fig. 2.1 WF 470 system configuration.

2.2 WF 470 hardware

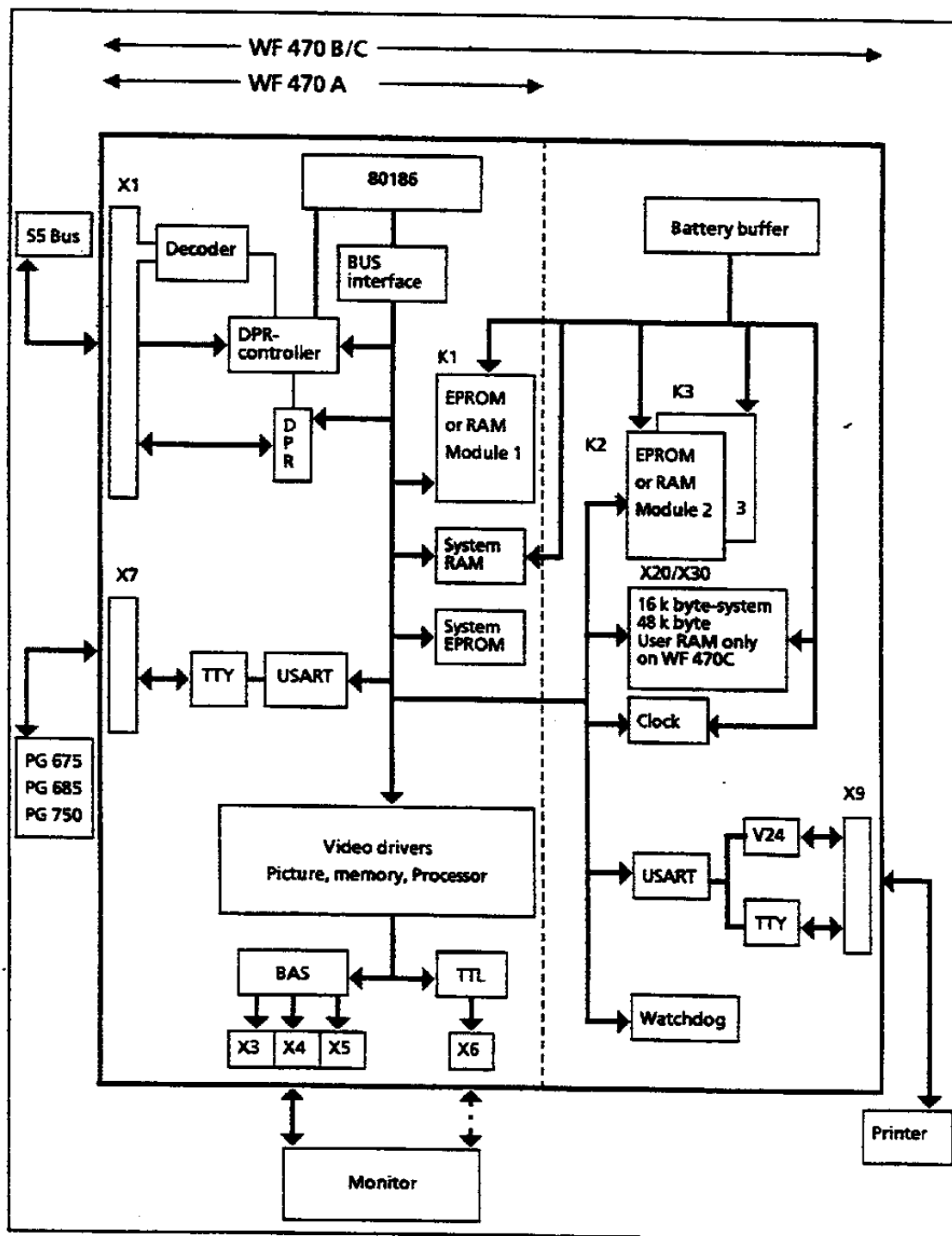


Fig 2.2 WF470 A, WF470 B, WF470 C Hardware block diagram.

When using a WF 470 B, a RAM module should be plugged into the third slot K3. Of this RAM, there will then be 8 Kbyte used by the system. This RAM is not necessary when the WF 470 pictures are simple and do not display a large amount of data, and when the printer function is not going to be used.

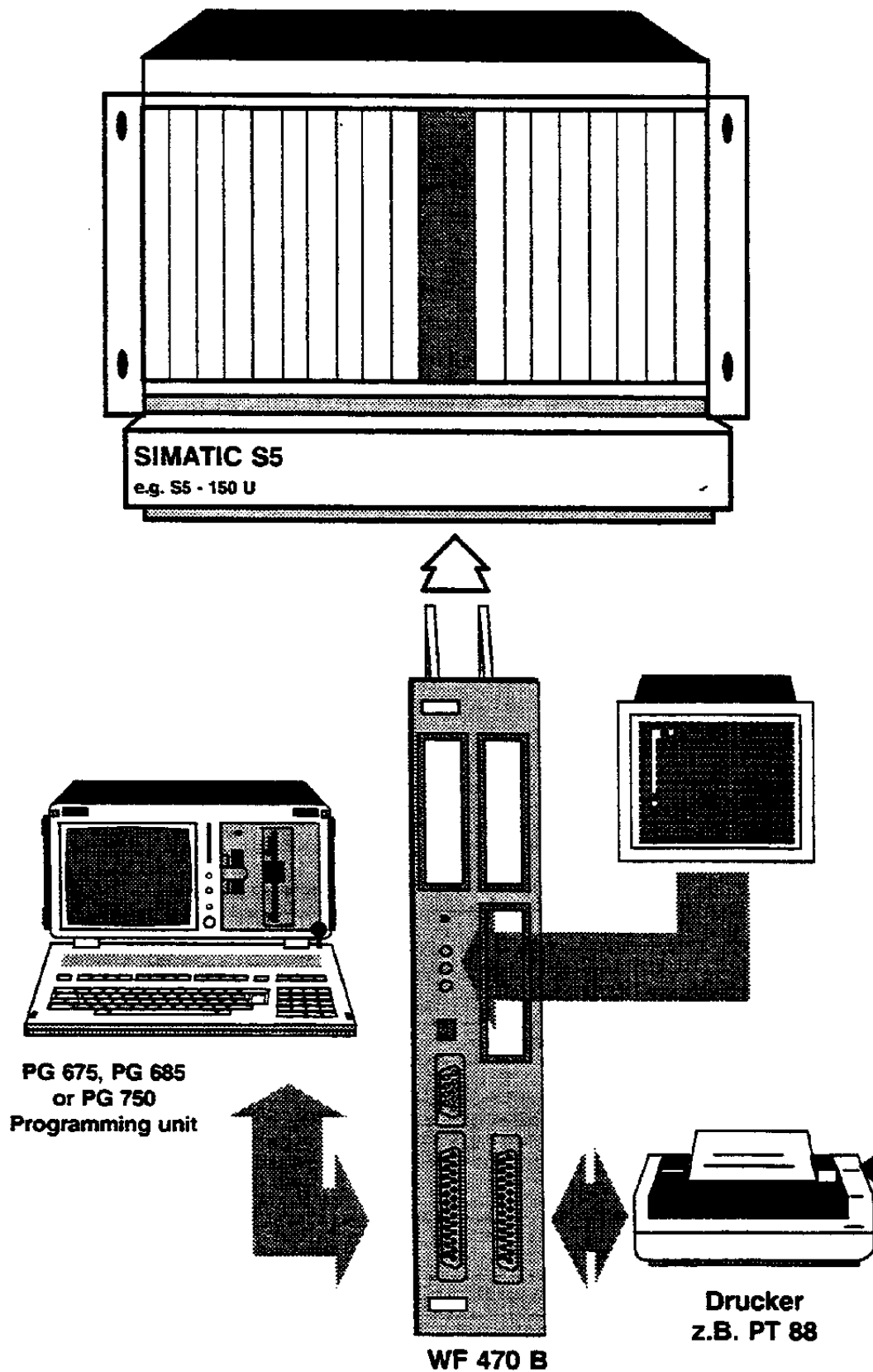


Fig. 2.3 Hardware configuration.

Technical Data

	WF 470 A Monochrome	WF 470 A Colour	
Microprocessor	For picture construction, data processing, hardware interface control		
Operating System	RMOS real time operating system		
Operating System Memory	2 x EPROM 27512 (128 K byte) 16 K byte RAM as internal workspace		
User Memory RAM- or EPROM- Module	1 slot memory capacity max. 128 K byte	1 slot memory capacity max. 128 K byte	
Time Generation	Software clock	Software clock	
Interfaces			
- link to SIMATIC S5	Via Dual Port RAM, 256 byte RGB, frame and line synchronisation; Theoretical maximum cable length: 400 m maximum cable length: 2,5 m		
- BAS Outputs			
- TTL Monitor			
Serial Interface for PG 675, PG 685 and PG 750	X	X	
Serial Interface for printer	-	-	
SIMATIC S5 PLC's	115U, 135U, 150U, 155 U, 130W(B)		
Power Supply	Via SIMATIC S5-bus; Power supply 5 V DC		
Current Requirement	2.5 A	2.5 A	
Dimensions	Single slot width	Single slot width	
	WF 470 B Monochrome	WF 470 B Colour	WF 470 C Colour
Microprocessor	For picture construction, data processing, hardware interface control		
Operating System	RMOS real time operating system		
Operating System Memory	2 x EPROM 27512 (128 Kbyte) 16 Kbyte RAM used as internal workspace		
User Memory RAM- or EPROM- Module	3 slots memory capacity max. 3x128 K byte	3 slots memory capacity max. 3x128 K byte	3 slots memory capacity max. 3x128 K byte and 48 K byte RAM on the module
Time Generation	Hardware clock	Hardware clock	Hardware clock
Interfaces			
- link to SIMATIC S5	Via Dual Port RAM, 256 byte RGB, Theoretical maximum cable length: 400 m Maximum cable length: 2.5 m		
- BAS-Output			
- TTL-Monitor			
Serial Interface for PG 675, PG 685 and PG 750	X	X	X
Serial Interface for printer	X	X	X
SIMATIC S5 PLC's	115U, 135U, 150U, 155 U, 130W(B)		
Power Supply	Via SIMATIC S5-bus; supply voltage 5 V DC		
Current Requirement	3.0 A	3.0 A	3.0 A
Dimension	Double slot width	Double slot width	Double slot width

2.3 WF 470 Battery back-up buffer

The WF 470 A uses the SIMATIC S5 battery to provide the battery back up. The WF 470 B/C allows the user to select how the unit will be buffered (Fig. 2.4):

- Buffered via S5: (S2.1 closed, T-S open)
- Buffered via S5 and self-buffered (mixed): (S2.1 open, T-S closed)
- Buffered via S5 and self-buffered (joint): (S2.1 closed, T-S closed)

This is the setting used in normal applications.

The T-S link is left OPEN when the unit is delivered from the factory, to prevent the battery from being discharged. It must be soldered in before the WF 470 is inserted in the SIMATIC rack.

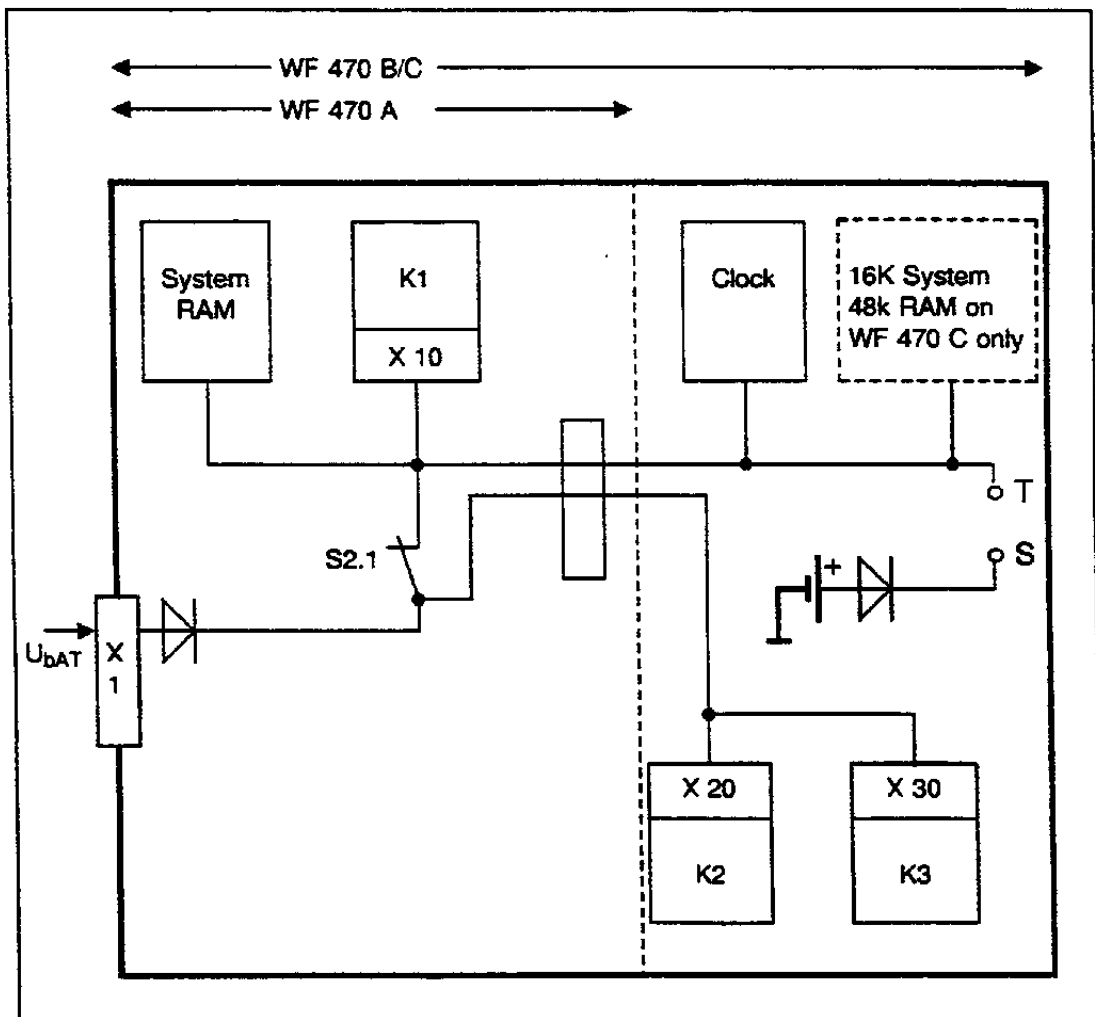


Fig 2.4 Battery back-up WF 470 A and WF 470 B/C.

2.4 Linking the WF 470 to the SIMATIC PLC

The WF 470 can operate as a

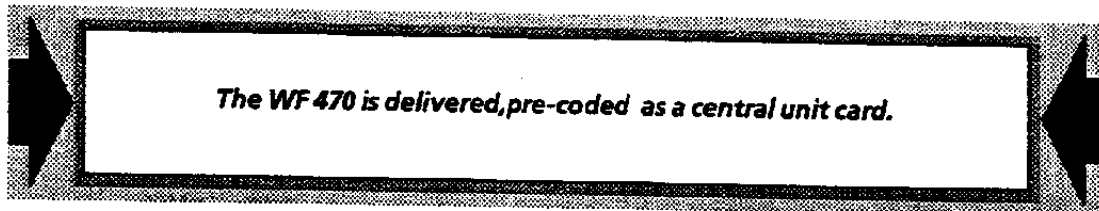
- Central unit module
- Peripheral module

The data exchange between the S5 and the WF 470 takes place via a Dual Port Ram on the WF 470 board. The Dual Port Ram acts as a memory which can be accessed from two sides, from the S5 and from the WF 470. The DPR therefore allows both partners to read from and write into the interface memory. A data transfer data block is also created in the PLC to receive data from the WF470 clock for the various option packages (sequence analyser, printer etc.).

The SIMATIC S5 Hardware treats the WF 470 like a memory module, for which the start address and size must be coded.

The module is pre-set with the following memory address and size:

- DPR Address : E000 (56 x 2¹⁰)
- DPR Size: 256 byte



2.4.1 WF 470 configured as a central unit module

When set to this mode, the WF 470 can be installed in the central rack or the extension rack. The extension rack offers the connections for the communication modules (CP connections, according to the SIMATIC catalogue). Prerequisite for this is the coupling of the extension racks via the connections AS304 - AS314.

The locations in the central rack which may be used are described in this manual in section 2.5 .

- DPR - start address: 0 to FF00 (63.75X2¹⁰, see section 2.6)
selectable in 256 byte steps
- DPR - size: 256 byte (fixed setting)

2.4.2 WF 470 configured as a peripheral module

This mode permits the module to be inserted into any peripheral slot in the central rack (see section 2.5). It can also be used in an extension rack, provided it is connected to the central rack in one of the following configurations:

CU		EU		EU	
300	→	312	→	312	(Centralised configuration)
301	→	312	→	312	(Centralised configuration)
301	→	310	→	310	(de-centralised configuration)
		300	→	312	

Expansion units which are linked via a 302-311 link cannot be used by the WF 470. The expansion unit must be fitted with a fan. The current consumption of the modules in the rack should be checked.

Provided that the above conditions are met, the WF 470 can be installed in any location in the extension unit.

The Dual Port Ram may then be coded into the analogue peripheral area (peripheral bytes 128-255) or in the expanded peripheral area (Q-bytes 0-256).

- DPR - start address: PY 128-255 (analogue section)
OY 0-255 - (Q section)
in steps of the DPR size
- DPR - size: 32/64/128/256 byte

The WF 470 cannot make use of the SIMATIC back-up battery when configured as a peripheral module (The WF 470B / C has its own battery - see section 2.3).

By reducing the size of the DPR, the data transfer time between the S5 and the WF 470 is increased. It is therefore recommended to set the DPR size as large as possible.

The WF 470 is normally configured as a central module.