

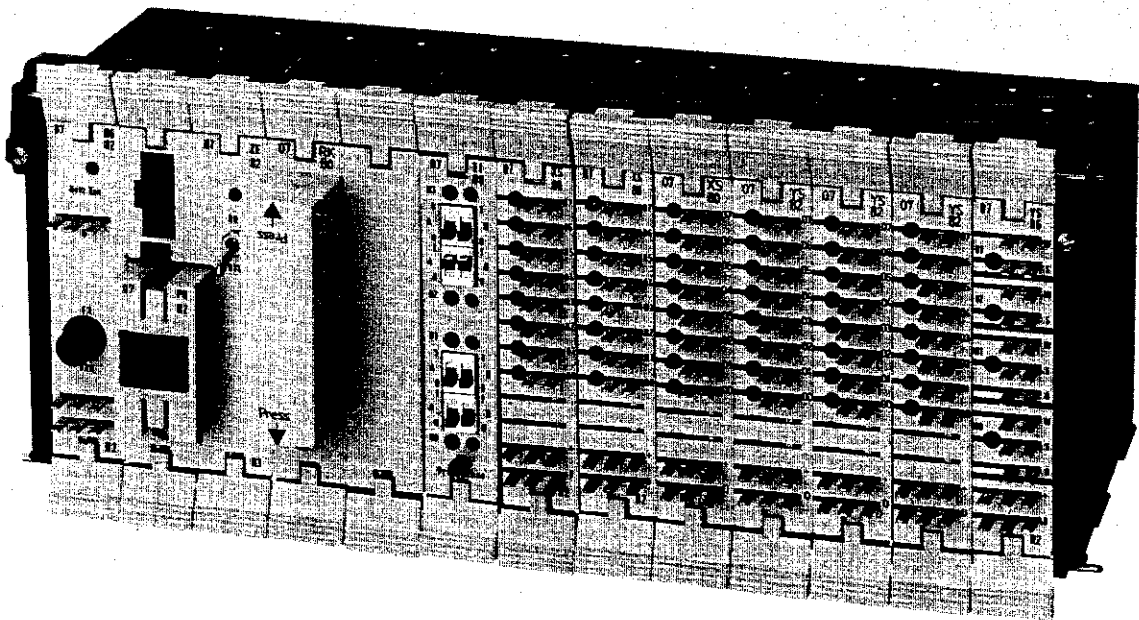
System Description

**ABB Procontic b**

Programmable Control System

General Part

Order number  
GATS 1311 01 R2001 part 1  
replaces  
Publication number  
D AT 1619 87 E



**ABB Schalt- und Steuerungstechnik GmbH**

**ABB**  
ASEA BROWN BOVERI

## Regulations

### Regulations concerning the setting up of installations

Apart from the basic "Regulations for the setting up of power units" VDE\* 0100 and for "The rating of creepage paths and air gaps" VDE 0110 the regulations "The equipment of power units with electrical components" VDE 0160 in connection with VDE 0660, part 500, have to be taken into due consideration. Further attention has to be paid to VDE 0113 in case of the control of working and processing machines. If operating elements are to be arranged near shock-hazard parts with protection against electrical shock, VDE 0106, part 100, is relevant.

The user has to ensure that the units as well as the associated components have to be installed according to these regulations. Respectively valid safety regulations, e.g. regulation for the prevention of accidents and the law concerning technical working material, are valid for machines and units connected as well.

ABB Procontic units have been built according to VDE regulation 0160. The protection against direct touching as demanded by chapter 5.5.1 of this VDE regulation has to be satisfied by the user, e.g. at installing of switch cabinet.

ABB Procontic units have been designed for operation according to insulation class A of VDE 0110. If considerable pollution is expected during operations, the units have to be installed in housings of the respective kind of protection.

\* VDE stands for "Assosiation of German Electrical Engineers".

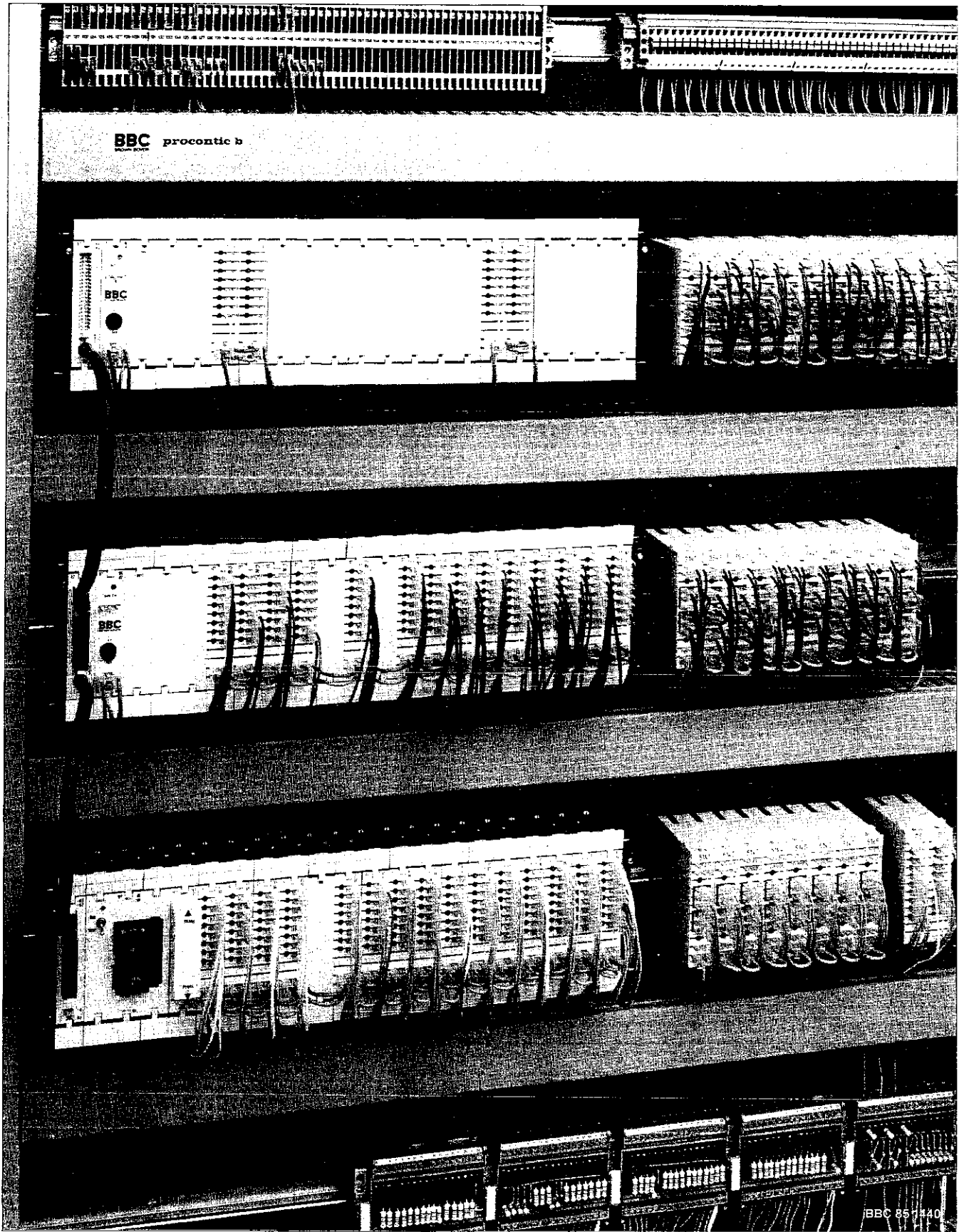
Note: Please observe the national regulations for the installation of electrical equipments, which are valid in your country.

ABB Schalt- und Steuerungstechnik GmbH

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PROCONTIC b is a modular control system which does justice to a high degree to a modern control system in the field of automation.

For instance, this includes bit and word processing, arithmetic computing operations, modular technology, analog data processing and the possibility of addressing serial interfaces. A system which is always in compliance with the state of the art

will be available to the user at all times in the future thanks to intensive updating of both the system's hardware and software.

A staggered range of programming units facilitates the user's task of creating and testing software and of commissioning systems.

# General Part

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# 1 General system description

ABB Procontic b is a modular control system which fulfills high requirements in a minimum of space.

The control system with a central processor unit 07 ZE 84 connected with a word processor 07 WP 84 can basically be split up into a bit section and a word section, whereby the central function is assigned to the bit processing processor, while word operations are assigned to the word processor. Thus, the bit processor can be operated separately for pure bit operations, although this does not apply to the word processor.

The bit processor, the central processor 07 ZE 84, contains the program of the entire control. It assigns word operations to the word processor which it cannot execute itself. The word processor is capable of processing these in the foreground or in a background cycle.

The word processor 07 WP 84 operates in the foreground when it is assigned a task and the assigning bit processor waits until a result is provided to it. During background processing, both processors continue to operate in parallel after transfer of the information until the bit processor is ready to hand over a result.

The bit processor can only process yes/no information. It can thus only process the status of an operand, e.g. of an input, to ascertain whether or not it is activated or deactivated. The depiction of numerical values is only possible in word operations. Bit operations are carried out in the central processor unit 07 ZE 84.

In the central processor 07 ZE 86 and 07 ZE 88 are bit and word operations only with one processor carried out. The disconnection of bit and word operations does not exist here.

**Typical bit operations are:**

**a. Linkage of operands**

(input signals, flags, timers) for the generation of assignments (switching of outputs)

**b. Subroutine technique**

Parts of the program are run through depending on the process

**c. Branch technique (not 07 ZE 82)**

Depending on the process, it is possible to specifically branch to and process program sections.

**d. Module technique (not 07 ZE 82)**

Recurring program sections can be declared as modules and processed by calling the module number.

Word commands can only be processed in the word processor 07 WP 84 or in the central processor 07 ZE 86. Numerical values are distributed in binary code over 15 bits. The numerical space is limited due to the number of available bits. It amounts to  $2^{15} = 32767$ . The 16th bit is the sign bit. Analog format (MICAS format) numerical values can be processed in the word processor in addition to binary notation (signed integer). In the former case, the value  $10\text{ V} = 1.000 = 100\%$  (Value area  $\pm 7.999$ ).

**Typical word commands are:**

- arithmetic operations, i.e. fundamental operations
- processing of analog values
- comparative operations





## 2 Technical data

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Capabilities	<ul style="list-style-type: none"><li>- bit processing</li><li>- subroutine technique</li><li>- module processing</li><li>- branch functions</li><li>- word processing</li><li>- comparison operations</li><li>- arithmetics</li><li>- analog value processing</li><li>- logging functions</li></ul>
Connection	to the ABB field bus ZB10
Programming	instruction lists (word and bit processing) contact plan function plan
Supply voltage	24 V DC
Allowed potential difference	± 30 %
Permissible temperature range	0 °C ... +55 °C during operation -25 °C ... +75 °C when idle
Humidity class	F
Format and installation mode	Metal subrack, optionally for screwing onto plates, for snapping onto 35 mm standard profile rail in accordance with DIN 46 277, Sheet 3, or for installation in 19" racks  Depth: 120 mm Height: 128 mm Width: Commissioning and test unit: 157 mm subrack with 13 plug-in positions: 277 mm subrack with 21 plug-in positions: 437 mm
Connection	Faston tab connector, 2.8 x 0.8 mm or system cable
Number of binary inputs and outputs	Max. 1536 inputs and outputs in six subracks
Number of analog inputs and outputs	Max. 128 inputs and 128 outputs in four subracks
Number of timers	Max. 60, additionally software timers
Number of counters	Max. 16, additionally software counters
Number of fast counters	Max. 64

Number of main memories:	Max. 7K bit, buffered, 512 word memories of 16 bits each, 256 word memories of these buffered
Program memory:	EPROM 2 kwords, 4 kwords, 8 kwords; EEPROM 8 kwords, 16 kwords on the CPU RAM 2K words, 8K words, buffered, on the commis- sioning and test unit
Cycle time:	
Central control unit 07 ZE 82	2.5 ms/1K words for binary statements
Central control unit 07 ZE 84	2.5 ms/1K words for binary statements
Central control units 07 ZE 86 and 07 ZE 88	5 ms/1K words (only I/O $\leq$ 15,15, M and S)
Serial interfaces	RS 423 on the digital timer unit 07 TZ 82 RS 423 on the word processor 07 WP 84 RS 423 On the central control unit 07 ZE 86  ZB 10 interface on the coupling unit 07 ZB 80 ZB 10 interface on the coupling unit 07 ZB 82
Binary inputs	220 V AC or 110 V AC, electrically isolated 48 V DC or 24 V DC Evaluator for 2-wire initiators in accordance with DIN 19 234 (NAMUR)
Binary outputs	Relay output, max. 250 V/2A 24 V DC/2A 24 V DC/500 mA 24 V DC/130 mA
Analog inputs	0 ... 20 mA/4 ... 20 mA, 0 ... +10 V, 8 bit 0 ... 20 mA/4 ... 20 mA, -2,4 ... +2,4 V/-12 ... +12 V, 12 bit
Analog outputs	-10 ... +10 V, 8 bit 0 ... 20 mA/4 ... 20 mA, -12 V ... +12 V, 12 bit

# 3 Assortment

## BUS modules

Type	Description	Order number
07 ET 82 R2	BUS module with 8 slots for binary input/ output units	GJR5217400R2
07 ET 83 R2	BUS module with 16 slots for binary input/ output units	GJR5217500R2
07 ET 84 R2	BUS module with 16 slots for binary digital and analog input/output units	GJR5218500R2

## Power supply unit

Type	Description	Order number
07 NG 80 R4	Power supply unit	GJR5211700R4
07 NG 82 R4	Power supply unit	GJR5215100R4

## BUS coupling modules

Type	Description	Order number
07 BT 82 R3	BUS driver with central control unit 07 ZE 82, modules $\leq 15.15$	GJR5215600R3
07 BT 84 R1	BUS driver with central control units from 07 ZE 84	GJR5230400R1
07 BV 84 R1	BUS line connection for extension subrack, also modules $>15.15$	GJR5230500R1

## Zentrale Steuerwerke

Type	Description	Order number
07 ZE 82 R4	Central processor unit with 256 bits main memory, for 2 kwords user program (without EPROM)	GJR5215900R4
07 ZE 84 R2	Central processor unit for 4 kwords or 8 kwords user program (without EPROM) (only in conjunction with 07 AS 82)	GJR5218700R2
07 ZE 88 R101	Central processor unit for 8 kwords user program (EEPROM), bit- and wordprocessing, 1 serial interface	GJR5231800R101
07 ZE 88 R102	Central processor unit for 16 kwords user program (EEPROM), bit- and wordprocessing, 1 serial interface	GJR5231800R102

## Program memories

Type	Description	Order number
07 PR 82 R1	2 kword EPROM program memory	GJR5216000R1
07 PR 84 R2	8 kword EPROM program memory	GJR5218400R2

## Active memories

Type	Description	Order number
07 RK 80 R4	Step chain memory, 8 chains per 16 steps + 64 flags (power failsafe). Only in conjunction with the central processor unit 07 ZE 82	GJR5214400R4
07 AS 82 R1	Memory unit, 7 K bit (power failsafe)	GJR5218300R1

## Wortprozessor

Type	Description	Order number
07 WP 84 R302	Word processor with 512 word memories of 16 bits each, 256 of these are power failsafe. Module processing, firmware modules, serial interface RS 423, arithmetics, comparison and logging functions, PI-regulator	GJR5230300R302

## Timing and counting units

Type	Description	Order number
07 TI 80 R1	Analog timer, 4 independent functions, 0.05 ... 128 seconds potentiometer-adjustable range switching on the PC board	GJR5211900R1
07 TI 80 R2	Analog timer, 4 independent functions, 0.05 ... 128 seconds potentiometer-adjustable range switching on the front side	GJR5211900R2
07 TI 81 R1	Digital timing unit, two independent functions, times software-adjustable, 5 time cycles	GJR5215200R1
07 TZ 82 R201	Microprocessor-controlled timing unit with 60 digital timers, 3 time cycles, setpoint monitoring, serial interface, logging functions	GJR5217100R201
07 ZG 84 R1	Fast counter, 16 bit, up/down counter, logic for the sense of direction	GJR5232600R1

## Binary input units

Type	Description	Order number
07 XS 80 R5	Input unit, 8 inputs for 24 DC input signals, with LED (typical input delay in 8 ms)	GJR5212000R5
07 XS 81 R1	Input unit, 8 inputs for 2-wire initiators (NAMUR evaluator), with LED (typical input delay 3 ms)	GJR5217200R1
07 XS 86 R1	Input unit, 8 inputs for input signals from 13 ... 63 V DC, with LED (typical input delay 8 ms)	GJR5218200R1
07 XS 86 R2	Input unit, 8 inputs for input signals from 13 ... 63 V DC, with LED (typical input delay 0.1 ms)	GJR5218200R2
07 XS 87 R1	Input unit, 4 electrically isolated inputs for 220 V AC/DC input signals (typical input delay 13 ms)	GJR5216500R1

## Binary output units

Type	Description	Order number
07 YS 80 R2	Output unit, 8 outputs, 24 V DC/130 mA, with LED	GJR5212100R2
07 YS 81 R2	Output unit, 4 outputs, 24 V DC/2 A, with LED (total load max. 6 A)	GJR5221800R2
07 YS 82 R1	Output unit, 8 outputs, 24 V DC/500 mA, with LED (total load max. 2 A)	GJR5221100R1
07 YS 86 R2	Relay output, 4 outputs (2 changeover, 2 n/o contacts), 250 V AC/DC/2 A, with LED	GJR5215400R2
07 AB 83 R1	Output unit, 8 outputs, 24 V DC/500 mA, short circuit protected, with LED	GJR5231400R1

## Binary input and output units

Type	Description	Order number
07 AE 83 R1	In/output unit, 8 inputs for 24 V DC, with LED, 8 outputs 24 V DC/500 mA, with LED, total load max. 1 A	GJR5231200R1

## Analog input units

Type	Description	Order number
07 EA 80 R1	Input unit for 8 analog signals, 0 ... 20 mA/4 ... 20 mA, 0 ... +10 V, resolution 8 bits	GJR5230200R1
07 EA 81 R1	Input unit for 8 analog signals, 0 ... 20 mA/4 ... 20 mA, -2,4 V ... +2,4 V/-12 ... +12 V, resolution 12 bits (10 $\mu$ A or 10 mV)	GJR5214000R1

## Analog output units

Type	Description	Order number
07 AA 80 R1	Output unit for 4 analog signals -10 V ... +10 V, resolution 8 bits	GJR5230000R1
07 AA 81 R1	Output unit for 2 analog signals 0 ... 20 mA/4 ... 20 mA -12 V ... +12 V, resolution 12 bits (10 $\mu$ A or 10 mV)	GJR5218600R1

## Drive control units

Type	Description	Order number
07 AG 80 R1	Drive control unit for non-reversing drives	GJR5217700R1
07 AG 81 R1	Drive control unit for reversing drives	GJR5217900R1

## Programming and test adaptors

Type	Description	Order number
07 IE 84 R202	Commissioning and test adaptor with buffered RAM for 8 kwords For central processor units 07 ZE 82 und 07 ZE 84. Without system cable 07 SK 85.	GJR5219100R202

## Systemkabel

Type	Description	Order number
	System cables with front connector for input/output units with 8 connections:	
07 SK 82 R11	Cable length 750 mm	GJR5214900R11
07 SK 82 R12	Cable length 1500 mm	GJR5214900R12
07 SK 82 R13	Cable length 2000 mm	GJR5214900R13
07 SK 87 R2	V 24 cable to connect 07 PC 31/32 to 07 IE 84 and 07 ZE 86	GJR5230800R1
07 SK 88 R1	V 24 cable to connect 07 PM 11, 35 BS 93 with 07 ZE 88, 07 WP 84 and 07 TZ 82	GJR5231700R1
07 SK 89 R1	V 24 cable to connect 07 PC 32, 07 PH 31 to 07 ZE 88 and 07 IE 84	GJV3073901R1
07 SK 84 R1	System plug connector for binary I/O-modules (not for 07 AE 83)	GJV3073901R1
07 SK 85 R1	System cable for connecting the commissioning unit 07 IE 84 to the central processor unit 07 ZE 84	GJR5219900R1
-	Connect housing (empty) as shock hazard protection for I/O units with 24 V DC or 60 V DC	GJR1948094P2

## Accessories

Type	Description	Order number
07 BA 80 R1	Dummy panel	GJR5214200R1
07 MW 80 R1	2 brackets for cabinet installation of a BUS module	GJR1948116R1
07 ZW 80 R2	cycle monitoring unit, cycle time approx. 260 ms	GJR5215300R2

## Spare units

Type	Description	Order number
07 SK 81 R4	System cable for connection of or 07 IE 84 to the central processor unit 07 ZE 82	GJR5213800R4
07 LB 20 R1	Lithium battery for 07 RK 80, 07 AS 82, 07 TZ 82, 07 WP 84 and 07 ZE 86	GJR5223500R1
-	Actuating pin for switch sockets	GJT115502P1

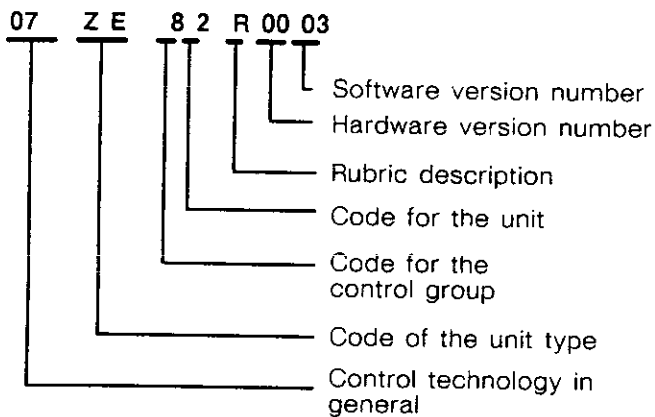
## 4 Information on ordering

### General ABB Procontic description system- aty

A unit or a component is described functionally by the type description in the control system ABB Procontic b. The development consultation is carried out using the order number. ABB Procontic units are described in accordance with the following rules:

#### a) Type description

Example:



Note: The preceding zeroes of the hardware or software version numbers can be omitted, e.g., 07 ZE 82 R0003 and 07 ZE 82 R3 or 07 IE 84 R0202 and 07 IE 84 R202 are the same. The shorter form is preferred.

### Codes of the unit types

ZE	central units
BT	bus drivers
BV	bus connectors
NG	power-supply units
T	timers
XS	binary input units
AE	in- and output units
AB	binary output units
YS	binary output units
WP	word processor
RK	register unit
AS	memory units
AA	analogue output units
EA	analogue input units
PG	programming units
ZV	bus administrator
ZB	bus coupler
PT	programming unit
PC	personal computer

#### b) Order number

Example: GJR5215900R3

Units, which are similar to a large extent but are not completely identical, are distinguished by the rubric description with the hardware and software version numbers. The rubric data in the type description and in the order number are the same.

#### c) Order data

The order data must include the **complete type descriptions and order numbers** in order to guarantee a perfect supply.





## 5 Seminars

Asea Brown Boveri offers seminars to support configuring, starting and operating ABB Procontic b controls. Seminars are also carried out on the customer's premises, if required.

Detailed information is included in the leaflet, "Seminars for factory automation", which you can request from:

ABB Schalt- und Steuerungstechnik GmbH  
Abteilung: SST/MV  
Eppelheimer Straße 82  
D-6900 Heidelberg 1

Telephone (06221) 777-135  
Telefax (06221) 777-111

The registration is carried out directly at the above mentioned address or via our distribution centres:

ABB Schalt- und Steuerungstechnik GmbH  
Vertriebszentrum Nord  
Hildesheimer Straße 25  
P. O. Box 1040  
D-3000 Hannover 1

Telephone (0511) 8501-343  
Telefax (0511) 8501-200  
Telex 922 708 bbcb d

ABB Schalt- und Steuerungstechnik GmbH  
Vertriebszentrum West  
Kronprinzenstraße 5-7  
P. O. Box 10 04 52  
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ABB Schalt- und Steuerungstechnik GmbH  
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D-6800 Mannheim

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ABB Schalt- und Steuerungstechnik GmbH  
Vertriebszentrum Süd  
Schloßstraße 29  
P. O. Box 609  
D-7000 Stuttgart 1

Telephone (0711) 2059-300  
Telefax (0711) 29 06 76  
Telex 722567 bbcb d

The following seminars for the ABB Procontic b are on offer:

### **Programmable controls Seminar concerning the principles**

**Contents:** Getting to know the ABB Procontic controls and their components, learning the programming language, programming with the personal computer, practical exercises on ABB Procontic systems, configuration instructions, independent configuration using given tasks together with starting up a system model

**Aim:** Independent configuration of a system model with the ABB Procontic PLC.

**Prerequisite:** Knowledge of the general control technology

**Duration:** 5 days

### **ABB Procontic b configuration seminar**

**Contents:** Components of the ABB Procontic b, extension possibilities, networking, programming of the ABB Procontic b, practical exercises concerning the binary, word and analog processing, configuration with function blocks, setting up your own user blocks, applications for the control of various system models

**Aim:** Independent configuration of a system model with ABB Procontic b

**Prerequisite:** Knowledge of the general control technology.

**Duration:** 5 days

## **ABB Procontic b maintenance seminar**

- Contents:** Getting to know the ABB Procontic b components, learning the ABB Procontic programming language, composing the hardware, starting a system model with fault-finding in the ABB Procontic b PLC in the range of the coupling level and in the system model.
- Aim:** Independently starting a system model and finding the faults with ABB Procontic b.
- Prerequisite:** Knowledge of the general control technology
- Duration:** 5 days

# 6 Maintenance Services and Supports

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## Services

We have a qualified service department in order to be able to help with difficult problems as well.

- Consultation by telephone
- Malfunction analyses and removal from the machine/system
- Support when compiling programs
- Training of the personnel in the factory
- Leasing programming units

If you wish to consult our service department, we request you to take the corresponding preparations depending on the desired service, like, e.g.:

- Making the complete documentation available
- Unhindered access to the machine/plant
- Assignment of operating personnel etc.

Inquiries and orders are to be directed to:

ABB Schalt- und Steuerungstechnik GmbH  
Abteilung SST/VPS  
Eppelheimer Straße 82  
D-6900 Heidelberg 1

Telephone (06221) 777-210  
Telefax (06221) 777-113

## Support

Our range of services also includes the following:

- Supply of spare units
- Repairing of faulty units and systems

Inquiries and orders are to be directed to:

ABB Schalt- und Steuerungstechnik GmbH  
Abteilung SST/OA  
Neuer Weg 47  
D-6930 Eberbach

Telephone (06271) 81-467



## 7 Application department

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The modular multiprocessor-based control system ABB Procontic b represents a competent range of units and standard software for the user's applications.

The application department is responsible for advising the customer when selecting the suitable system in the respective special case of application and, if desired, undertaking the compilation of user programs as a service.

The possibility of using the ABB know-how in the sector of factory automation exists in this way.

The application department offers the following:

- Cooperation when specifying the control task and when determining the suitable system configuration
- Compiling user programs in the form of PLC instruction lists or function block diagrams for ABB Procontic b
- Executing commissioning

The basis for the execution of applications is a deadline schedule worked out with the user, which is constantly followed together with a project leader known to the user.

You can contact the application department under the following address:

ABB Schalt- und Steuerungstechnik GmbH  
Vertriebszentrum Projekte  
Abteilung: SST/VP  
Eppelheimer Straße 82  
D-6900 Heidelberg 1

Telephone 06221/777-200  
Telefax 06221/777-113



## 8 Advice and addresses

You can consult competent ABB employees worldwide under the following addresses, and they will be pleased to advise you:

### Germany

ABB Schalt- und Steuerungstechnik GmbH  
Abteilung: SST/V  
Eppelheimer Straße 82  
D-6900 Heidelberg 1  
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## Europe

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### Denmark

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Telephone 0045 2 999111  
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### Finland

Asea Brown Boveri Strömberg Distribution Ltd.  
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Telex 12440566 STR SF

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10, Rue Ampere Z. I.  
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Telex 350635

### Great Britain

Asea Brown Boveri Power Ltd.  
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