PSS 5000

Welding Control PSS 5100.310 B/PSS 5100.313 B Technical Information

Edition 102

PSS 5000

Welding Control PSS 5100.310 B/PSS 5100.313 B Technical Information

1070 078 237-102 (2002.04) GB

Reg. No. 16149-01/2

Contents

1 Introduction

The documentation on the PSS 5100.310 B/PSS 5100.313 B weld timer (WT) describes the functions that deviate from the PSS 5000 basic timer model.

The basic timer model is described in the following documents:

- Technical Information PSS 5000: : Order no.1070 078 216
- Operating and Programming Instructions, Vol. 1 : Order no.1070 078 217
- Operating and Programming Instructions, Vol. 2 : Order no.1070 078 218

NOTE

Unless described otherwise, the safety instructions, technical standards, notes and technical data mentioned in the documentation on the basic timer model are applicable.

PSS 5100.313 B The functions described by this symbol are only available with PSS 5100.313 B.

1.1 Address of INTERBUS-S Club

INTERBUS-S Club e.V.
Geschäftsstelle
Postfach 1108

D-32817 Blomberg

Telephone : +49 (0) 5235 / 342100
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2 Different performance features

The PSS 5100.310 B/PSS 5100.313 B is a WT with a serial I/O module. This module is designed for networking in the INTERBUS-S (Messrs. Phoenix Contact) and uses a remote bus interface.

The INTERBUS-S connection of the WT operates according to the C0 profile specification with specific additional features.

Compared to the PSS 5000 basic timer model, the WT basically features the following differences:

PSS 5100.313 B **Medium-frequency inverter**

PSS 5100.313 B Medium-frequency inverters are driven by the X2 port and the *Weld_On* output O7. The WT expects a direct feedback of the actual current values when operated in combination with medium-frequency power units.

Main switch trip

The main switch trip does **not** exist in PSS 5100.310 B/PSS 5100.313 B.

Inputs

The inputs are divided into one discrete (24V) and one serial (INTERBUS-S) interface.

The timers offer a discrete and a serial *Start* input.

Thyristor unit faults are signalled with their number to the WT via discrete inputs.

The faults are reset via the serial input *Acknowledge thyristor unit fault* of the control word.

Outputs

The outputs are divided into one discrete (24V) and one serial (INTERBUS-S) interface.

The *Weld Complete* signal is available at the discrete (24V) and at the serial interface (INTERBUS-S).

The weld timers signal the timer status with the following outputs (+24V) to the thyristor unit:

- *Stop thyristor unit*
- *Enable thyristor unit*
- *Reset thyristor unit fault*

2.1 Overview of discrete inputs

Control of the following inputs is with the discrete 24V interface:

- I0 *Start*
- I1 *Fault_input_1 Thyristor unit* (value of fault number = 1)
- I2 *Fault_input_2 Thyristor unit* (value of fault number = 2)
- I3 *Fault_input_4 Thyristor unit* (value of fault number = 4)
- I4 *Fault_input_8 Thyristor unit* (value of fault number = 8)

2.2 Overview of discrete outputs

Control of the following outputs is with the discrete 24V interface:

- O0 *Weld complete*
- O1 *Reset thyristor unit fault*
- O2 *Stop thyristor unit*
- O3 *Enable thyristor unit*
- O4 *Transformer_selection_1*
- O5 *Transformer_selection_2*
- O6 *Transformer_selection_3*
- O7 *Weld_On*

2.3 Overview of serial inputs (control word)

Control of the following inputs is with the serial INTERBUS-S interface. The control word has the following structure:

Bit no.	Meaning in C0 profile, INTERBUS-S, Messrs. Phoenix	Meaning for PSS 5000 in extended C0 profile, Messrs. BOSCH
0	Start	Start
1	Tips have been dressed	Tips have been dressed
2	freely selectable	Reset thyristor unit fault
3	Counter Reset (electrode change)	Counter Reset (electrode change)
4	Fault reset	Fault reset
5	Fault reset - number	Fault reset with WC
6	Fault reset - number	Fault reset with reweld
7	Weld (weld on external)	Weld (weld on external)
8	Welding_program_number_1	Welding_program_number_1
9	Welding_program_number_2	Welding_program_number_2
10	Welding_program_number_4	Welding_program_number_4
11	Welding_program_number_8	Welding_program_number_8
12	Welding_program_number_16	Welding_program_number_16
13	freely selectable	Welding_program_number_32
14	freely selectable	Welding_program_number_64
15	freely selectable	Welding_program_number_128

2.4 Overview of serial outputs (status word)

Control of the following outputs is with the serial INTERBUS-S interface. The status word has the following structure:

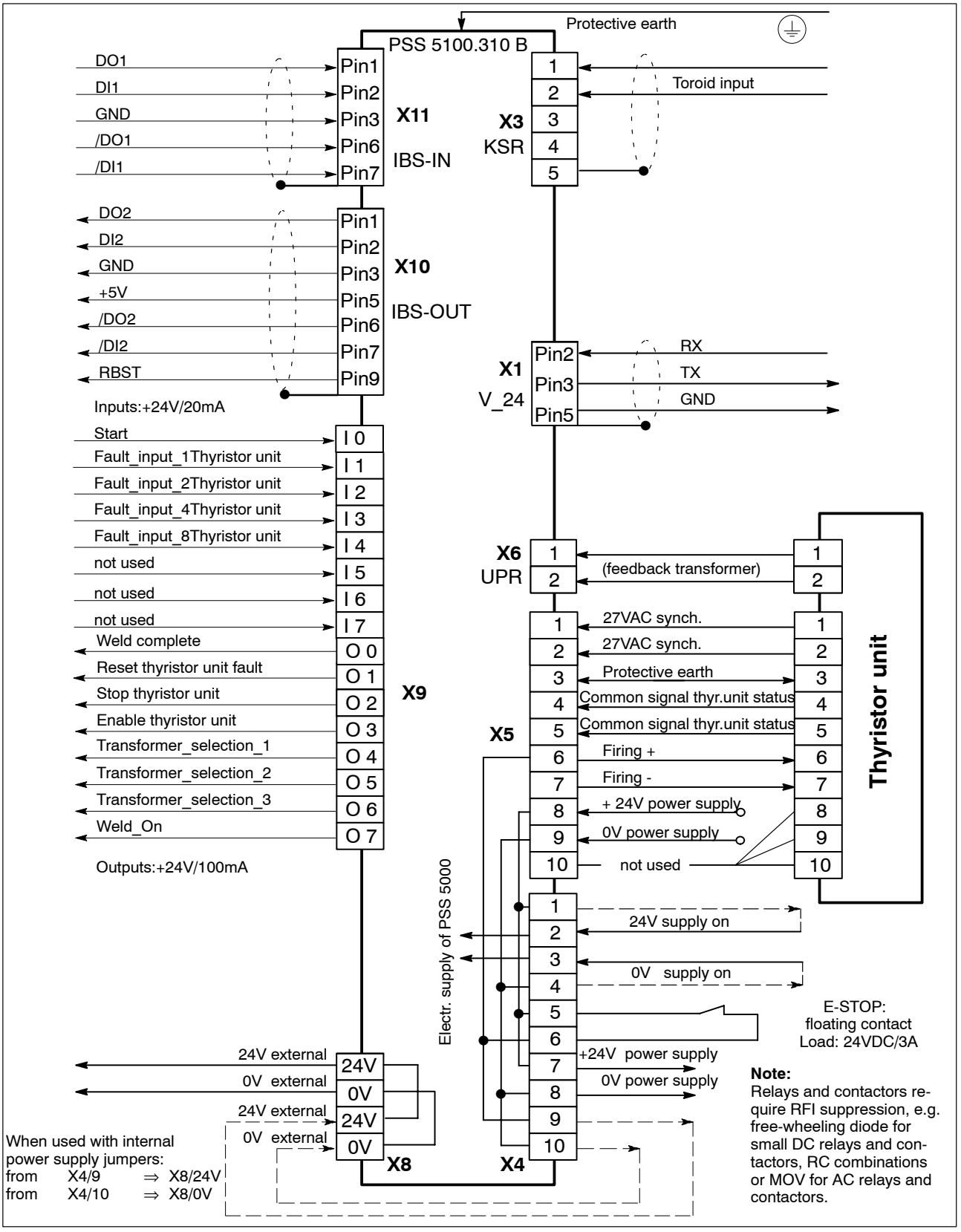
Bit no.	Meaning in C0 profile, INTERBUS-S, Messrs. Phoenix	Meaning for PSS 5000 in extended C0 profile, Messrs. BOSCH
0	Weld complete	Weld complete
1	Tip dress request	Tip dress request
2	Prewarning	Prewarning
3	End of stepper (Max. life)	End of stepper (Max. life)
4	Ready	Ready
5	Welding fault	Welding fault
6	Without welding sequence monitoring	Without welding sequence monitoring
7	Weld	Weld
8	freely selectable	Proportional_valve_selection_1
9	freely selectable	Proportional_valve_selection_2
10	freely selectable	Proportional_valve_selection_4
11	freely selectable	Proportional_valve_selection_8
12	freely selectable	Proportional_valve_selection_16
13	reserved	reserved
14	reserved	Weld without command
15	reserved	Thyristor unit fault

2.5 Proportional valve control

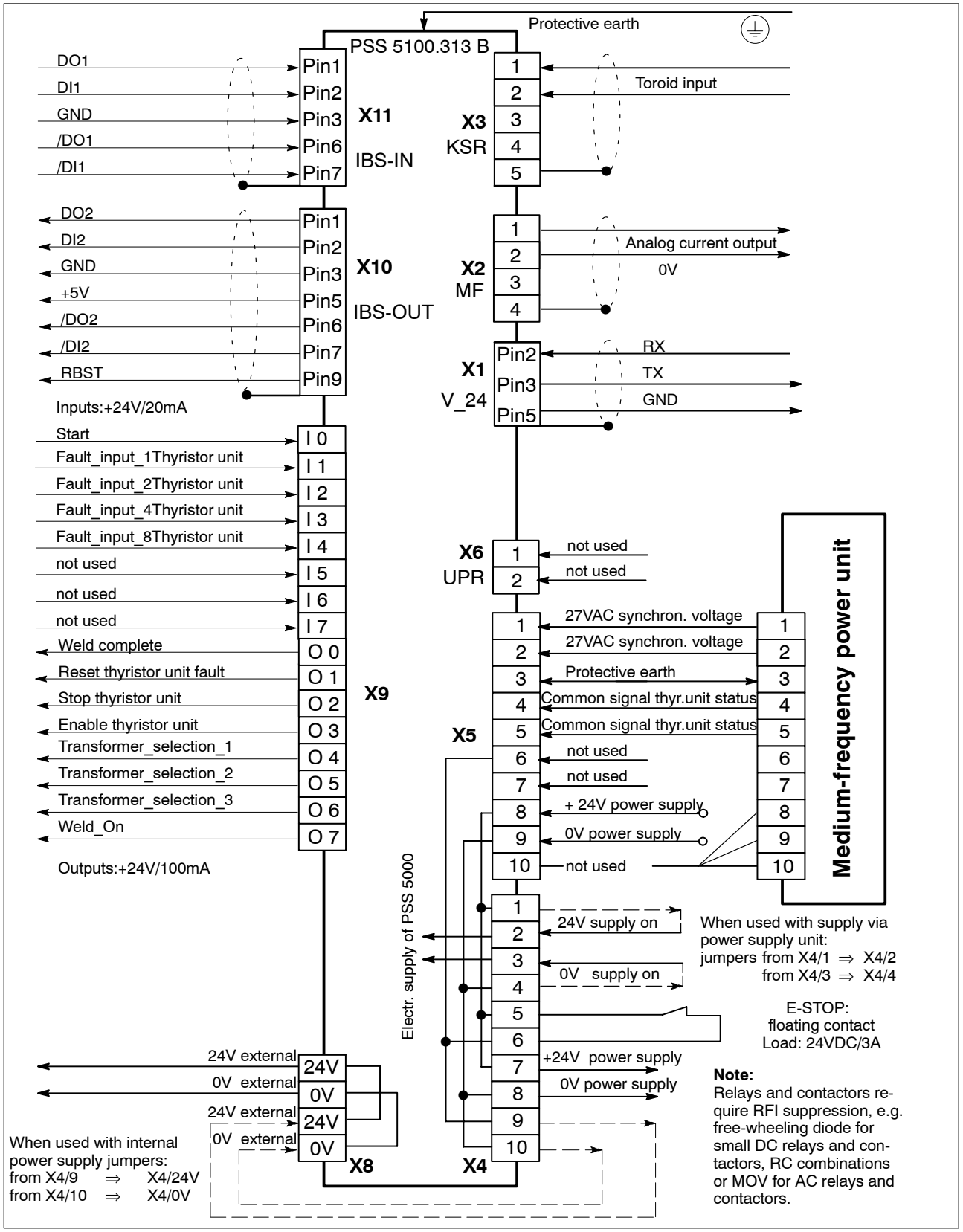
The setting range for pressure control is output in digital form (5 bit resolution) in the status word.

Using the Calibrate Pressure software function (*Stepper Setup* option of the *Basic-Setup* menu), the system is adjusted to the pressure behavior (electrode force) using a zero shift and a factor.

2.6 Connection diagram of PSS 5100.310 B



2.7 Connection diagram of PSS 5100.313 B



2.8 Functional description of the discrete inputs

NOTE

The signal description of the inputs contained in the product manual Technical Information, Wiring section, is applicable. The following section describes deviating and additional functions.

I0 *Start*

When the start signal is given with the control word, input I0 is used in parallel for starting the sequence with a +24VDC signal.

The parallel start results in the following start configurations:

Start I0	Start in status word, bit 0	Timer start
0	0	0
0	1	1
1	0	1
1	1	1

I1 - I4 *Thyristor unit fault number*

The thyristor unit uses these inputs to signal its status to the WT. The inputs are scanned depending on the common signal *Thyristor unit status* (X5: L4 and L5). The status messages are logged by the WT including their date and time and can be evaluated at the programming unit.

2.9 Functional description of serial input, bit 2 of the control word

Bit 2: *Reset thyristor unit fault*

This serial input is directly passed to the discrete output O1 and has no effect on the WT. It is designed for fault reset at the thyristor unit.

2.10 Functional description of the discrete outputs

NOTE

The signal description of the outputs contained in the product manual Technical Information, Wiring section, is applicable. The following section describes deviating and additional functions.

O0 *Weld complete*

Discrete and serial output of the *weld complete* signal.

O1 *Reset thyristor unit fault* (echo of control word bit 2)

The serial input signal *Reset thyristor unit fault* (control word bit 2) is directly passed to the discrete output O1. The signal is not evaluated by the timer.

O2 *Stop thyristor unit*

If the E-stop circuit is open, and the I/O range receives external power supply through terminals X8/1 and X8/2, this output carries a +24V signal, otherwise the signal level is 0V.

O3 *Enable thyristor unit*

This output carries a +24V signal only if the E-stop circuit is closed, otherwise the signal level is 0V (inverse signal of *Stop thyristor unit*).

O4 to **O6** *Transformer_selection_1 to Transformer_selection_3*

Weld schedules using stepper numbers 1 to 9 drive the *Transformer_selection_1* output.
Weld schedules using stepper numbers 10 to 19 drive the *Transformer_selection_2* output.
Weld schedules using stepper numbers 20 to 29 drive the *Transformer_selection_3* output.
Weld schedules using any other stepper number will not change the output.

O7 ***Weld_On***

This output is used to drive a medium-frequency inverter. It controls the weld time of the MF inverter.

2.11 Functional description of the serial outputs

Bit 8 -12: *Proportional valve control*

For controlling the proportional valve, the WT supplies a digital value 5 bits long in the status word. The setting range from 0 to 100% is divided into 32 sections.

Bit 14: *Weld without command*

If a thyristor unit with feedback transformer is used, the WT has recognized a current in the welding circuit although none of the two start signals had been given.

Bit 15: *Thyristor unit fault*

This bit reflects the condition of the *Common thyristor unit status signal*. The status must be evaluated depending on the setting in the *Thyristor unit parameters* window in the *Basic-Setup* menu.

3 Weld timer with INTERBUS-S interface

In order to meet the increasing demand on the networking capability of automation equipment, various bus systems have been established on the market. One of them is the INTERBUS-S of Messrs. Phoenix.

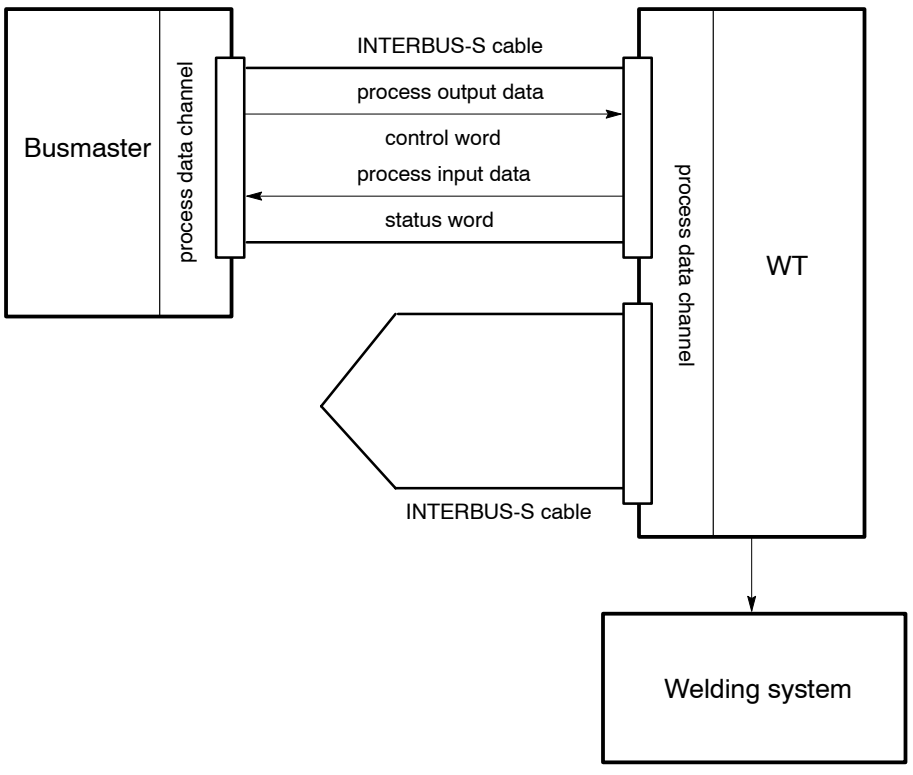
An INTERBUS-S interface in the PSS 5100.310 B/PSS 5100.313 B offers the possibility of communicating with other bus stations via serial data transmission, e.g. with robot controls or PLCs.

The allocation of the I/Os was defined in a specification, the C0 profile. Using this profile, a control word controls various functions of the WT, and the device status of the WT is output in the form of a status word. Data transmission is without acknowledgement, but with monitoring and in equidistant form (cyclically in identical intervals).

The definitions for data transmission through the process data channel are specified in the INTERBUS-S club guideline and in DIN 19258.

The direction of data transmission is indicated from the busmaster's point of view.

Data transmission between INTERBUS-S master and WT



The control and status word is used for transmitting the process data in the INTERBUS. It has a length of 1 word = 2 bytes.

Process data of PSS 5100.310 B/PSS 5100.313 B

	Byte 1	Byte 0
IN	control word	
OUT	status word	

3.1 Identification of PSS 5100.310 B/PSS 5100.313 B in the INTERBUS-S

The WT is identified as follows in the INTERBUS-S:

Identification register of the PSS 5100.310 B/PSS 5100.313 B on the bus

b15 b13	b12 b8	b7 b0
reserved	data length	identification code

The lowermost 8 bits contain an identification of the equipment type (e.g. weld timer). The next 5 bits specify the data length (number of words) of the process data of the WT. This information is automatically provided by the WT hardware.

Bit 0 - 7: Identification code

The following identification code was specified for the WT:

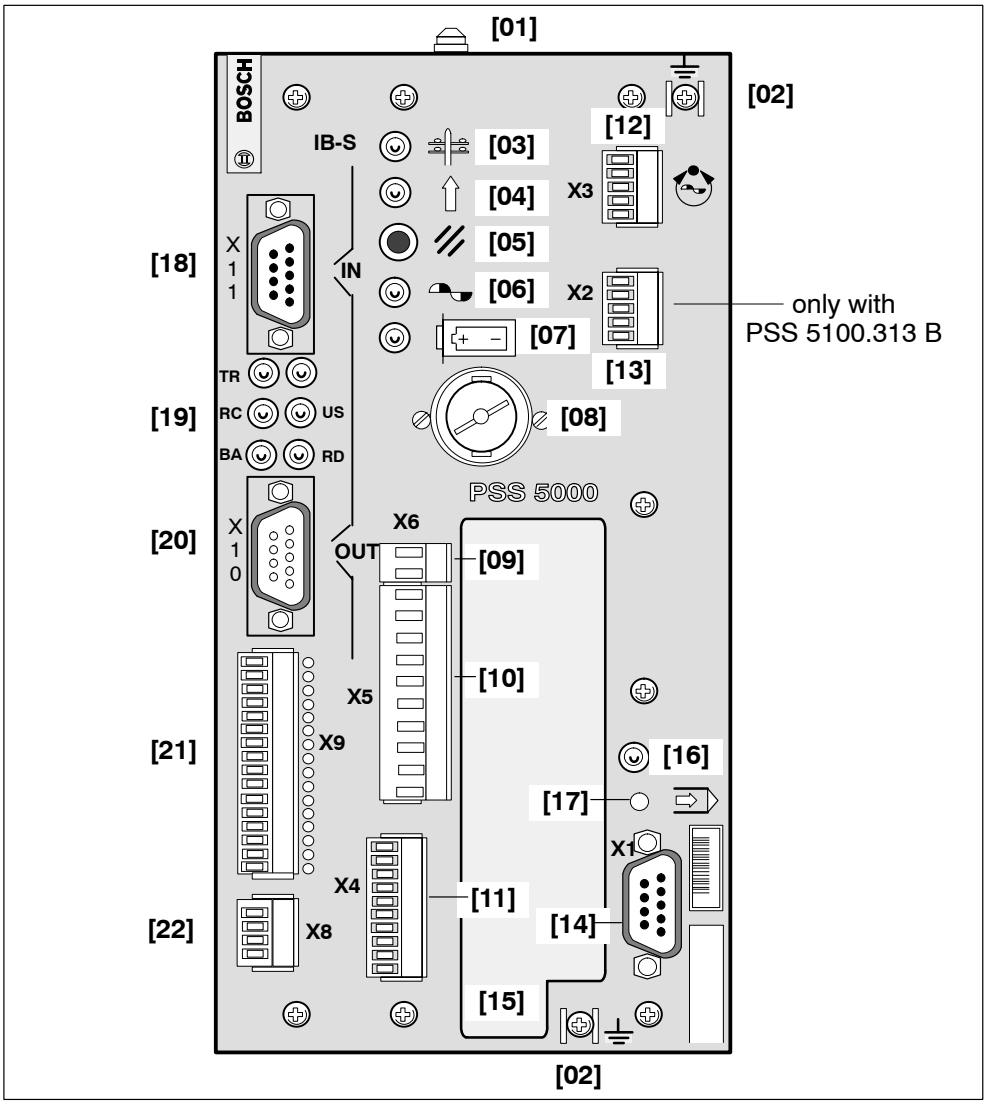
Equipment function of PSS 5100.310 B/PSS 5100.313 B	Identification code (dec)	Identification code (hex)
WT conforming to profile with digital I/Os	47	2F

Bit 8 - 12: Data length ((PSS 5100.310 B = 1 word)

The data length of the PSS 5100.310 B/PSS 5100.313 B is 1 word = 2 bytes, because it has 16 input and 16 output bits.

b12	b11	b10	b9	b8
0	0	0	0	1

4 Front panel



[01] Top of housing, spade connector for grounding connector

[02] Spade connector for cable shielding

[03] Line LED, connected to +24 VDC supply voltage for weld timer electronics (without I/O supply)

[04] Ready LED, timer ready, turns off in case of:
- Internal fault such as dead battery, or
- Schedule error, such as no current

[05] Reset push button, clears pending error messages, returns timer to ready state.

[06] Firing LED, control signal for thyristor unit active

[07] Battery fault LED, backup battery voltage too low

[08] Battery compartment; use only batteries with BOSCH part no. 1070 914 446.

[09] 2 pin plug-in terminal - welding transformer primary voltage feedback monitoring (UPR) for functions Weld without command, KUR

[10] 10 pin plug-in terminal - thyristor (power) unit:
- synchronizing voltage
- temperature contact
- firing (only in case of connection of thyristor units).

[11] 10 pin plug-in terminal - power supply:
- +24 V supply of internal power supply
- E-Stop
- +24 V discrete I/O's

[12] 5 pin plug-in terminal for measuring system e.g. with constant current control (KSR) connection for sensor

PSS 5100.313 B

[13] 4 pin plug-in terminal, analog current output of medium-frequency inverter.

[14] 9 pin D shell connector, V24 interface (programming unit)

[15] Blind cover, slot prepared for fieldbus module.

[16] LED red, timer processor not in operating mode:
The timer stopped processing commands. The timer is in boot mode. New operating software (firmware) may be loaded. This LED may turn on briefly during power up. Should the LED come on during normal operation (welding operation will not be possible), cycle power to the control. If the LED should turn on again, then the operating software is lost. Using a utility program from the programming unit, reload software over the V24 interface.

[17] Recessed key, switching from operating mode to boot mode:
Pressing this key turns the system to boot mode.
You should only turn to boot mode for loading a new operating program (firmware).

CAUTION!

This key may only be operated by authorized personnel.
Never operate this key during a welding operation.
Program execution will be aborted and all timer outputs are reset to zero.

[18] 9 pin D shell plug, INTERBUS-S IN interface (remote bus interface)

[19] Diagnostics messages of INTERBUS-S:

-TR: Transmit/Receive, not used.

-RC: Remote Check, the green LED indicates correct wiring of the remote bus input cable. When the INTERBUS-S master module is reset, the LED turns off.

-BA; Bus Active, the green LED signals an INTERBUS-S data transmission.

-US: Unit Supply, the green LED indicates that the INTERBUS-S signal voltage is available at the bus station.

-RD: Remote bus Disable, the red LED indicates that the downstream remote bus cable is switched off.

[20] 9 pin D shell socket, INTERBUS-S OUT interface (remote bus interface).

[21] 16 pin plug-in terminal for discrete I/O's

[22] 4 pin plug-in terminal for external voltage supply.

Notes:

5 Part numbers and shipment scope

Weld timer PSS 5100.310 B Part no. 1070 077 830

Weld timer PSS 5100.313 B Part no. 1070 081 259

Included in shipment

[09]	UPR, X6	2 pin (5mm)	No. 1070 914 564
[10]	Thyristor unit, X5	10 pin (5mm)	No. 1070 913 813
[11]	INT, X4	10 pin (3.5mm)	No. 1070 916 714
[12]	Measuring system, X3	5 pin (3.5mm)	No. 1070 916 910
[13]	MF, X2	4 pin (3.5mm)	No. 1070 916 908
[21]	I / Os, X9	16 pin (3.5mm)	No. 1070 916 795
[22]	EXT, X8	4 pin (3.5mm)	No. 1070 916 908

Not included in the shipment are

[18]	IB-S IN, X11	Cable (remote bus cable) and plugs from Messrs. Phoenix	
[20]	IB-S OUT, X10	Cable (remote bus cable) and plugs from Messrs. Phoenix	
	V24, X1	9 pin female D shell connector 9 pin female D shell connector housing	No. 1070 912 981 No. 1070 913 723
	Cable V24	For connection PC-PSS 5000 Length 1.5 meters	No. 1070 066 749
	Battery		No. 1070 914 446

Notes:

1070 078 237-102 (2002.04) GB · TI · BRC-WS/VKF · Printed in Germany