PSS 5000

Welding simulator
Technical information

Edition 101

PSS 5000

Welding simulator
Technical information

1070 087 024-101 (2002.10) GB

Reg. No. 16149-03

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1 Preface

The present manual describes the functions and the handling of the welding simulator when connected to the weld timers of the PSS 5000 series.

NOTE

Unless described otherwise, the safety instructions, technical information, notes and technical data provided in the manual of the basic timer unit are applicable.

The following PSS 5000 manuals describe the basic PSS 5000 timer series:

- Technical Information PSS 5000 (German)
  SAP No.1070 078 181
- Technical Information PSS 5000 (English)
  SAP No.1070 078 216
- Technical Information PSS 5000 (French)
  SAP No.1070 078 207
- Technical Information PSS 5000 (Spanish)
  SAP No.1070 078 208
- Technical Information PSS 5000 (Swedish)
  SAP No.1070 078 215

- Operating and programming instructions, volume 1 (German)
  SAP No.1070 078 182
- Operating and programming instructions, volume 1 (English)
  SAP No.1070 078 217
- Operating and programming instructions, volume 1 (French)
  SAP No.1070 078 210
- Operating and programming instructions, volume 1 (Spanish)
  SAP No.1070 078 211

- Operating and programming instructions, volume 2 (German)
  SAP No.1070 078 183
- Operating and programming instructions, volume 2 (English)
  SAP No.1070 078 218
- Operating and programming instructions, volume 2 (French)
  SAP No.1070 078 210
- Operating and programming instructions, volume 2 (Spanish)
  SAP No.1070 078 214

- Technical Information, Installation and operating instructions, PSU 5000/PSG (German), SAP No.1070 078 196
- Technical Information, Installation and operating instructions, PSU 5000/PSG (English), SAP No.1070 078 224
- Technical Information, Installation and operating instructions, PSU 5000/PSG (French), SAP No.1070 078 225

2 Application

NOTE

The simulator and the switchbox may only be used for training and test purposes or as laboratory units.

Qualified personnel

This manual is designed for qualified personnel (specially trained technicians and engineers) with special knowledge in welding engineering. They require profound knowledge of the hardware components of the timer, the inverter (PSU) and the welding rectifier-transformer (PSG).

Qualified personnel:

- engineering personnel familiar with the safety standards of the electrical and automation technology.
- commissioning personnel entitled to commission, earth and label electrical circuits and equipment/systems in compliance with the standards of safety technology.
- operating personnel that has been instructed for handling equipment in resistance welding technology and is familiar with the contents of this manual that refers to the operation of the system.

The PSS 5000 welding simulator serves for testing under laboratory and training conditions:

- of welding programs in the PSS 5000
- and parts of the welding system (e.g. controlling the PSS 5000 via its inputs).

The welding simulator performs:

- the function of the welding current (50 Hz AC current or inverter DC current) and/or the primary voltage of a welding transformer (50 Hz AC current),
- the control of the timer, and
- the power supply to the timer.

The welding simulator consists of the following components:

- Switchbox with 220 VAC connection,
- the actual Simulator,
- a cable kit (5 cables plus power cord).

The welding simulator is designed to perform sequences for the following current ranges:

- AC welding between 5 and 15 kA, approximately,
- DC welding between 4 and 27 kA, approximately.

The following components are additionally needed:

- A PSS 5000 weld timer with parallel inputs and outputs (if the timer has serial I/Os, they have to be served by an external controller).
- A programming terminal with the BOS 5000 software (the cable between the programming terminal and the PSS 5000/X1 is not included in the welding simulator delivery).

The welding program is created on the programming terminal with the help of the BOS 5000 software and loaded into the weld timer. When the welding simulator has been connected to the timer, the following test functions are available:

Switchbox

- Control of the weld timer inputs, e.g. start and selection of programs,
- Display of timer outputs,
- Display of the undervoltage trip signal **<Undervoltage>** (main switch),
- Display of the load current trip signal **<Load current>** (main switch),
- Closing and opening of Emergency-Stop circuit,
- Intervention in the timer schedule by the **<Temperature contact/ Power unit status group message>** signal,
- Feedback signal of the pressure control valve,
- Activation of the timer's 24V supply,
- Display of the simulated welding current by an Ignition lamp,
- Timer response to a welding current without a start command (current passed without command, CWC),
- Connection of an external solenoid valve (max. 10 VA).
- Connection of an external start signal.

Simulator

- Simulated control of AC power unit,
- Simulated control of power unit DC-5 kHz,
- Simulated control of power unit DC_ANA,
- Simulation of welding current,
- Display of weld times (WLD) on LEDs,
- Simulation of the current measuring loop (measuring loop short-circuit, measuring loop open, and faultless current measuring loop).

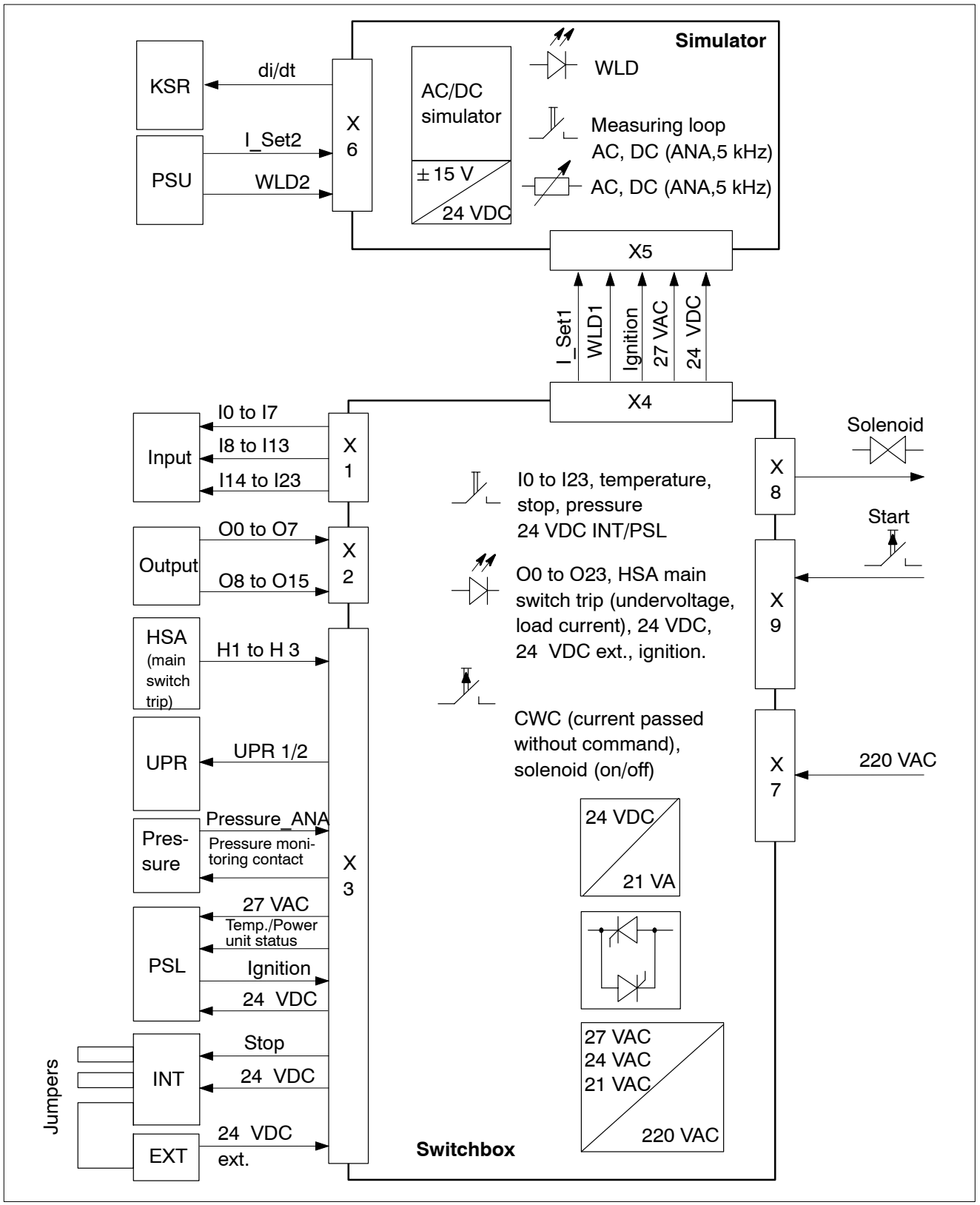
NOTE

Do not apply any major load to the cables on the simulator and the switchbox. You should never carry the simulator or the switchbox by their cables. Only use a dry piece of cloth for cleaning. Have your electrical personnel regularly check the simulator and the switchbox for proper functioning of the protective measures and the insulation. Loose or damaged cables and connectors should be immediately replaced or repaired.

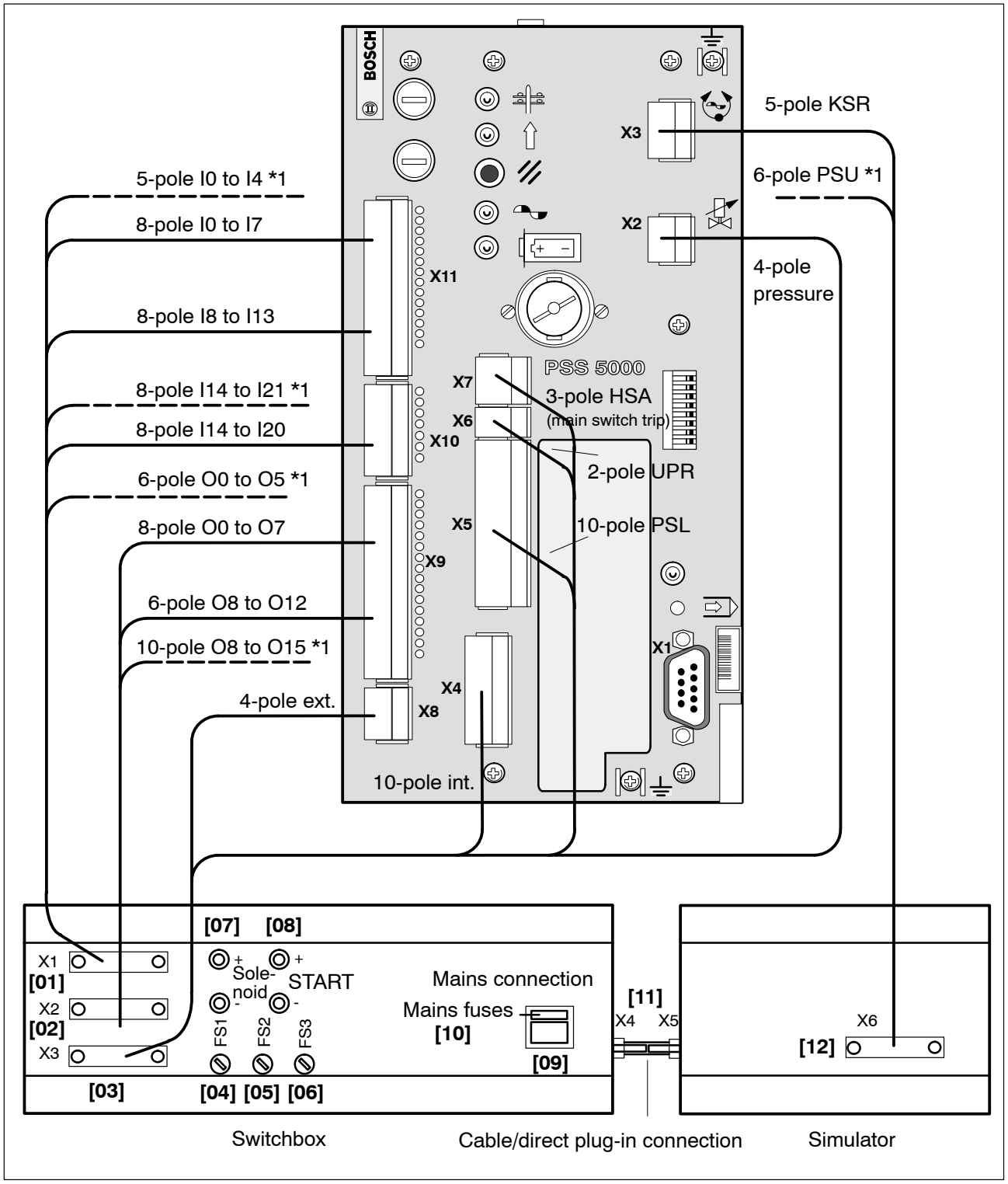
NOTE

Install the PSS 5000 in a place in which air may circulate from bottom to top (approx. 2 cm distance from base).

2.1 Functional scheme



3 Connection (example: PSS 5100.100 B)



*1: Depending on the timer type, the cable is connected as described in the wiring diagram in the "Technical Information" manual. It may not be necessary to use all the cables to connect a certain timer type.

Switch off the welding simulator, the timer and other peripherals used before making any connections.

NOTE

Refer to the specific wiring diagram for a particular timer and its connections.

[01] **X1 interface:** Connection of switch/key inputs I00 to I21 to the timer.

[02] **X2 Interface:** Connection of outputs O00 to O15 of the timer.

[03] **X3 interface:** Connection of power supply for the timer, the simulated power unit function, the simulated main switch function, and the simulated proportional valve.

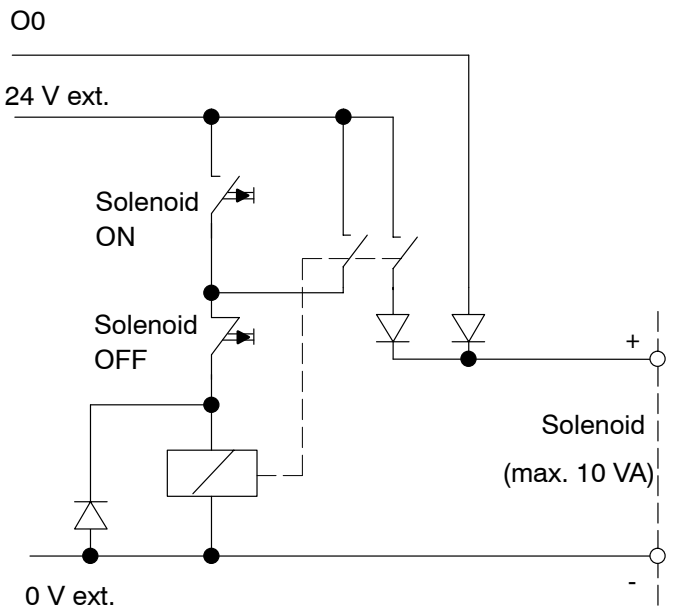
[04] **Fuse:** FS1 (M 0.8 A) for 27 VAC synchronizing voltage.

[05] **Fuse:** FS2 (M 0.3 A) for the KUR function.

[06] **Fuse:** FS3 (M 1.6 A) for 24VDC voltage supply.

[07] **Solenoid +/-:** Connection of an external solenoid valve (max. 10 VA).

Control of an external solenoid valve (max. 10 VA).



[08] START +/-: Connection of an external floating contact in parallel to switch/key I00.

[09] Mains connection for the 220V supply to the switchbox.

[10] Fuses: Miniature fuses (2x M 0.8 A) for mains connection.

[11] X4/X5 interface: Connection between switchbox and simulator. The connection may be made using cables or a direct plug-in connection.

[12] X6 interface: Connection of the KSR or PSU function.

Ports that are not needed should not be occupied or served by existing components:

- The I/Os of the timer are driven by a PLC or robot controller (including serial ports);
- Connection of an external power unit instead of simulator plugs HSA, UPR, and PSL.
- Connection of a proportionate valve instead of the simulator plug for pressure,
- Connection of a current sensor instead of the simulator plug for KSR,
- Connection of a solenoid valve (max. 10 VA power input) to solenoid +/- ports (function in parallel to output O00).
- Connection of a start input to ports START +/- etc.

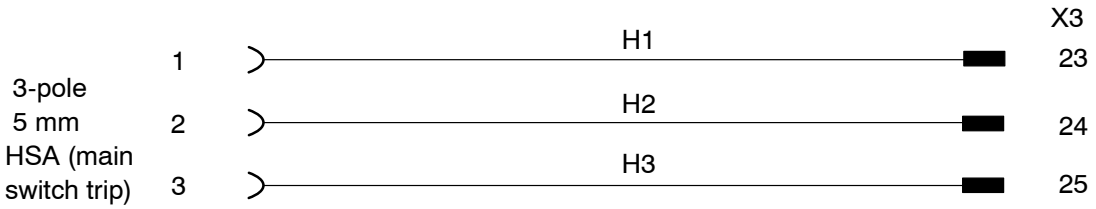
Please use the cable with the earthing pin plug for the mains supply to the simulator.

NOTE

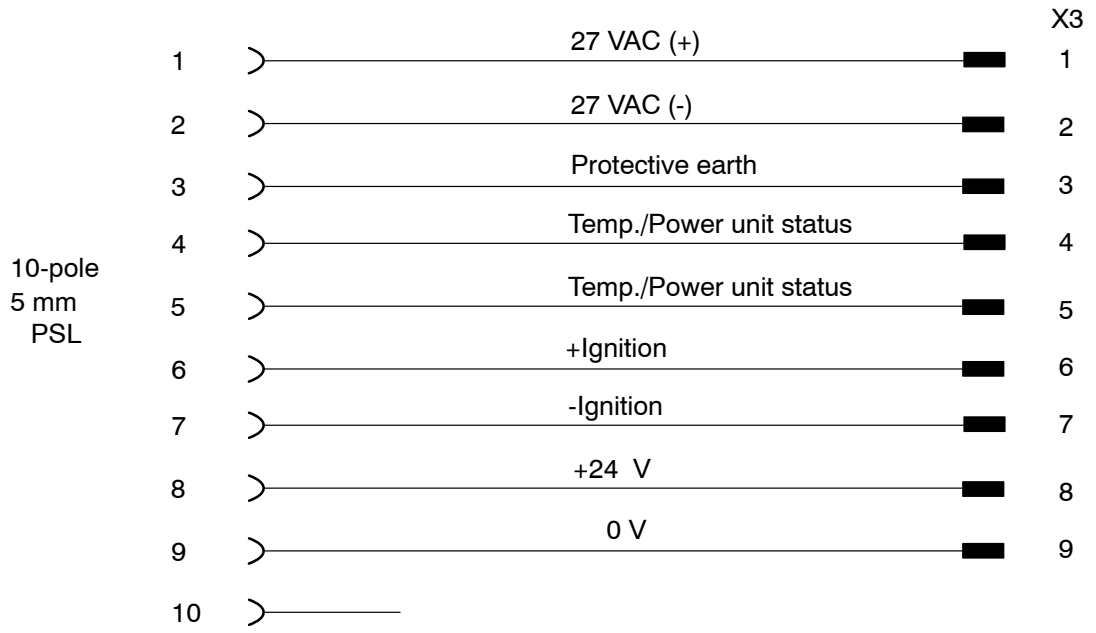
Please remove the mains connector before replacing any fuses.

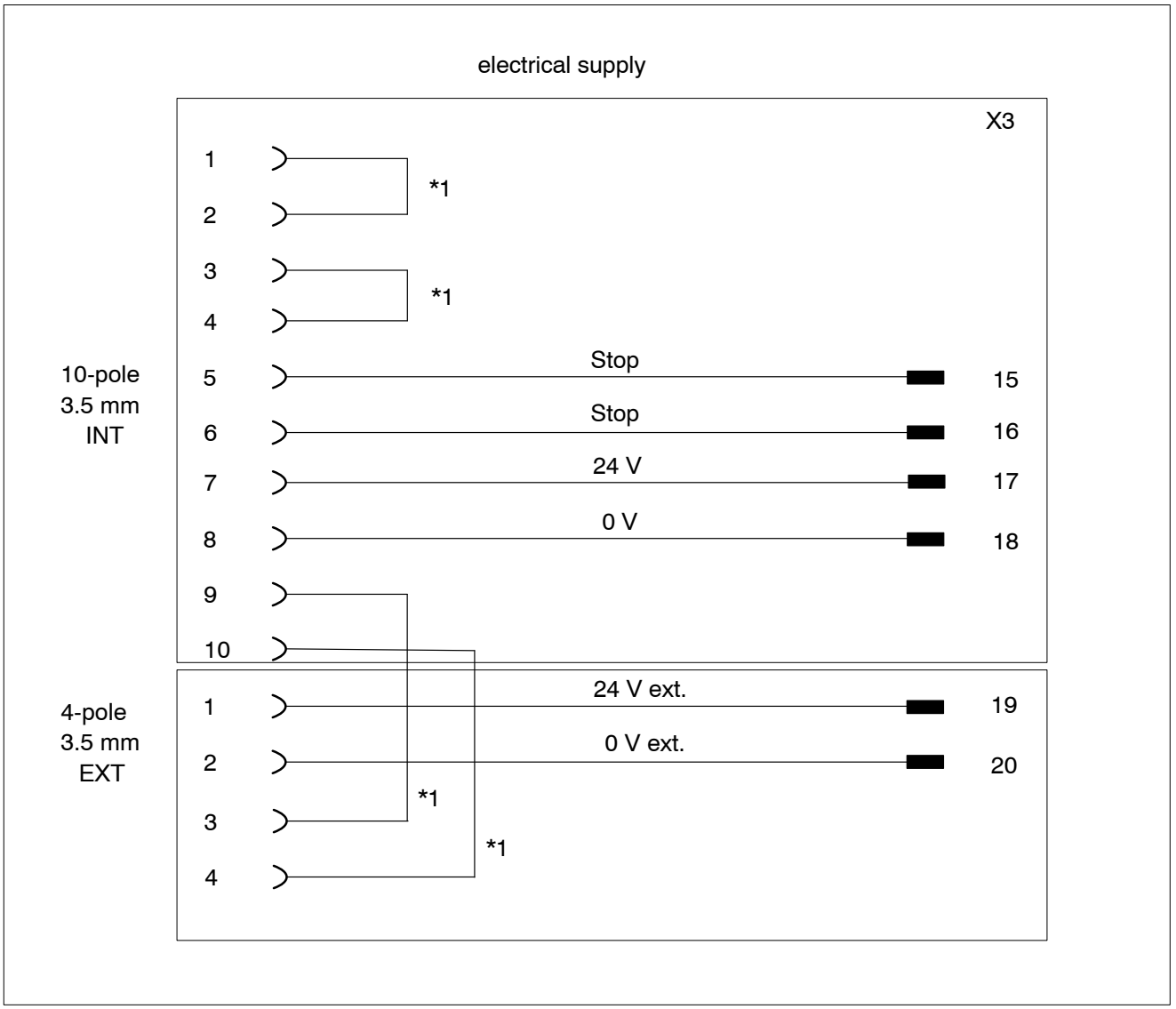
3.1 External connection diagrams

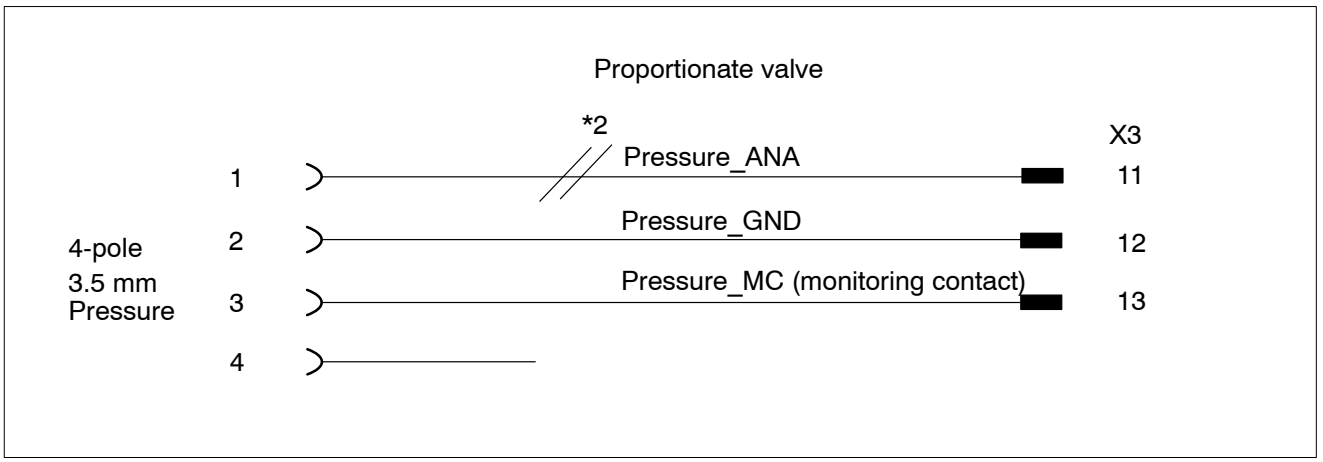
Connection of main switch simulation



Connection of power unit PSL simulation, power supply from power unit

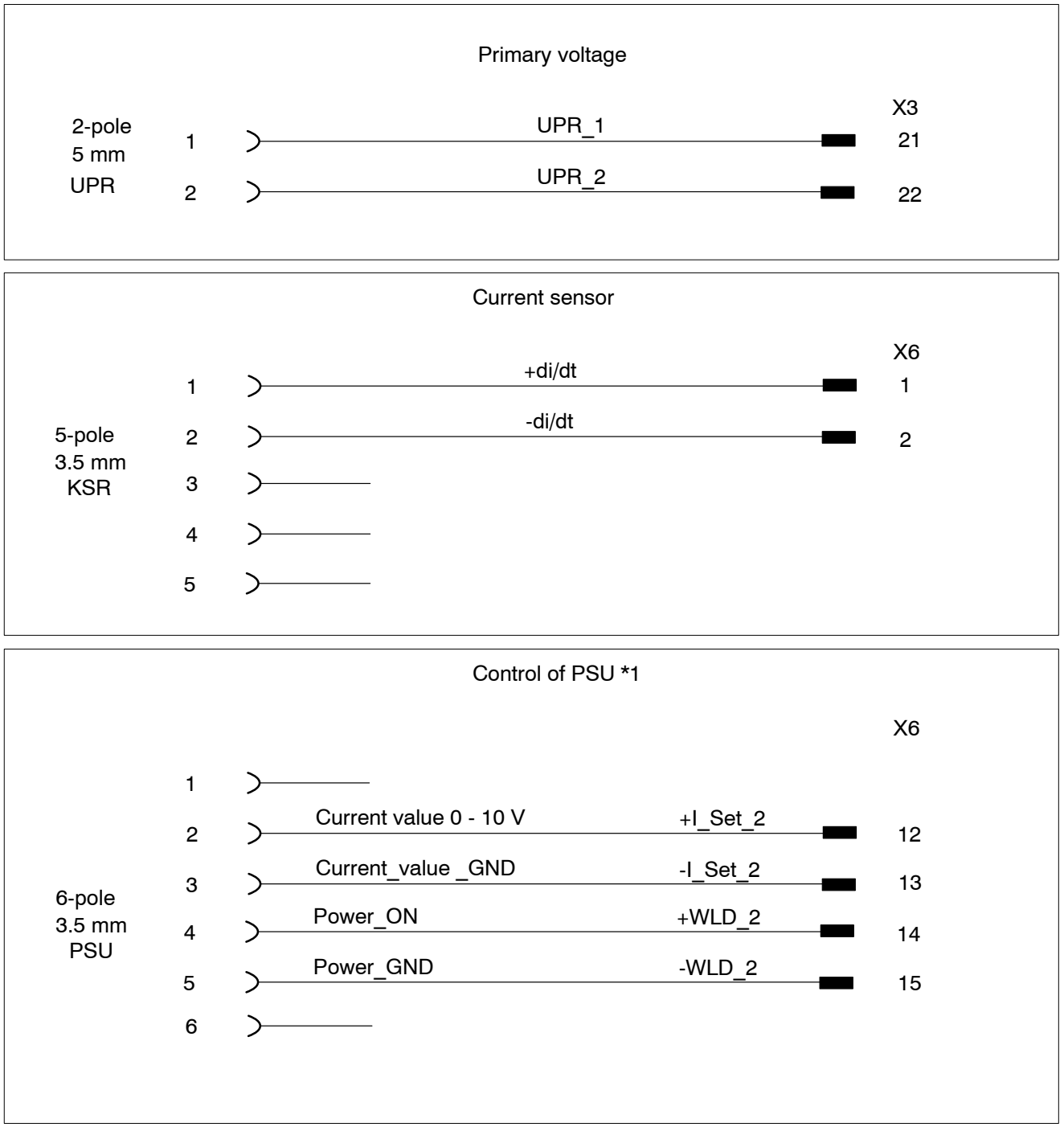




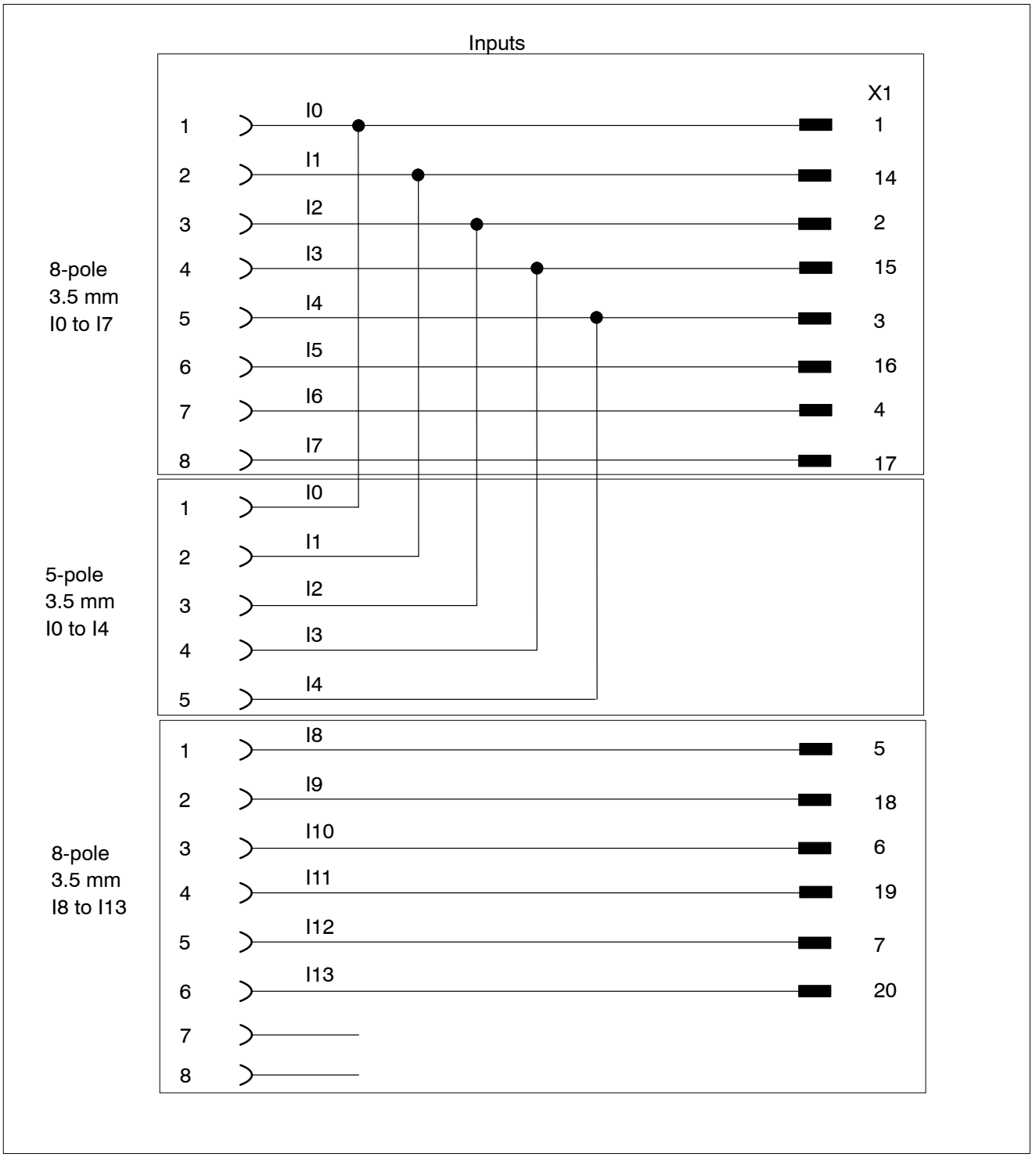


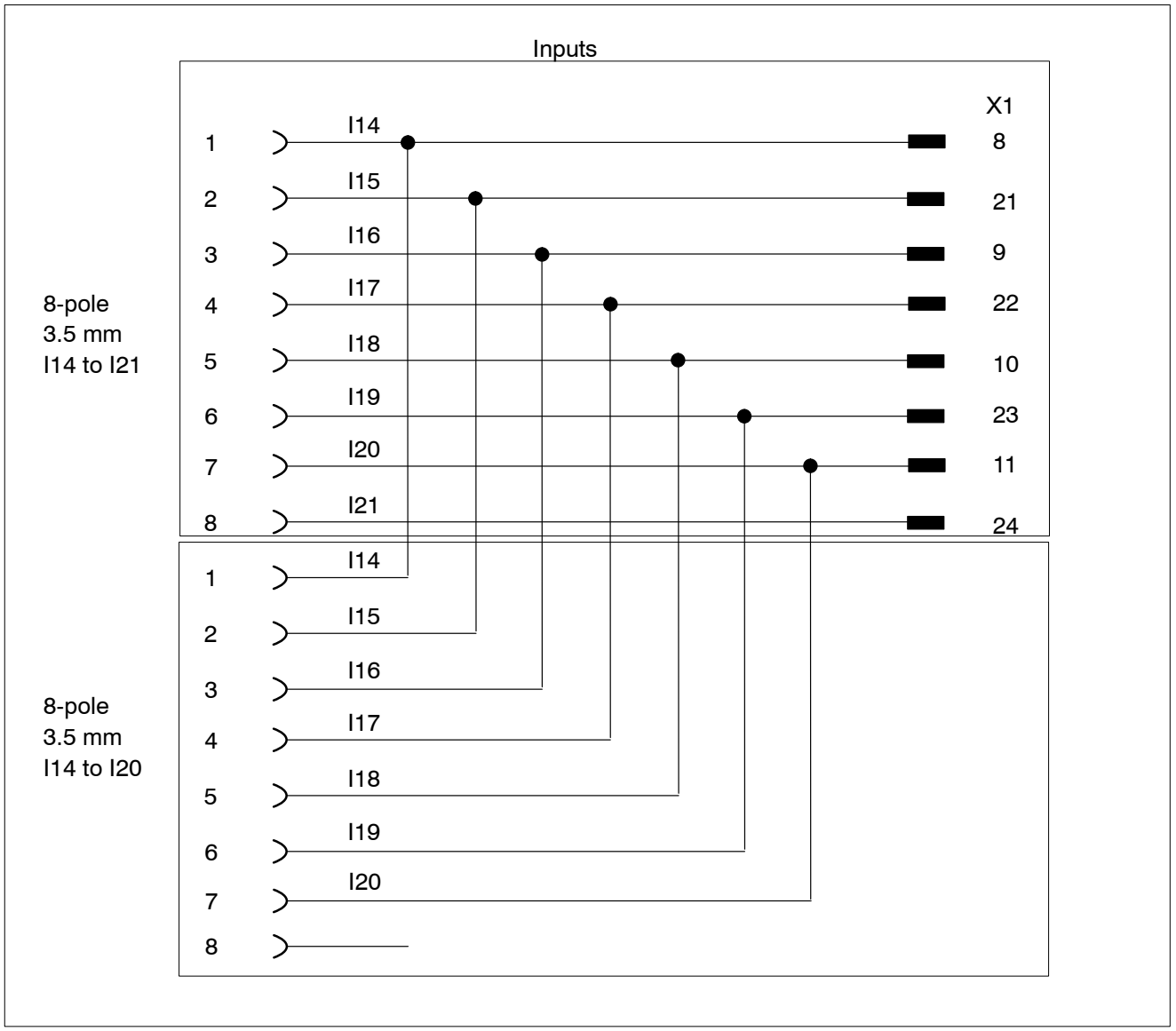
*1: When changing the power supply to the timer, please note or change all jumper positions, if necessary.

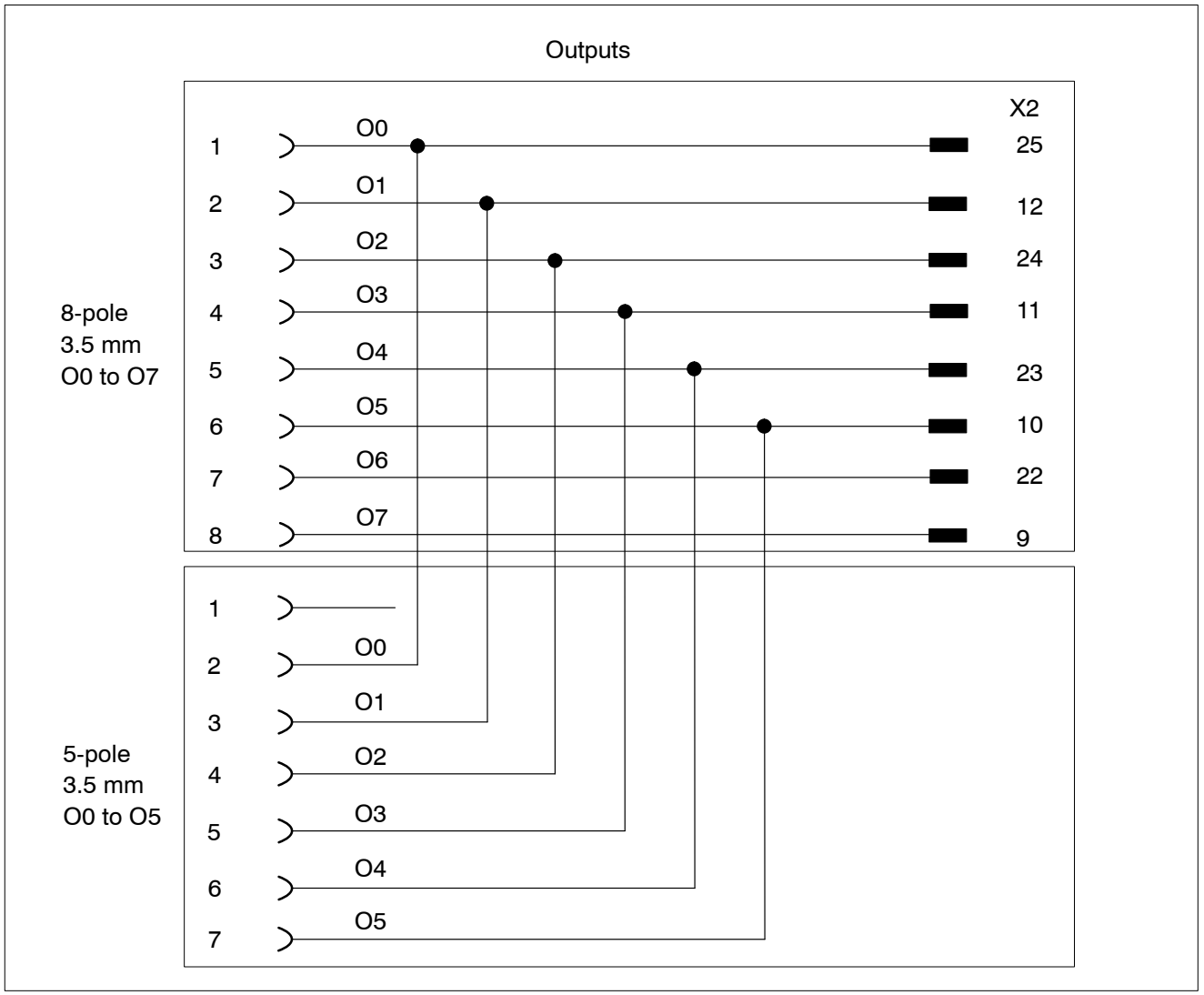
*2: Cable has not been connected to pressure connector (only necessary for inverter simulation using B module). A PSU connection is not necessary in this case.

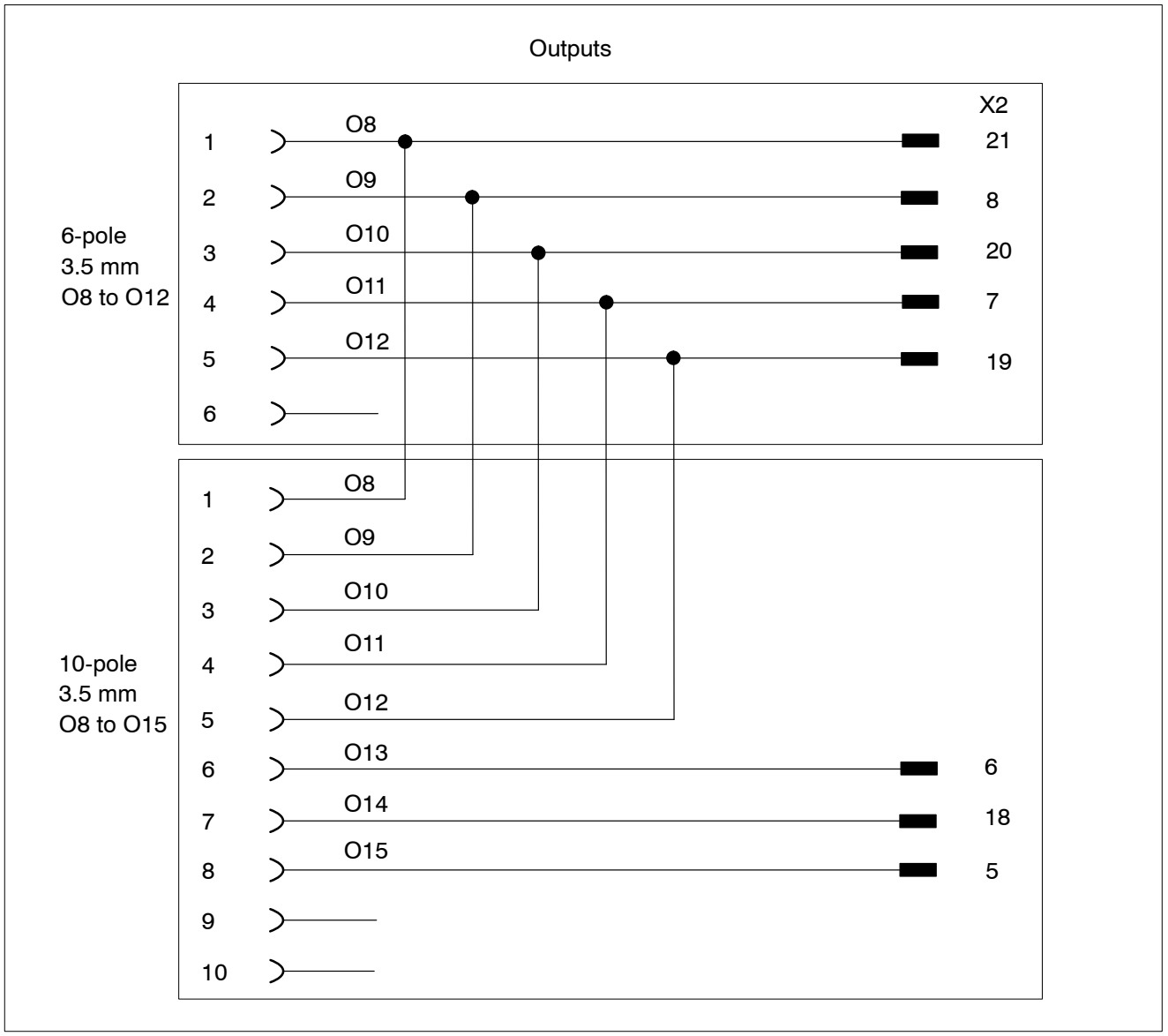


*1: Only with PSU simulation on a C module.

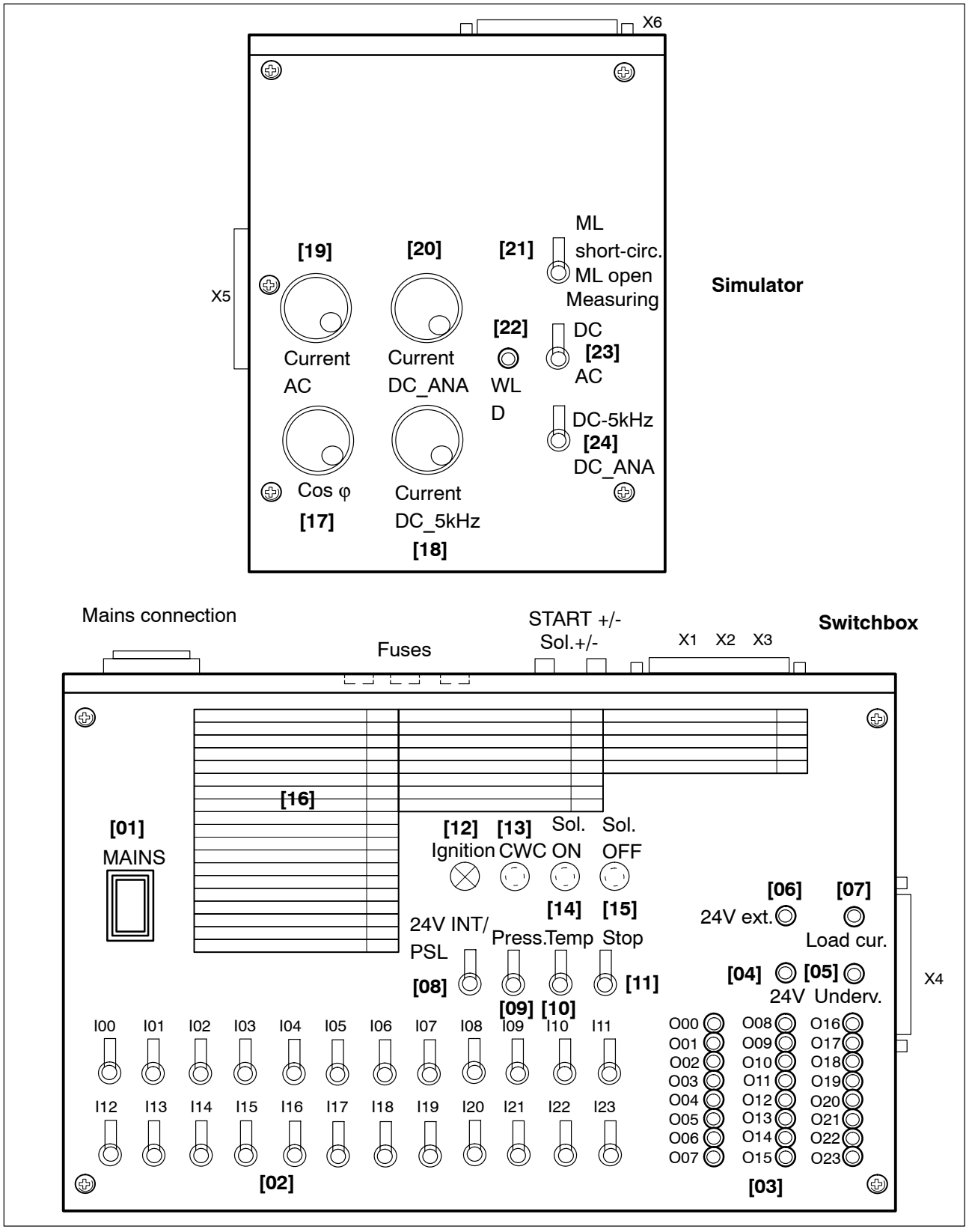

Inputs
X1
8-pole
3.5 mm
I0 to I7
1
2
3
4
5
6
7
8
I0
I1
I2
I3
I4
I5
I6
I7
1
14
2
15
3
16
4
17
5-pole
3.5 mm
I0 to I4
1
2
3
4
5
I0
I1
I2
I3
I4
8-pole
3.5 mm
I8 to I13
1
2
3
4
5
6
7
8
I8
I9
I10
I11
I12
I13
5
18
6
19
7
20


Inputs
X1
8-pole
3.5 mm
I14 to I21
1
2
3
4
5
6
7
8
I14
I15
I16
I17
I18
I19
I20
I21
8
21
9
22
10
23
11
24
8-pole
3.5 mm
I14 to I20
1
2
3
4
5
6
7
8
I14
I15
I16
I17
I18
I19
I20


Outputs
X2
1
2
3
4
5
6
7
8
O0
O1
O2
O3
O4
O5
O6
O7
25
12
24
11
23
10
22
9
8-pole
3.5 mm
O0 to O7
1
2
3
4
5
6
7
O0
O1
O2
O3
O4
O5
5-pole
3.5 mm
O0 to O5


Outputs
X2
6-pole
3.5 mm
O8 to O12
1
2
3
4
5
6
O8
O9
O10
O11
O12
21
8
20
7
19
10-pole
3.5 mm
O8 to O15
1
2
3
4
5
6
7
8
9
10
O8
O9
O10
O11
O12
O13
O14
O15
6
18
5

4 Operation


X6
X5
[19]
Current
AC
[20]
Current
DC_ANA
[21]
ML
short-circ.
ML open
Measuring
Simulator
[22]
WL
D
DC
[23]
AC
DC-5kHz
[24]
DC_ANA
Cos φ
[17]
Current
DC_5kHz
[18]
Mains connection
Fuses
START +/-
Sol.+/-
X1 X2 X3
Switchbox
[16]
[01]
MAINS
[12]
Ignition
[13]
CWC
Sol.
ON
Sol.
OFF
[14]
[15]
24V INT/
PSL
Press.
Temp
Stop
[08]
[09]
[10]
[11]
[06]
24V ext.
[07]
Load cur.
[04]
[05]
24V
Underv.
X4
I00 I01 I02 I03 I04 I05 I06 I07 I08 I09 I10 I11
I12 I13 I14 I15 I16 I17 I18 I19 I20 I21 I22 I23
O00 O01 O02 O03 O04 O05 O06 O07
O08 O09 O10 O11 O12 O13 O14 O15
O16 O17 O18 O19 O20 O21 O22 O23
[02]
[03]

[01] Power switch: Turning on the power supply to the switchbox and simulator.

[02] Switch ↓ / Key ↑ inputs I00 to I23: inputs to the timer (also refer to section 4.2). Functions as described in ”Technical Information” manual.

[03] LED outputs O00 to O23: for display functions as described in ”Technical Information” manual (also refer to section 4.2). Type-specific special features (e.g. PSS 5100.110: relay output) are not described at this point.

[04] 24 V power supply LED: indicates that the 24 V supply of the simulator is on. It is activated by switch 24 V INT/PSL **[08]**.

[05] Undervoltage LED: indicates the status of output H1 of the main switch trip HSA (HSA relay contact shown). In Ready state, the LED is on. The fault ”Current passed without command” turns the Undervoltage LED off, and the Load current LED on.

[06] 24 V ext. LED: indicates that the 24V supply to the parallel inputs and outputs is turned on (refer to diagrams in ”Technical Information” manual). It is activated by switch 24 V INT/PSL **[08]**. The necessary jumpers are provided together with the cable kit.

[07] Load current LED: indicates the status of output H3 of the main switch trip HSA (HSA relay contact shown). The fault ”Current passed without command” turns the Load current LED on, and the Undervoltage LED off.

[08] 24 V INT/PSL switch: changes over the 24VDC supply to the timer, connector X4/INT, between the switchbox and an external power unit.

[09] Pressure switch: switches the feedback of the proportionate valve.

[10] Temp switch: switches the status output of the power unit (e.g. temperature monitoring in power unit tripped). The O03 LED is turned off, the timer is no longer ready for use. This condition is acknowledged via inputs I14 to I16 (PSS 5100.100).

[11] Stop switch: simulates the Emergency Stop circuit function. The Ready message of the timer goes off when the Emergency Stop circuit is opened. A suitable message is output on the programming terminal.

[12] Ignition lamp: is on while a current flow is simulated during the weld times, where it depends on the phase angle setting. The lamp is off during cool times. Different %I values are indicated by different degrees of luminosity.

[13] CWC key: current passed without command. The CWC key simulates a welding current in the welding circuit without a weld command output. The Ready message of the timer goes off. A suitable message is output on the programming terminal.

- The UPR connector must have been plugged into the timer.
- The HSA connector must have been plugged into the timer.

[14] Solenoid ON key: switches an external solenoid valve on regardless of the weld schedule.

[15] Solenoid Off key: switches an external solenoid valve off regardless of the weld schedule.

[16] Label for inscriptions: functional description of the switches/keys of the switchbox inputs and outputs (valid for PSS 5100.100).

[17] Cos φ potentiometer: for internal test purposes, normal position at the far right end.

[18] Current DC_5kHz potentiometer: influences the simulated value fed back by the current sensor when welding with DC current, e.g., in order to simulate voltage fluctuations of the power unit supply or changes in resistance in the secondary circuit (no influence desired: potentiometer at the far right end).

[19] Current AC potentiometer: influences the simulated value fed back by the current sensor when welding with AC current, e.g., in order to simulate voltage fluctuations of the power unit supply or changes in resistance in the secondary circuit (no influence desired: potentiometer at the far right end).

[20] Current DC_ANA potentiometer: influences the simulated value fed back by the current sensor when welding with DC current, e.g., in order to simulate voltage fluctuations of the power unit supply or changes in resistance in the secondary circuit (no influence desired: potentiometer at the far right end).

[21] Measuring loop (ML) short-circuit/ML open/Measuring switch: simulates the function of the current measuring loop (KSR sensor).

[22] WLD LED: displays the current weld times. For a ms timer, the LED is on during the entire sequence of weld and cool times.

[23] DC/AC switch: selects the type of power unit to be simulated (AC <-> DC).

[24] DC-5 kHz/DC_ANA switch: selects the type of power unit control to be simulated (5 kHz: programming in 50Hz system cycles, ANA: programming in ms).

4.1 Commissioning (by the example of a PSS 5100.100)

NOTE

The functions of the control elements may be different in other timer types.

Switch off the welding simulator, the timer and other peripherals used and connect all necessary cables.

Switch on the power supply **[01]**.

Switch the 24V supply of the weld timer on at switch 24 V/INT/PSL **[08]**. The green Mains and 24V supply LEDs on the timer are on. The green Ready LED on the timer also goes on after a short while. If the timer does not display a Ready message on output O03, press the Reset button on the front panel. This clears any errors remaining from previous schedules.

- Connect the programming terminal to the timer.
- Create your test program.
- Load your test program into the timer.
- Turn the monitoring contact on I10, weld/no weld on I11 and NBS enable on I12 of the switchbox on.
- Select the program number of your test program on switches I01 to I08.

Start your test program by pressing key I00. The following outputs will be signaled:

- Solenoid valve O00,
- Weld complete contact O01,
- NBS request O02,
- Ignition lamp,
- Weld time LED WLD.

If the ”Sequence inhibited/Weld schedule stopped” error message occurs immediately after the start:

- Check the program number, parity, and schedule programming.

The solenoid valve output is not displayed:

- Check the Ready message of the timer.

The ignition lamp is not on:

- Check whether ”weld/no weld” has been enabled externally and internally, and whether the schedule has been enabled in the program.

The weld complete contact output O01 is not displayed:

- Check whether you selected a program for single-spot welding.
- Do not switch off the Start signal before the entire program has been processed.

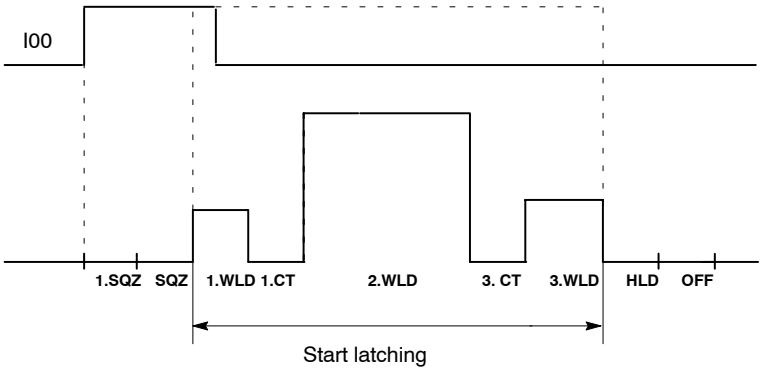
The functions of the control elements may be different in other timer types.

4.2 Functions (by the example of a PSS 5100.100)

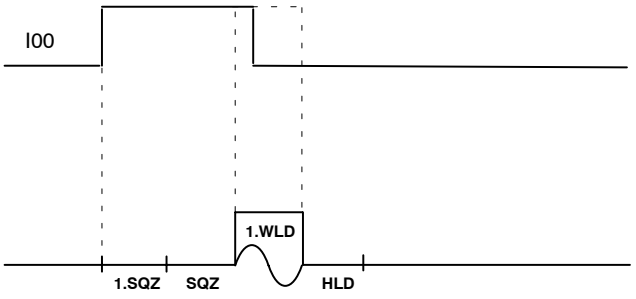
[02] Key/Switch inputs I00 to I23

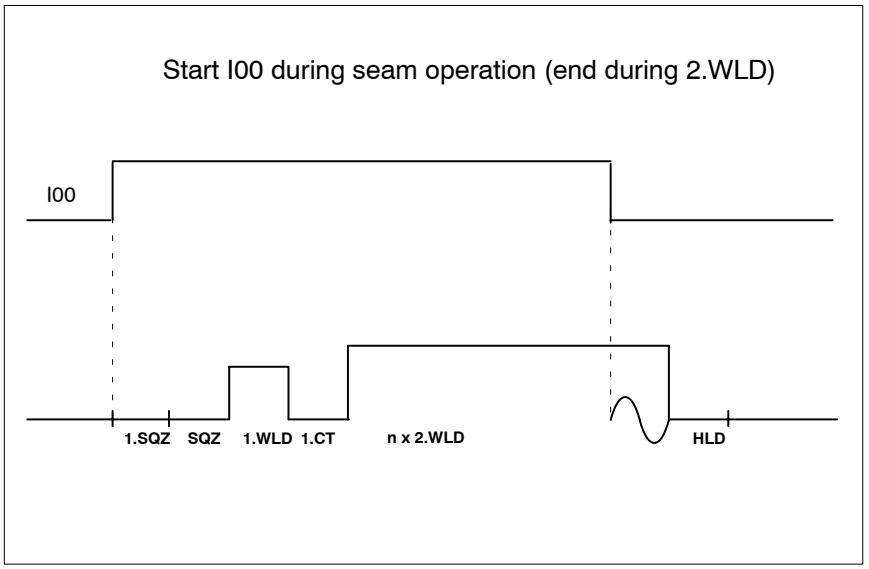
Key/Switch I00, Start: The test program previously loaded into the timer is started by switch I00. The timer is started synchronously (upon the first subsequent positive half-wave), output O00 **<solenoid valve>** is activated. When the Start has been given, the selected program number is interlocked which had been active bounce-free when the Start was output. The 1.SQZ time begins with the Start. When the 1.WLD begins, the program sequence starts to be latching.

Latching Start I00 with single-spot and repeat welding



Start I00 during seam operation (end during 1.WLD)





Key/Switch inputs I01 to I08, program selection: The parameters for max. 256 welding programs can be defined and selected in each timer. The program number of the desired test program is chosen by a binary program selection.

The desired program number must be available bounce-free prior to the start signal.

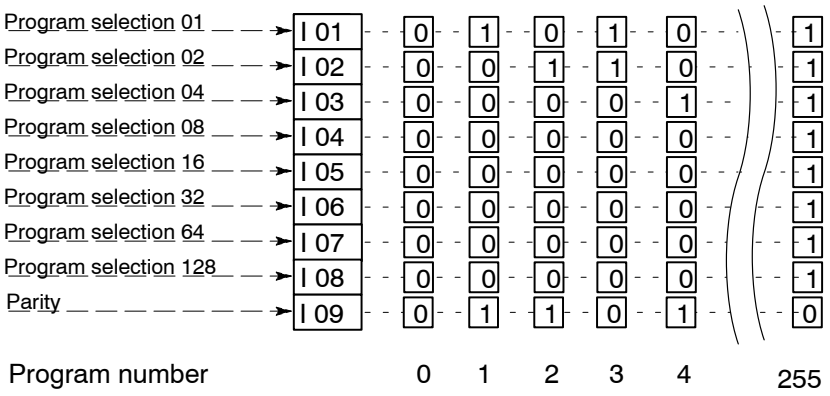
When the program number has been selected, the programmed pressure value is output to the analog pressure output.

NOTE

*Selecting program number 0 and applying a 24 VDC signal to input I18 (Electrodes have been replaced) will reset the counters of **all electrodes**. Selecting a program number between 1 and 255 and activating input I18 (Electrodes have been replaced) will reset the counters of **the electrode assigned** to this program only.*

Key/Switch I09, Parity: The program selection may be complemented by a parity bit. The parity bit complements the program number to an even or odd parity (checksum).

Program selection: Examples of even parity



NOTE

The type of parity (off, on, odd) is programmed in the Basic Set-up, I/O parameters option.

Key/Switch I10, monitoring contact: When the 1.SQZ has elapsed, input I10, monitoring contact, will be scanned. Use switch I10 to report to the timer that the electrodes have been closed. When this signal is available on input I10, the SQZ starts running.

Switch I10 must be switched on for the test.

Key/Switch I11 Weld/no weld external: Switch I11 enables the external weld/no weld signal. Furthermore, the weld/no weld settings in the program are active (internal weld/no weld and program-specific weld/no weld).
If weld/no weld external has been activated by switch I11, and if weld/no weld internal or the program-specific weld signal has been disabled in the program, the test program will be started and executed without simulating a welding current.
No weld external : Switch I11 disabled.
Weld on external : Switch I11 enabled.
In order to simulate the welding current, weld on external on switch I11 and weld on internal as well as the program-specific weld signal have to be enabled in the program.

NOTE

Weld/no weld is programmed in the Basic Set-up, Sequence setup option.

Key/Switch I12, NBS enable: The mains load limitation (NBS) ensures that only a number of weld timers can weld simultaneously within its monitoring range as can be supported by the supplying system. Switch I12 is scanned at the end of the SQZ. If this condition is met, the simulation will be carried out without a delay.

Switch I12 must be switched on for the test.

Key/Switch I13, External termination of weld: Key I13 offers the opportunity to force a synchronous, exact termination of the welding schedule (the weld time will end upon the next negative half-wave) by means of an external intervention. Afterwards, the HLD is started. Key I13 also clears output O10 **<Freely programmable output>**.

Key/Switch I14 to I16, reset fault: These keys should be operated if a fault during the simulation prevents further test schedules of the timer. Active error messages may also be reset via:

- the BOS-5000 software,
- the green key on the front panel of PSS 5000,
- activation of inputs I14 to I16.

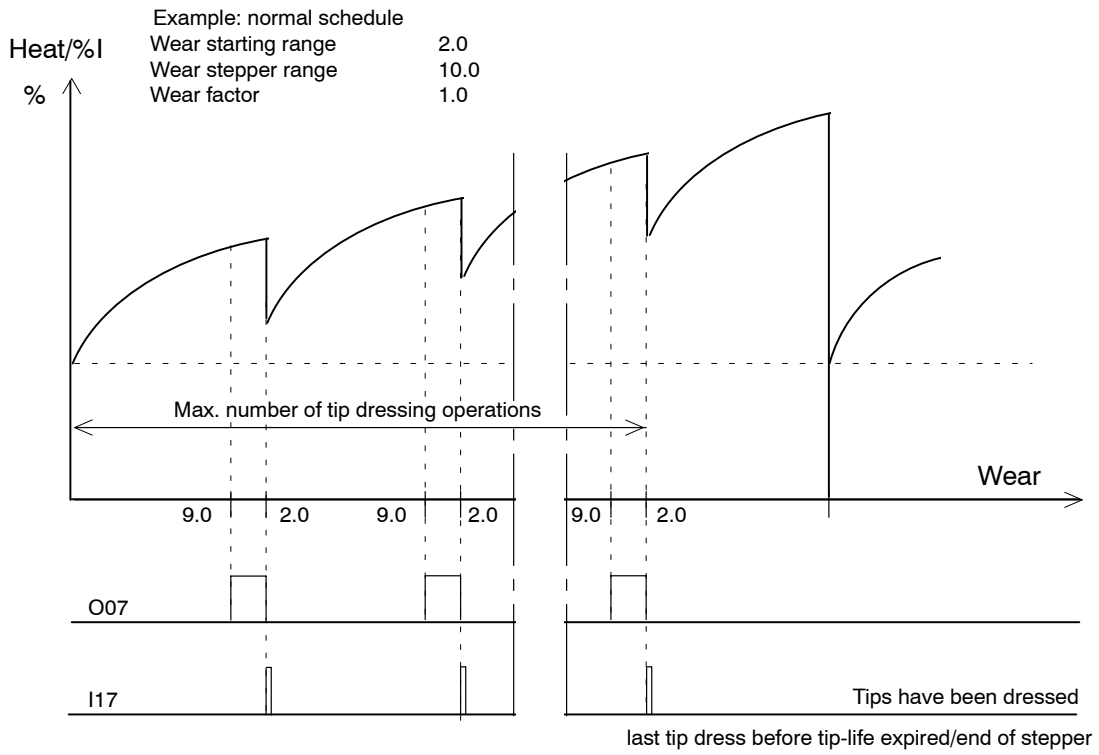
Key/Switch I14, reset fault: An impulse given by key I14 will reset the fault displayed. The cause of the fault must have been eliminated beforehand. LED O01, **<Weld complete contact>** (WC) is not driven, whereas LED O03, **<Timer Ready>** will be on.

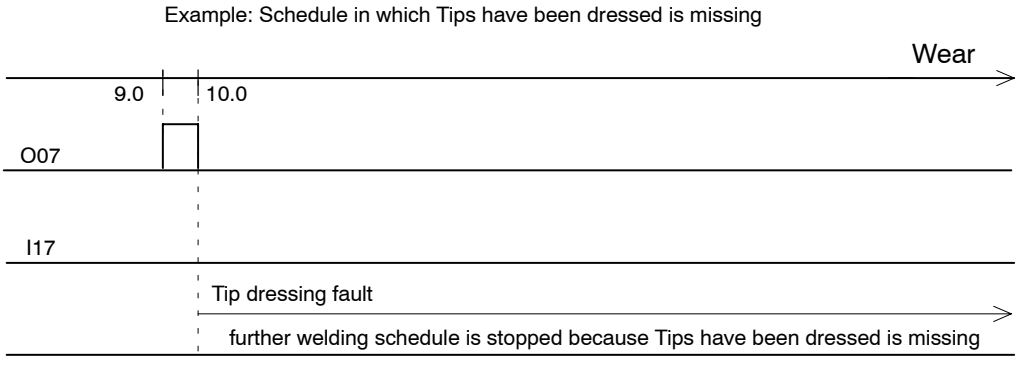
Key/Switch I15, reset fault with weld complete contact: An impulse given by key I15 will reset the fault displayed. The cause of the fault must have been eliminated beforehand. LED O01, **<Weld complete contact>** (WC) is driven if Start is present, and LED O03, **<Timer Ready>** will be on.

Key/Switch I16, reset fault with reweld: An impulse given by key I16 will reset the fault displayed. The cause of the fault must have been eliminated beforehand. If the Start signal is present, the timer will be placed into Ready state, and the simulation of the sequence will be repeated.

If the start signal is still present in ”reset fault” status, the PSS 5000 will start its test program run immediately.

Key/Switch I17, tips have been dressed: In stepper operation, a welding range has been programmed for which one or several electrode tip dressing cycles are necessary. LED O07, **<Tip dress request>** signals that dressing is required. An impulse output by key I17 will signal that the dressing procedure has been completed. LED O07, **<Tip dress request>**, will be cleared.





NOTE

Selecting electrode number 0 on switches I01 to I08, and operating key I17 (Tips have been dressed) will increment all tip dress counters by 1 and reset all wear counters.
Selecting one electrode number between 1 and 31 on switches I01 to I08, and operating key I17 (Tips have been dressed) will increment the selected tip dress counter by 1 and reset the selected wear counter.

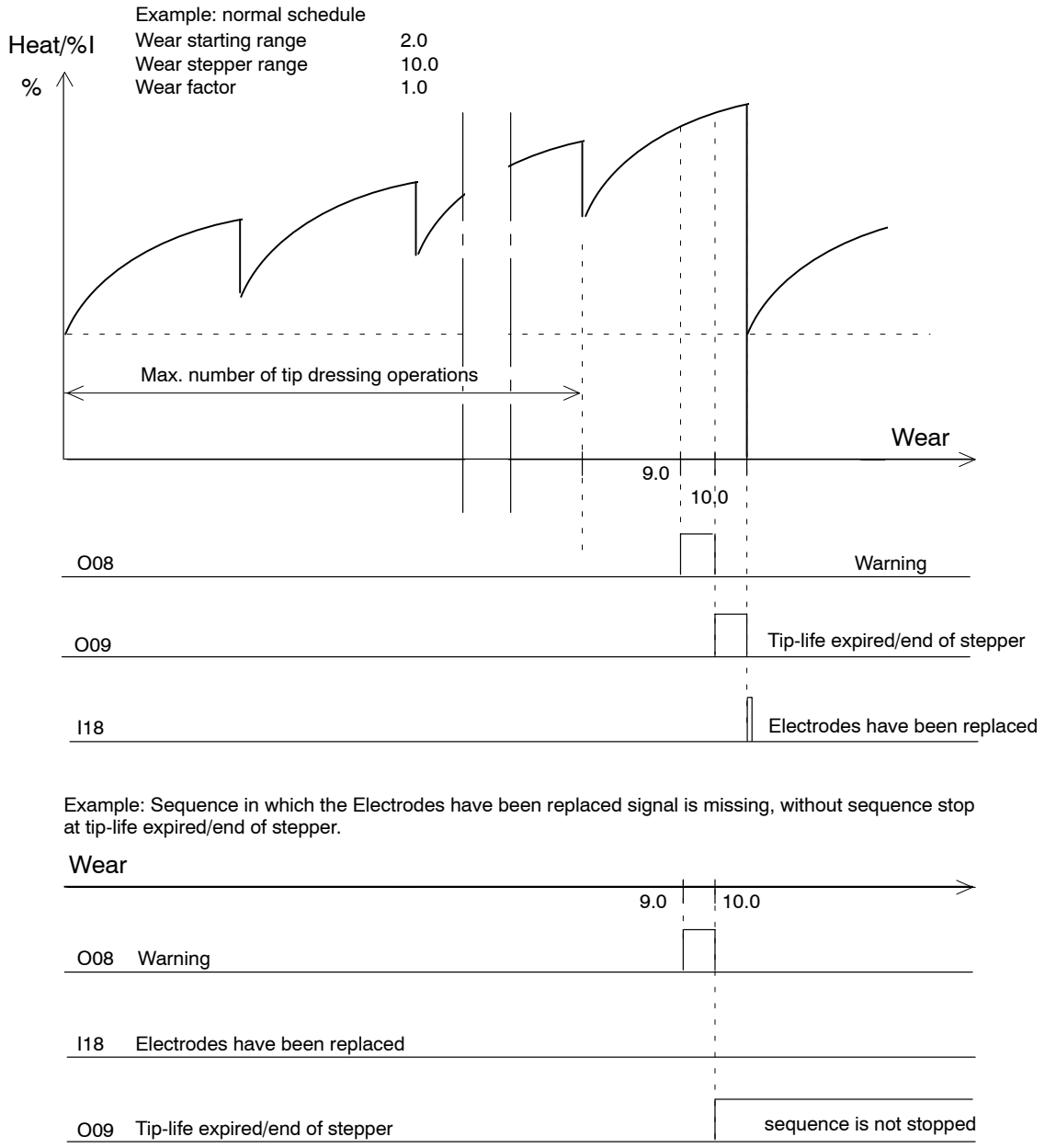
NOTE

The number of tip dress operations can be programmed in the Welding Parameters - Heat Stepper/Stepper menu.

Key/Switch I18, Electrodes have been replaced: LED O09 signals **<Tip-life expired/end of stepper>** when the programmed tip-life expired/end of stepper is reached. Further test program runs are possible or inhibited, depending on the programming. An impulse output by key I18 will signal that the electrodes have been replaced. LED O09, **<Tip-life expired/End of stepper>**, will be cleared.

NOTE

The timer response (stop or continued sequence) to tip-life expired/end of stepper is programmed in the Basic Set-up, Global Stepper Setup option.



NOTE

Selecting electrode number 0 on switches I01 to I08, and operating key I18 (Electrodes have been replaced) will reset the tip dress and wear counters of ***all electrodes****.*
Selecting an electrode number between 1 and 31 on switches I01 to I08, and operating key I18 (Electrodes have been replaced) will reset the tip dress and wear counter of this electrode.

Key/Switch inputs I19 to I23: for control functions of other timer types (refer to "Technical Information" manual).

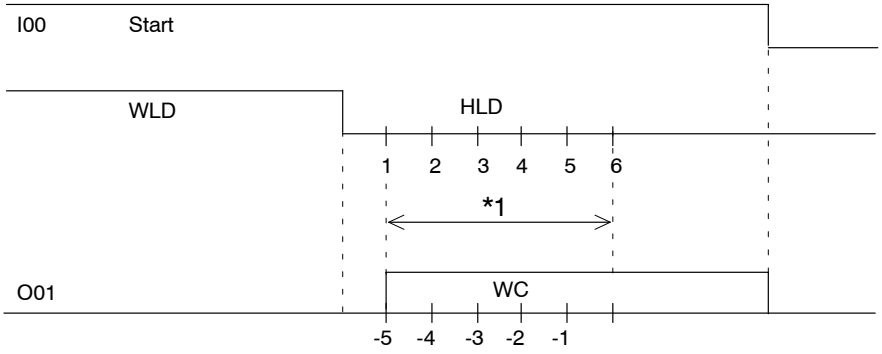
[03] LEDs O00 to O23

LED Solenoid valve, LED O00: The O00 LED signals that the solenoid valve is energized from the beginning of the 1.SQZ until the end of HLD. The O00 LED is not lit when the OFF time has started. In repeat mode, the O00 LED will only be lit during OFF. An external solenoid valve (max. 10 VA) may be connected to the Solenoid +/- female ports in parallel to this output.

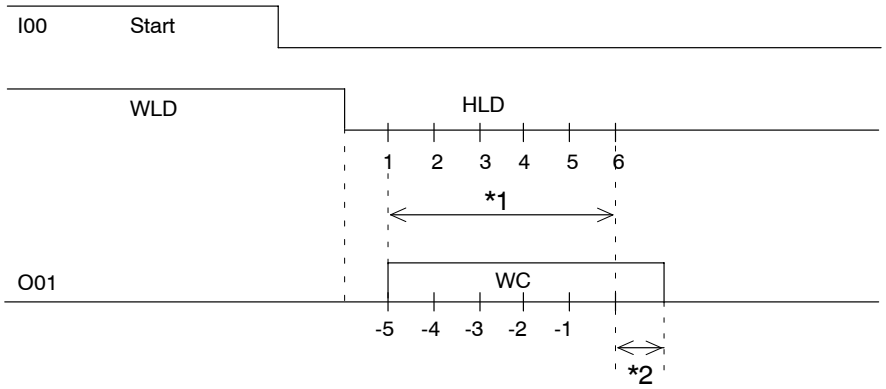
Weld complete contact, LED O01: When the last weld time is over, the O01 LED indicates that a single spot has been welded properly for as long as the **<Start>** signal is active, or for a programmed duration of mains cycles, if no **<Start>** signal is present. The **<Weld Complete Contact>** signal is output after each schedule in a single-spot simulation. In repeat and seam mode, output O01 signals a faultless schedule after the end of repeat mode or at the end of the seam.

Programming example for the WC Weld Complete contact

HLD = 6 cycles if start is present in single-spot mode



HLD = 6 cycles if start is not present in single-spot, repeat or seam mode



**1: Possible time frame for programming "beginning of WC":*

**2: Duration of WC after the end of HLD with no start signal present = 1 cycle.*

NOTE

The maximum programmable value for the beginning of WC is: Number of HLD cycles less 1 cycle. This value is programmed in the Basic Set-up, I/O Parameters option.

NBS request, LED O02: One mains cycle prior to the end of SQZ until the end of the last WLD, LED O02 signals the NBS request. The **<NBS request>** signal serves as a request to the mains load limitation control which may enable or disable the requesting timer by the **<NBS enable>** signal, depending on the load situation within the mains system.

Timer Ready, LED O03: The O03 LED signals the Ready condition of the timer. In parallel, the green ⇑ LED on the timer's front panel is on. LED O03 will be cleared in the event of a fault, e.g. if:

- internal +24 VAC power supply is missing,
- EMERGENCY-STOP circuit is open,
- a welding fault has occurred, which has been defined as a fault in the *Fault Allocation* table of the *Basic Set-up* menu.
- the main switch has been tripped by Current passed without command,
- a battery fault has occurred, which has been defined as a fault in the *Fault Allocation* table of the *Basic Set-up* menu.

NOTE

The programming terminal indicates the cause of the fault in the Status Message window. Detailed information can be displayed by calling up I/O diagnostics or timer diagnostics.

When the cause of the fault has been corrected, the Ready status will be restored by an impulse output on keys I14, I15 or I16.

Welding fault, LED O04: A welding fault within the simulated schedule is signalled by the O04 LED if its cause has been defined as a fault. The Ready status of the timer goes off. If a fault is related to a spot, the schedule will remain inhibited until an impulse **<Reset fault>**, **<Reset fault with WC>** or **<Reset fault with reweld>** is output to keys I14, I15 or I16, respectively.

The fault is indicated for:

- Single-spot mode: After the simulated single-spot schedule. Simulating further single spots is not possible without a reset.
- Repeat mode: After the end of the simulated schedule during which the fault was detected. Simulation of more repeat spots is stopped. Simulating further repeat spots is not possible without a reset.
- Seam operation: After the end of the seam. Simulating further seams is not possible without a reset.

NOTE

The event is defined as a fault in the Fault Allocation table of the Basic Set-up menu.

Ignition, LED O05: LED O05 indicates that weld/no weld has been activated on switch I11.

- O05 LED on: Weld/no weld has been switched on for all timer programs.
- O05 LED off: Weld/no weld has been switched off for all timer programs.

NOTE

In addition to switch I11, weld/no weld is also switched on and off by an appropriate selection when programming the Basic Set-up, Sequence Set-up option. In this menu item, weld/no weld can be switched on or off for all programs of a timer (timer-specific) or for individual programs (additionally for the current program).

Weld/no weld settings

Timer-specific		Program-specific	Program-specific
Weld on external	Weld on internal	Ignition	Weld Sequence
off	off	off	Schedule **without** welding current
off	off	on	Schedule **without** welding current
off	on	off	Schedule **without** welding current
off	on	on	Schedule **without** welding current
on	off	off	Schedule **without** welding current
on	off	on	Schedule **without** welding current
on	on	off	Schedule **without** **[1]** welding current
on	on	on	Schedule **w i t h** welding current

[1] Attention: The program-specific weld on signal may be switched on for other programs

NOTE

If weld/no weld is switched off internally and program-specific, the O05 LED will not be cleared before the next start signal.

Without Monitoring, LED O06: The O06 LED signals that the last test program started did not use current or time monitoring. The O06 LED will be activated after the end of the last weld time and cleared by the next start.

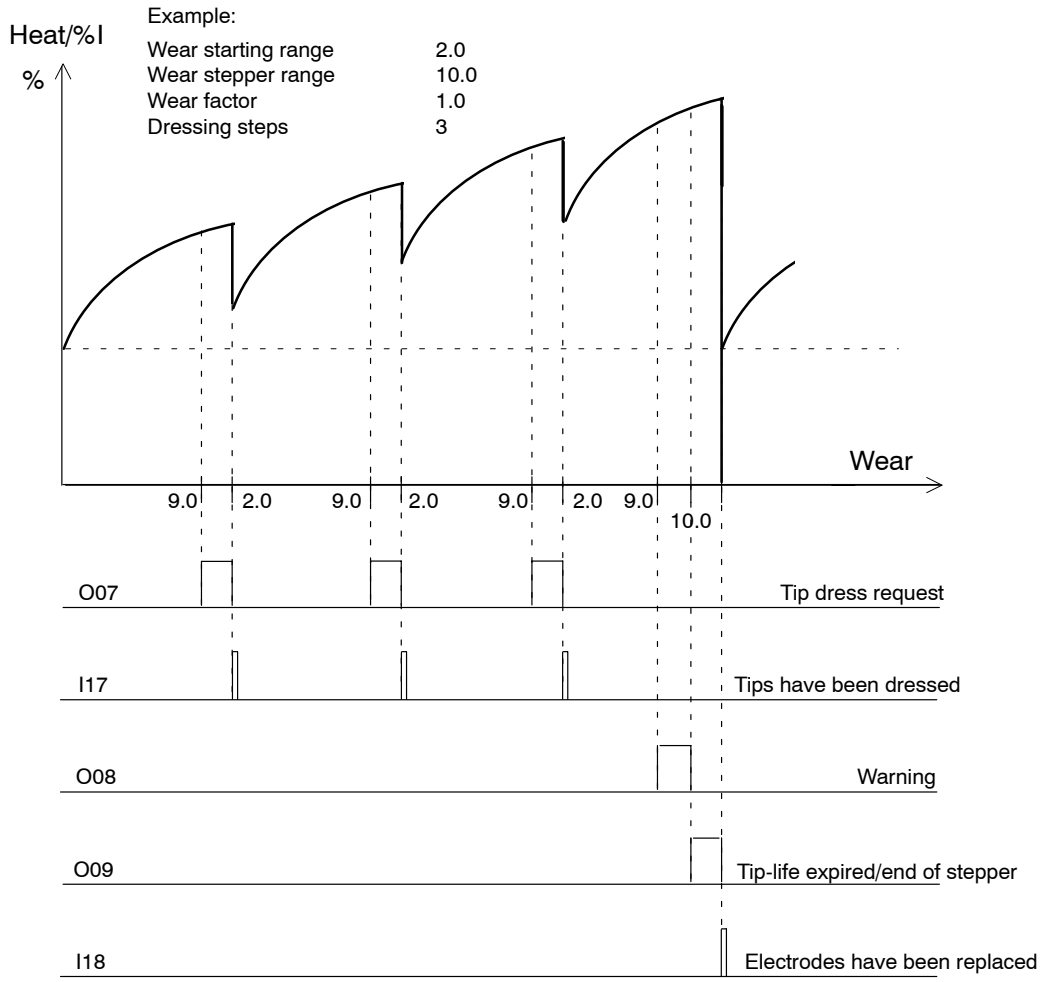
Monitoring

Current monitoring	Time monitoring	Monitoring **stopped** timer-specific	Monitoring function and display by O06
off	off	on	on : **without** monitoring
off	off	off	on : **without** monitoring
off	on	on	on : **without** monitoring
off	on	off	off : **with** monitoring
on	off	on	on : **without** monitoring
on	off	off	off : **with** monitoring
on	on	on	on : **without** monitoring
on	on	off	off : **with** monitoring

NOTE

Monitoring stopped is enabled or disabled timer-specific (for all programs of the selected timer) in the Basic Set-up, Sequence Parameters option.
Current monitoring can be enabled and disabled program-specific using menu items Welding Parameters - Current Monitoring.
Time monitoring can be enabled and disabled program-specific using menu items Welding Parameters - Time Monitoring.

Tip dress request/inquiry, LED O07: The O07 LED (Dress electrodes) is switched on for electrode maintenance. LED O07 signals that dressing is required. An impulse on key I17 indicates the simulated tip dressing process, LED O07 is cleared.



Warning LED, O08: A wear is programmed for a simulated welding schedule, which lights up LED O08 when reached. This LED indicates that tip-life expired/end of stepper will soon be reached. The O08 LED goes off as soon as tip-life expired/end of stepper is reached.

NOTE

The wear can be programmed in the Welding Parameters - Heat Stepper option.

Together with the programmed wear Warning, the tip dress request is output by the stepper function to indicate that tip dressing will soon be necessary.

Tip-life expired/end of stepper, LED O09: LED O09 is lit when the programmed tip-life expired/end of stepper is reached. Further program sequences in the timer may be inhibited by appropriate programming. LED O09 goes off as soon as an impulse output by key I18 signals the simulated electrode change and resets the signal.

NOTE

Stop at end of stepper/Stop when tip-life expired is programmed in the Basic Set-up, global stepper parameters option.

Freely programmable output, LED O10: Each welding program may be combined with a freely programmable output. During the simulated sequence, LED O10 signals a maximum of three freely programmable off and on times.

Upon the beginning of SQZ, the time period of the ”freely programmable output” is started, which ends together with the HLD or earlier (O10 LED is cleared). This will always be the case, although some longer times may have been programmed.
Key I13, **<External termination of weld time>**, has the same function. It also forces the time period of the freely programmable output to terminate and clears the O10 LED.

NOTE

The freely programmable output can be programmed in the Welding Parameters menu, freely programmable output option.

O11 LED: For user- or type-specific use.

Warning, O12: In the event of a fault, LED O12 indicates that the cause of the fault has been defined as a warning. The simulation of further sequences is not inhibited. If a warning is related to a spot, the O12 LED will be reset by an impulse **<Reset fault>**, **<Reset fault with WC>** or **<Reset fault with reweld>** to keys I14, I15 or I16, respectively, or by the next Start.

NOTE

The event is defined as a warning in the Fault Allocation table of the Basic Set-up menu.

Outputs, LEDs O13 to O23: for display functions of other timer types (refer to ”Technical Information” manual).

5 Technical data

Technical data	
Degree of protection	IP20
Operating voltage	220 AC +20% -15%, 50 Hz
Climate / Temperature	
● Operation	0°C . . . . . +60°C
● Storage	-25°C . . . . +70°C
● Transportation	-25°C . . . . +70°C
● Air pressure	0 . . . . . 2000 m a.m.s.l.
● Air humidity	Condensation is not permitted
Weight without packaging	
● Switchbox	approx. 2.9 kg
● Simulator	approx. 1.2 kg
● Cable kit	approx. 1.4 kg
Power input	max. 50 VA

Notes:

6 Ordering

Description	Part no.
Welding simulator (switchbox, simulator and cable kit)	No part no.

Notes:

A Annex

A.1 Abbreviations

AC	AC power unit
CWC	Current passed without command
DC_5 kHz	AC current power unit, controlled by 5 kHz pulses
DC_ANA	DC power unit, driven in 1 ms intervals
Ignition	Signal that drives the power unit
Load current	Relay contact for load current -> main circuit breaker
LT	Power unit
MC	Proportional valve monitoring contact
ML	Measuring loop (current sensor)
NBS	Mains load limitation control
PSL/PSU	Type of power unit
Undervolt.	Relay contact for undervoltage -> main circuit breaker
WT	Weld timer
WLD	Weld time(s)

Notes:

1070 087 024-101 (2002.10) GB · HB TI · BRC-WS/VKF · Printed in Germany