Operating Instructions and Spare Parts List

SDC 1 System Diagnostic Control

SDC 1 System Diagnostic Control

An ITW Company
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Safety Regulations

1. The SDC 1 System Diagnostic Control must only be connected to the Mains, and started up after these Safety Regulations and Operating Instructions for the electrostatic powder coating equipment have been carefully read and understood.

2. All plug connections on the SDC 1 should only be disconnected when the whole installation is switched off (Mains switch - red switch on yellow base).

Operating Instructions for electrostatic powder coating

1. This installation can be dangerous when not operated according to the following Standards:
   - EN 50 050 (or VDE 0745, Part 100), EN 50 053, Part 2 (or VDE 0745, Part 102), as well as the leaflet for electrostatic powder coating - ZH 1/444.

2. All electrostatically conductive parts, which are within 5 m of the coating station, especially the workpieces, must be grounded.

3. The floor of the coating area must be electrostatically conductive (normal concrete is generally conductive).

4. The operating personnel must wear electrostatically conductive footwear (e.g. Leather soles).

5. Connect the grounding cable (green/yellow) supplied to the grounding screw on the electrostatic manual powder coating equipment. The grounding cable must have a good metal to metal contact with the coating booth, the powder recovery equipment, and the conveyor or the workpiece hangers.

6. The power, and powder supply lines to the guns must be laid out so that they are protected from mechanical damage.

8. The powder coating equipment should only be able to be switched on when the booth is operating. If the booth stops, the powder coating equipment must also switch off.

9. The grounding of all conductive parts is to be checked at least once a week.

10. When cleaning the gun, and replacing the nozzle the control unit must be switched off.
### Technical Data
#### SDC 1 System Diagnostic Control

- **Number of PGC Control units per installation:** 10
- **Number of PRC Control units per installation:** 4
- **Selectable voltages:** 100 V, 110 V, 120 V, 200 V, 220 V, 230 V, 240 V
- **Tolerance:** ± 10%
- **Frequency:** 50/60 Hz
- **Fuses:**
  - 100-120 V: F1, F2 = 500 mA
  - 200-240 V: F1, F2 = 250 mA
- **Power consumption:** 30W
- **Operating temperature:** 0°C to +40°C (+32°F to +104°F)
- **Storing temperature:** -20°C to +70°C (-4°F to +158°F)
- **Type of protection:** IP54
- **Dimensions:**
  - Width: 425 mm
  - Depth: 270 mm
  - Height: 88 mm
  - Weight: 6.2 kg
1. SDC 1 System Diagnostic Control

ATTENTION!: The Operating Instructions must be carefully read before even connecting the System Diagnostic Control to the Mains or switching it on.

The SDC 1 System Diagnostic Control serves to monitor the functioning of the PGC 1 (Powder Gun Control) and the PRC (Powder Reciprocator Control) used with automatic powder coating equipment.

Front view

1. Malfunction display windows
2. Display for the individual units
3. Main switch

Figure 1

On the front panel is the display which monitors the functioning of the connected units. On the top row are ten green light emitting diodes (LED), which indicate the functioning of the PGC equipment or the attached powder guns. If they are illuminated, then this equipment is working correctly. On the left of this display is a red LED, which indicates if one of the connected units is not functioning. Which units is not functioning can be seen from the green LED which is not illuminated.

On the bottom row is a similar LED display which fulfils the same function for the PRC Reciprocator Control.

1.1 Special Characteristics

- Simple adaptation to all world Mains voltages.
- Connections for up to ten PGC units.
- Connections for up to four PRC units.
- Possible to "cascade" for larger installations.
- One fault output each (potential-free - 220 V/3 A) for a PGC or PRC unit malfunction.
- Display for the functioning of each powder gun.
- Display for the functioning of the reciprocator.
- Retrofit possible for all PGC, and PRC equipment.
- IP54 Type protection.
2. Start-up

2.1 Cable connections on the SDC 1

![Diagram of SDC 1 connections]

Connections on the rear of the SDC 1

![Diagram of rear connections]

1. Fuseholders - F1 and F2
2. Mains connection
3. Cable leadthrough - single
4. Cable leadthrough - double

**ATTENTION!!:** Before unplugging cable connections always switch off the complete installation (red switch on yellow base) and then lock the switch with a padlock!
2.2 Hardware versions of the SDC 1

The SDC 1 System Diagnostic Control is available as a Housing version for building into the APS 1 or APS 2.

Front view:

Rear view:

View from above:

Figure 4
2.3 Selecting the Mains input voltage

Before the SDC 1 Diagnostic unit is connected to the Mains, the built-in Power pack must be adapted to the local Mains voltage.

**ATTENTION !** An under or over voltage of > 10% can lead to malfunctions or damage to the electronics.

Input voltage selection: 100 V, 110 V, 120 V, 200 V, 220 V, 230 V, 240 V.

In order to set the Input voltage on the SDC 1, see Chapter 3.1 "Mains power supply POWER IN" first.

Procede as follows:

1. Disconnect all electrical connections on the rear of the unit.
2. Release the screws on the rear of the unit and pull the unit out.
3. Turn the quick-release screws on the cover of the control unit a half turn and then remove the cover.
4. The wiring connections on the 10-pole plug X16 on the Backplane, and bridges on the built-in PS 1 Power pack must now correspond to the required voltage.
5. Replace the cover and tighten the quick-release screws again.
6. Replace the unit and refit the electrical connections.

2.4 Configuring the unit.

**ATTENTION !** Wrongly set bridges on the Logic board can lead to malfunctioning of the SDC 1 Unit.

In order to cover all modes of use, some of the connection bridges on the Logic board must be connected in certain combinations, see Figure 5.

2.4.1 Configuring the Diagnostic function for PGC Control unit

In order to be able to select equipment with a PLC, instead of that without, the correct bridge connections have the designation *TRIGGER MODE*:

On equipment with PLC the connection bridges J1, J3, J4, J6, J7, J9, J10, J12, J13, J15, J16, J18, J19, J21, J22, J24, J25, J27, J28 and J30 must be set on EXT (Pins 2, and 3 connected).

On equipment without PLC the connection bridges must be connected on GUN (Pins 1, and 2 connected). Depending on if the corresponding gun (or PGC) is connected, the connection bridges J2, J5, J8, J11, J14, J17, J20, J23, J26, and J29 must also be connected on ON (Pins 1, and 2) or OFF (Pins 2, and 3).
2.4.2 Configuring the Diagnostic function for PRC Control

The number of PRC Reciprocator control units connected must be fed to the System Diagnostic Control. This takes place through the connecting bridges J32, J34, J36, and J38. If a PRC is connected, then the corresponding bridge must be connected to ON (Pins 1 and 2), otherwise to OFF. Due to differences in the Hardware between PRC 1, on the one hand, and PRC 2 and PRC 3 on the other, the type of reciprocator control unit being used must also be indicated. This is done through bridges - J31, J33, J35, and J37. When connecting a PRC 1 Control unit, Pins 2 and 3 are connected on Position 1, and when connecting a PRC 2 or PRC 3 Control unit, Pins 1 and 2 on Position 2/3 must be connected (see Bridges J31, J33, J35 and J37 - Fig. 5).

2.5 Setting the Delay time

The SDC 1 Diagnostic unit has the possibility to delay a signal which indicates a fault on the PGC unit. In order to adjust this time the potentiometer R17 on the Logic board is used. It can be set for a very short (lefthand stop) to a very long time (righthand stop). Only the signal, which switches the potential free contact is delayed. The red LED (Light Emitting Diode) on the front panel indicates a fault immediately.
3. Connections and Plug allocations

The external control signals can be connected on the Backplane.

Connections on the Backplane (partial drawing)

Sequence:

1. **X16**: Power supply (POWER IN)
2. **X1** to **X10**: PGC connections
3. **X12** to **X13**: PRC connections
4. **X14**: Further SDC 1 units - if required
5. **X15**: Fault indication Output - if required
6. **X11**: PLC Connection - if required
3.1 Power supply

<table>
<thead>
<tr>
<th>Voltage</th>
<th>N</th>
<th>P</th>
<th>Bridge X16</th>
<th>BR1</th>
<th>BR2</th>
<th>BR3</th>
<th>BR4</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>2</td>
<td>4</td>
<td>3-8 / 5-9</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>110</td>
<td>2</td>
<td>4</td>
<td>3-8 / 5-9</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>120</td>
<td>2</td>
<td>6</td>
<td>7-10 / 3-8</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>200</td>
<td>2</td>
<td>9</td>
<td>4-8</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>220</td>
<td>2</td>
<td>9</td>
<td>4-8</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>230</td>
<td>2</td>
<td>9</td>
<td>6-8</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>240</td>
<td>2</td>
<td>10</td>
<td>6-8</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

Protective conductor connection PE on X16.1

Example: for 220 V Mains voltage.

Figure 7
3.2 Signals of the PGC Gun control, and GCC 1 Gun monitor

The PGC Gun control unit is connected to Plugs X1 to X10 on the Backplane. Socket "B" on the rear of the PGC Gun control unit is used for this purpose. There is a GCC 1 Gun monitor for each PGC Gun control unit. This is connected to the rear of the PGC Gun control in Socket "A" instead of a gun. The gun is connected to the vacant socket on the GCC 1 Gun monitoring. Each PGC Gun control unit is connected with its GCC 1 Gun monitor to a Plug (X1 to X10) on the Backplane.

<table>
<thead>
<tr>
<th>Plug on Backplane</th>
<th>Equipment to be connected</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1/1</td>
<td>1. PGC: Pin 1 Plug B</td>
</tr>
<tr>
<td>X1/2</td>
<td>1. PGC: Pin 2 Plug B</td>
</tr>
<tr>
<td>X1/3</td>
<td>1. PGC: Pin 3 Plug B</td>
</tr>
<tr>
<td>X1/4</td>
<td>1. PGC: Pin 4 Plug B</td>
</tr>
<tr>
<td>X1/5</td>
<td>1. PGC: Brown wire GCC 1</td>
</tr>
<tr>
<td>X1/6</td>
<td>1. PGC: White wire GCC 1</td>
</tr>
<tr>
<td>X1/7</td>
<td>1. PGC: Screening GCC 1</td>
</tr>
<tr>
<td>X2/1 to 7</td>
<td>2. PGC: same Pin allocation</td>
</tr>
<tr>
<td>X3/1 to 7</td>
<td>3. PGC: same Pin allocation</td>
</tr>
<tr>
<td>X4/1 to 7</td>
<td>4. PGC: same Pin allocation</td>
</tr>
<tr>
<td>X5/1 to 7</td>
<td>5. PGC: same Pin allocation</td>
</tr>
<tr>
<td>X6/1 to 7</td>
<td>6. PGC: same Pin allocation</td>
</tr>
<tr>
<td>X7/1 to 7</td>
<td>7. PGC: same Pin allocation</td>
</tr>
<tr>
<td>X8/1 to 7</td>
<td>8. PGC: same Pin allocation</td>
</tr>
<tr>
<td>X9/1 to 7</td>
<td>9. PGC: same Pin allocation</td>
</tr>
<tr>
<td>X10/1 to 7</td>
<td>10. PGC: same Pin allocation</td>
</tr>
</tbody>
</table>

PGC No. 1

The PGC Control units can be connected to the SDC 1 Diagnostic equipment in any desired sequence. The PGC Nummer refers only to the LED on the front panel.

PGC No. 10

Figure 8
### 3.3 Signals of the PRC Powder Reciprocator Control

The PRC Reciprocator control units are connected to the SDC 1 Diagnostic units by Plugs X12 and X13. PRC 1, PRC 2, and PRC 3 Reciprocator control units can also be connected.

<table>
<thead>
<tr>
<th>Plug on Backplane</th>
<th>PRC 1</th>
<th>PRC 2/3</th>
</tr>
</thead>
<tbody>
<tr>
<td>X12/1</td>
<td>1. PRC connection 5/1</td>
<td>1. PRC X6/21</td>
</tr>
<tr>
<td>X12/2</td>
<td>Not Connected</td>
<td>1. PRC X6/20</td>
</tr>
<tr>
<td>X12/3</td>
<td>1. PRC connection 5/2</td>
<td>1. PRC X6/15</td>
</tr>
<tr>
<td>X12/4</td>
<td>2. PRC connection 5/1</td>
<td>2. PRC X6/21</td>
</tr>
<tr>
<td>X12/5</td>
<td>Not Connected</td>
<td>2. PRC X6/20</td>
</tr>
<tr>
<td>X12/6</td>
<td>2. PRC connection 5/2</td>
<td>2. PRC X6/15</td>
</tr>
<tr>
<td>X13/1</td>
<td>3. PRC connection 5/1</td>
<td>3. PRC X6/21</td>
</tr>
<tr>
<td>X13/2</td>
<td>Not Connected</td>
<td>3. PRC X6/20</td>
</tr>
<tr>
<td>X13/3</td>
<td>3. PRC connection 5/2</td>
<td>3. PRC X6/15</td>
</tr>
<tr>
<td>X13/4</td>
<td>4. PRC connection 5/1</td>
<td>4. PRC X6/21</td>
</tr>
<tr>
<td>X13/5</td>
<td>Not Connected</td>
<td>4. PRC X6/20</td>
</tr>
<tr>
<td>X13/6</td>
<td>4. PRC connection 5/2</td>
<td>4. PRC X6/15</td>
</tr>
</tbody>
</table>

The PRC Reciprocator control units can be connected to the SDC 1 Diagnostic equipment in any desired sequence. The PGC Nummer refers only to the LED on the front panel.

### 3.4 Signals of the PLC (if present)

The PLC is connected to Plug X11, whereby two pins are required for one PGC Gun control at any given time. That is : Pins 1, and 2 for the first PGC, Pins 3, and 4 for the second, etc. It should be noted, that pins with the lower number are negative pole and pins with the higher number are positive pole. Cable screening is connected to Pins 21, and 22.

The connections X12/3, X12/6, X13/3, and X13/6 to the PRC Reciprocator control unit are not required when a PLC is connected.
3.5 Signals for the Warning equipment

At any one time there is a potential free change-over contact available for all PGC, and PRC units, which switches when a connected unit breaks down. It is found on Pins 1, 2, 3 or 4, 5, 6 of the Plug X15, whereby Pins 3, and 2 or 6, and 5 are the Break contacts and Pins 3, and 1 or 6, and 4 are the Make contacts.

![Diagram of alarm contacts](image)

3.6 Signals for further SDC 1 Diagnostic units

The possibility exists to connect further SDC 1 Diagnostic units if more than ten PGC Gun control units or more than four PRC Reciprocator control units are used. It is therefore possible to "cascade" a number of SDC 1 Diagnostic units. The advantage lies in the fact that due to this "cascading", only one fault message is received for the PGC Gun controls, and PRC Reciprocator controls.

For "cascading" the Plug X14 is used, whereby Pin 5 is connected with Pin 1 of the next SDC 1 unit, Pin 6 with Pin 2 of the next SDC 1 unit, Pin 7 with Pin 3 of the next SDC 1 unit, and Pin 8 with Pin 4 (screening) of the next SDC 1 unit. Pins 1 to 4 on the first SDC 1 unit, and Pins 5 to 8 on the last SDC 1 unit remain unallocated. The Collective fault message can now be read on the last SDC 1 Diagnostic unit for all connected units.
4. GCC 1 Gun Current Control

The SDC 1 Diagnostic unit has a "T-Piece" (GCC 1) for each PGC 1 Gun control unit. The GCC 1 serves the SDC 1 Diagnostic unit to check the function of each PG 1 or PG 1-A guns connected to the PGC Gun control. The possibility now exists to set the sensitivity of the gun monitoring. This takes place by adjusting a potentiometer inside the GCC 1 unit. This can be reached by removing the 7-pole Flange socket from the GCC 1. The setting screw of the potentiometer is adjusted with a small screwdriver, whereby turning to the left (counter clockwise) the sensitivity is increased, turning to the right (clockwise) the sensitivity is decreased. This setting is made at the factory, so in most cases it is not necessary to make any adjustments.
Spare Parts for SDC 1 System Diagnostic Control

Ordering Spare Parts

When ordering Spare Parts for the SDC 1 System Diagnostic Control, the following specifications are required:

1. Type of Powder coating equipment
2. Order No., Quantity, and Description of the Spare Part

Example:

1. Type: SDC 1
2. Order No.: 201 073, 5 Pieces, 0.5 AT Fuse

Wear parts are always marked with a # in the Spare Parts List.
## SDC 1 System Diagnostic Control

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control board - SDC Logic</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PS 1 Power Pack - complete</td>
<td>340 383</td>
</tr>
<tr>
<td>3</td>
<td>Front display for SDC 1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Rear board (Backplane) - SDC 1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Switch</td>
<td>235 911</td>
</tr>
<tr>
<td>6</td>
<td>Bulb - 24V, 2W</td>
<td>235 954#</td>
</tr>
<tr>
<td>7</td>
<td>Adapter fixture</td>
<td>235 920</td>
</tr>
<tr>
<td>8</td>
<td>Contact unit</td>
<td>235 938</td>
</tr>
<tr>
<td>9</td>
<td>Mains cable connection (single plug)</td>
<td>303 607</td>
</tr>
<tr>
<td>10</td>
<td>Fuse holder - (F1, and F2)</td>
<td>200 131</td>
</tr>
<tr>
<td>10.1</td>
<td>Fuse - 0.25 AT, 200-240 V</td>
<td>227 161#</td>
</tr>
<tr>
<td>10.2</td>
<td>Fuse - 0.5 AT, 100-120 V</td>
<td>200 174#</td>
</tr>
</tbody>
</table>

# Wear parts
SDC 1 System Diagnostic Control

Figure 1