Operating instructions and spare parts list

FPS15 Tilt table
Documentation FPS15 Tilt table

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General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the FPS15 Tilt table.

These safety regulations must be read and understood before the FPS15 Tilt table is used.

Safety symbols (pictograms)

The following warnings with their meanings can be found in the ITW Gema operating instructions. The general safety precautions must also be followed as well as the regulations in the operating instructions.

- **DANGER!**
  Danger due to live electricity or moving parts. Possible consequences: Death or serious injury

- **WARNING!**
  Improper use of the equipment could damage the machine or cause it to malfunction. Possible consequences: minor injuries or damage to equipment

- **INFORMATION!**
  Useful tips and other information

Conformity of use

1. The FPS15 Tilt table is built to the latest specification and conforms to the recognized technical safety regulations. It is designed for the normal application of powder coating.

2. Any other use is considered as non-conform. The manufacturer is not responsible for damage resulting from improper use of this equipment; the end-user alone is responsible. If the FPS15 Tilt table is to be used for other purposes or other substances outside of our guidelines, then ITW Gema AG should be consulted.

3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of the conformity of use. The FPS15 Tilt table should only be used, maintained
and started up by trained personnel, who are informed about and are familiar with the possible hazards involved.

4. Start-up (i.e. the execution of a particular operation) is forbidden until it has been established that the FPS15 Tilt table has been set up and wired according to the guidelines for machinery (98/37/EG). EN 60204-1 (machine safety) must also be observed.

5. Unauthorized modifications to the FPS15 Tilt table exempts the manufacturer from any liability from resulting damage.

6. The relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations, are to be observed.

7. Furthermore, the country-specific safety regulations must be observed.

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Technical safety regulations for stationary electrostatic powder spraying equipment

**General**

The powder spraying equipment of ITW Gema is designed with safety in mind and is built according to the latest technological specifications. This equipment can be dangerous if it is not used for its specified purpose. Consequently it should be noted, that there exists a danger to life and limb of the user or third party, a danger of damage to the equipment and other machinery belonging to the user and a hazard to the efficient operation of the equipment.

1. The powder spraying equipment should only be started up and used once the operating instructions have been carefully studied. Incorrect use of the controlling device can lead to accidents, malfunction or damage to the control itself.

2. Before every start-up, check the equipment for operational safety (regular servicing is essential)!

3. Safety regulations BGI 764 and VDE regulations DIN VDE 0147, part 1, must be observed for safe operation.

4. Safety precautions specified by local legislation must be observed!

5. Before opening the devices for repair, they must be disconnected from the mains!

6. The plug and socket connections between the powder spraying equipment and the mains network should only be removed when the power supply is switched off.

7. The connecting cables between the control unit and the spray gun must be laid out in such a way that they cannot be damaged during operation. Safety precautions specified by local legislation must be observed!

8. Only original ITW-Gema spare parts should be used, because the explosion protection will be preserved that way. Any warranty claim is void, if damage occurs by using no ITW Gema parts.
9. If ITW Gema powder spraying equipment is used in conjunction with machinery from other manufacturers, then their safety regulations must also be taken into account.

10. Before starting work familiarize yourself with all installations and operating elements, as well as with their functions! Familiarization during operation is too late!

11. Caution must be exercised when working with a powder/air mixture! A powder/air mixture in the right concentration is flammable! Smoking is forbidden in the entire plant area!

12. As a general rule for all powder spraying installations, persons with pacemakers should never enter high voltage areas or areas with electromagnetic fields. Persons with pacemakers should not enter areas with powder spraying installations!

**WARNING!**
We advert that the customer himself is responsible for the safe operation of equipment. ITW-Gema AG is in no way responsible for any resulting damages!

### Safety conscious working

Each person responsible for the assembly, start-up, operation, service and repair of powder spraying equipment must have read and understood the operating instructions and the “Safety regulations” chapter. The operator must ensure that the user has had the appropriate training for powder spraying equipment and is aware of the possible sources of danger.

The control devices for the spray guns must only be set up and used in zone 22. Spray guns are certified for the zone 21.

The powder spraying equipment should only be used by trained and authorized personnel. This applies to modifications to the electrical equipment, which should only be carried out by a specialist.

The shutdown procedures given in the operating instructions on all work concerning assembly, start-up, setting up, operation, modification of operating conditions and operating methods, maintenance, inspection and repair are to be observed as necessary.

The powder spray equipment can be turned off by using the main switch or failing that, the emergency shutdown. Individual components can be turned off during operation by using the appropriate switches.

### Individual safety regulations for the operating firm and/or operating personnel

1. Any operating method which will negatively influence the technical safety of the powder spraying equipment is to be avoided.

2. The operator has to ensure that no non-authorized persons work on the powder spraying equipment (e.g. this also includes using the equipment for non-conform work).

3. For dangerous materials, the employer has to provide an operating instructions manual for specifying the dangers arising for humans and environment by handling dangerous materials, as well as the necessary preventive measures and behavior rules. The operating instructions manual has to be written in an under-
standable form and in the language of the persons employed, and has to be announced in a suitable place in the working area.

4. The operator is under obligation to check the powder spraying equipment at least once every shift for signs of external damage, defects or changes (including the operating characteristics) which could influence safety and to report them immediately.

5. The operating enterprise has to ensure that GEMA electrostatic spraying equipment is only operated in perfect condition.

6. As far as is necessary, the operating firm must ensure that the operating personnel wear protective clothing (e.g. facemasks).

7. The operating firm must guarantee cleanliness and an overview of the workplace with suitable instructions and checks in and around the powder spraying equipment.

8. No safety devices should be dismantled or put out of operation. If the dismantling of a safety device for set-up, repair or servicing is necessary, reassembly of the safety devices must take place immediately after the maintenance or repair work is finished. All maintenance activities must be executed when the powder spraying mechanism is switched off. The operator must train and commit the responsible personnel to this.

9. Activities such as checking powder fluidization or checking the high-voltage spray gun etc. must be carried out when the powder spraying equipment is switched on.

Notes on special types of hazard

Power/electrical tension

It is necessary to refer once more to the danger of life from high voltage current if the shutdown procedures are not observed. High voltage equipment must not be opened - the plug must first be taken out - otherwise there is danger of electric shock.

Powder

Powder/air mixtures can be ignited by sparks. There must be sufficient ventilation in the powder coating booth. Powder lying on the floor around the powder spraying equipment is a potentially dangerous source of slipping.

Static charges

Static charges can have the following consequences: Charges to people, electric shocks, sparking. Charging of objects must be avoided - see "Earthing".

Grounding

All electricity conducting parts and machinery found in the workplace (according to DIN VDE 0745, part 102) must be grounded 1.5 meters either side and 2.5 meters around each booth opening. The grounding resistance must amount to 1 MOhm. The resistance must be tested regularly. The condition of the work piece attachments as well as the hangers must guarantee that the work pieces remain grounded. If the grounding of the work pieces takes place by their attachments, these must constantly be kept clean in order to guarantee the necessary conductivity. The appro-
appropriate measuring devices must be kept ready in the workplace in order to check the grounding.

**Compressed air**

When there are longer pauses or standstill times between working, the powder spraying equipment should be drained of compressed air. There is a danger of injury when pneumatic hoses are damaged, or when an uncontrolled release and improper use of compressed air happens.

**Crushing and cutting**

During operation, moving parts may automatically start to move in the operating area. It must be ensured, that only instructed and trained personnel go near these parts. The operator should ensure that barriers comply with the local security regulations.

**Access under exceptional circumstances**

The user enterprise has to ensure due to the local conditions, that when repairs at the electrical part or restarting operation activities are done, additional measures such as providing with gates against the admission of unauthorized persons are absolutely executed.

**Prohibition of unauthorized conversions and modifications to machines**

All unauthorized conversions and modifications to electrostatic spraying equipment are forbidden for safety reasons.

The powder spraying equipment should not be used if damaged, and the faulty part must be immediately replaced or repaired. Only original ITW-Gema replacement parts should be used. Any warranty claim is void, if damage occurs by using no ITW Gema parts.

Repairs must only be carried out by specialists or in ITW-Gema workshops. Unauthorized conversions and modifications may lead to injury or damage to machinery. The ITW Gema AG guarantee would no longer be valid.

**Safety requirements for electrostatic powder coating**

1. This equipment can be dangerous, if the instructions in this operating manual are not followed.
2. All electrostatic conductive parts, in particular the work pieces within 5 meters of the coating equipment, must be grounded.
3. The floor in the coating area must be electrically conductive (normal concrete is generally conductive).
4. The operating personnel must wear electrically conductive footwear (e.g. leather soles).
5. The operating personnel should hold the gun in the bare hand. If gloves are worn, they must be electrically conductive.
6. The supplied grounding cable (green/yellow) must be connected to the grounding screw of the manual electrostatic powder spraying equipment. The grounding cable must have a good metal to metal connection with the coating booth, the recovery unit and the work piece conveyor system, especially with the work piece suspension.
7. The electricity and powder supply to the hand guns must be set up in such a way that they are fully protected against heat and chemical damage.

8. The powder coating equipment may be able to be switched on only if the booth is in operation. If the booth stops, then the powder coating device must switch off too.

9. The grounding of all electricity conducting devices (e.g. hooks, conveyor chains) must be checked weekly. The grounding resistance must amount to 1 MOhm.

10. The control unit must be switched off, if the hand gun is cleaned or the nozzle is changed.

11. When working with cleaning agents, there may be a risk of hazardous fumes. By handling these agents, absolutely consider the manufacturer indications!

12. The manufacturer's instructions and the applicable environmental requirements must be observed when disposing of powder lacquer and cleaning agents.

13. If any part of the spray gun is damaged (broken parts, fractures) or missing, then it should not be used.

14. For your own safety, only use accessories and attachments listed in the operating instructions. The use of other individual parts can lead to risk of injury. Only original ITW-Gema replacement parts should be used.

15. Repairs must only be carried out by specialists and under no circumstances should they be carried out in the operating area. The ignition protection must not be compromised.

16. Conditions leading to dangerous levels of dust concentration in the powder spraying booths or in the powder spraying areas, must be avoided. A sufficient technical ventilation must be available, to prevent a dust concentration of more than 50% of the lower explosion limit (UEG) (UEG = max. permissible powder/air concentration). If the UEG is not known, then a value of 10 g/m³ should be used.

A summary of the rules and regulations

The following is a list of relevant rules and regulations which are to be observed:

**Guidelines and regulations, German professional association**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>BGV A1</td>
<td>General regulations</td>
<td></td>
</tr>
<tr>
<td>BGV A2</td>
<td>Electrical equipment and material</td>
<td></td>
</tr>
<tr>
<td>BGI 764</td>
<td>Electrostatic coating</td>
<td></td>
</tr>
<tr>
<td>BGR 132</td>
<td>Guidelines for the avoidance of the dangers of ignition due to electrostatic charging (Guideline &quot;Static electricity&quot;)</td>
<td></td>
</tr>
<tr>
<td>VDMA 24371</td>
<td>Guidelines for electrostatic coating with synthetic powder</td>
<td>part 1 General requirements - part 2 Examples of use</td>
</tr>
</tbody>
</table>
**Leaflets**

| ZH 1/310 | Leaflet for the use of tools in locations where there is danger of explosion ¹ |

**EN European standards**

| RL94/9/EG | The approximation of the laws of the Member States relating to apparatus and safety systems for their intended use in potentially explosive atmospheres |
| EN 292-1 | Machine safety ² |
| EN 292-2 | Machine safety ² |
| EN 50 014 to EN 50 020, identical: DIN VDE 0170/0171 | Electrical equipment for locations where there is danger of explosion ³ |
| EN 50,050 | Electrical apparatus for potentially explosive atmospheres - Electrostatic hand-held spraying equipment ² |
| EN 50 053 Teil 2 | Requirements for the selection, installation and use of electrostatic spraying equipment for flammable materials - Manual electrostatic powder spray guns ² |
| EN 50 177 | Stationary electrostatic spraying equipment for flammable coating powder ² |
| PR EN 12981 | Coating plants - Spray booths for application of organic powder coating material/safety requirements |
| EN 60529, identical: DIN 40050 | IP protection types; contact, foreign bodies and water protection for electrical equipment ² |
| EN 60 204 identical: DIN VDE 0113 | VDE regulations for the setting up of high-voltage electrical machine tools and processing machines with nominal voltages up to 1000 V ³ |

**VDE (Association of German Engineers) Regulations**

| DIN VDE 0100 | Regulations for setting-up high voltage equipment with nominal voltages up to 1000V ⁴ |
| DIN VDE 0105 | VDE regulations for the operation of high voltage equipment ⁴ |
| part 1 | General regulations |
| part 4 | Supplementary definitions for stationary electrical spraying equipment |
| DIN VDE 0147 | Setting up stationary electrostatic spraying equipment ⁴ |
| part 1 | |
| DIN VDE 0165 | Setting up electrical equipment in locations in areas with danger of explosion ⁴ |

*Sources:*

¹ Carl Heymanns Verlag KG, Luxemburger Strasse 449, 5000 Köln 41, or from the appropriate employers association
² Beuth Verlag GmbH, Burgrafenstrasse 4, 1000 Berlin 30
³ General secretariat, Rue Bréderode 2, B-1000 Bruxelles, or the appropriate national committee
⁴ VDE Verlag GmbH, Bismarckstrasse 33, 1000 Berlin 12
Special security measures

- The installation work, to be done by the customer, must be carried out according to local regulations
- Before starting up the plant, check if no foreign objects are in the booth or in the ducting (input and exhaust air)
- It must be observed, that all components of the plant are grounded according to the local regulations
General information

These operating manual contains all important information which you require for the working with the FPS15 Tilt table. It will safely guide you through the start-up process and give you references and tips for the optimal use of your new powder coating system.

Information about the function mode of the individual system components - reciprocators, booths, powder gun controls, powder guns etc. - you will find in the corresponding enclosed documentations.
Function description

Field of application

The FPS15 Tilt table is used for the fresh powder supply from the manufacturer’s container to the powder containers or powder guns. The powder conveying takes place by powder pumps with integrated powder fluidizing and distributing equipment (so-called powder fluidization).

The Tilt table can be subsequently integrated into any powder coating system.

Function

The powder container is placed directly onto the vibration table and vibrated by the motor mounted laterally on the table.

For fluidizing the powder, in addition to table vibration, fluidizing air is fed into the exterior tube of the fluidizing/suction unit, where it emerges at the lower end through the fluidizing pad. The area around the suction tube is fluidized, the powder acquires fluid-like characteristics and is sucked up into the tube.

The table vibration causes a better flow of powder to the suction tubes and prevents accumulation of residual powder in the corners of the container. By tilting up to 40° degrees, the powder flows to the lower bundle.
edge and can be delivered almost completely. The vibrated and fluidized powder is sucked up by the conveying air by the suction tube into the powder pump and carried on.

**Note:**
The vibration and the powder conveying only works, if the level sensor does not announce lack of powder in the main powder container!

## Mechanical construction

Depending the version, the Tilt table can be equipped with 1-4 fluidizing/suction units.

![FPS15 Tilt table - mechanical structure](image)

1. Frame
2. Tilt plate
3. Pneumatic cylinders
4. Rubber damper
5. Pedestal bearing
6. Tilt frame

## Safety and monitoring features

- All moving axes must be secured before starting-up and during operation by safety barriers, provided by the customer (see local regulations)
- The pneumatic cylinders are equipped with firm screens, so that fast movements are not possible
- The Tilt table may only be start-up after the security gate is closed
- The security gate must be locked in such a way, that it can be opened only after lowering the Tilt table
Control cabinet

In the FPS15 control cabinet, the pneumatic and electrical elements and the control devices are implemented. The operation components (pressure control valves) are also situated in the control cabinet.

The control cabinet must be positioned outside of the safety barriers, respectively the danger area. It can be firmly fixed on the floor.
## FPS15 Tilt table

### General Data

<table>
<thead>
<tr>
<th>FPS15 Tilt table</th>
<th>max. 550 kg (1212.5 pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay load</td>
<td>approx. 200 kg (440.9 pounds)</td>
</tr>
<tr>
<td>Motor voltage</td>
<td>3 x 400 VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Compressed air, max. input pressure</td>
<td>10 bar / 145 psi</td>
</tr>
<tr>
<td>Air requirement for tilting</td>
<td>less than 1 Nm³/h (0.6 SCFM)</td>
</tr>
<tr>
<td>Compressed air quality:</td>
<td></td>
</tr>
<tr>
<td>Max. water vapor content</td>
<td>1.3 g/m³</td>
</tr>
<tr>
<td>Max. oil vapor content</td>
<td>0.1 mg/m³</td>
</tr>
</tbody>
</table>

### Control unit

<table>
<thead>
<tr>
<th>FPS15 Tilt table</th>
<th>3 x 400 V+N+E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>Input power</td>
</tr>
<tr>
<td></td>
<td>200 W</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 Hz</td>
</tr>
</tbody>
</table>

### Control signal for powder feed

| FPS15 Tilt table | Potential free contact or 24 VDC or 230 VAC |
Start-up

Setting up and mounting

- After unpacking and setting up the Tilt table, it must absolutely be fixed on the floor with the provided steel bolts
- Sufficient working space for loading and unloading the Tilt table must be provided
- The frame of the Tilt table must be grounded together with the plant
- To charge the tilt plate with the hand-operated lift truck, the optionally supplied ramp is to be used. This ramp must be screwed firmly on the floor
- The Tilt table must be equipped with a safety barrier, which prevents the admission for unauthorized persons

Operation

Move the fluidizing/suction unit(s) manually upwards, lock the retaining slide and place the powder container on the Tilt table.

Fluidizing/suction unit on upper position
Push back the retaining slide and move manually the fluidizing/suction unit(s) slowly downwards.

**Attention:**
Do not let drop down, otherwise the fluidizing pads can be damaged!

Press the green push button on the control cabinet to release the tilting procedure.

**Attention:**
Due to the inserted safety throttles, the tilting procedure works just slowly, i.e. after the required tilting pressure is adjusted, it takes approx. 20 sec. until the movement becomes visible!

The tilting procedure is started as follows:

- **Pressure regulator 1**: Tilting basic position 6 bar
- **Pressure regulator 2**: Tilting empty position 3 bar

After releasing the tilting procedure, the full powder container is lifted into the tilting basic position. The Tilt table continues to incline automatically up to the end position, during the powder discharge.

The time for additional tilting is determined by the pressure regulator 2. This pressure regulator must be readjusted depending on the powder type etc.:

- If too little powder in the tilting basic position flows to the suction tube, the pressure must be increased
- If the Tilt table moves to the empty position although there is still enough powder to the suction tube, the pressure can be reduced

If the powder container is emptied, press the red stop button. The Tilt table lowers back into the horizontal position.

Lift the fluidizing/suction unit(s) manually upwards, change the powder container and continue operating.
Safety barrier

An optional security gate is supplied by ITW Gema AG, which has the following characteristics:

- Wing door for charging the tilt plate and for committing the safety area
- With electrical safety limit switch
- With pneumatically interlocking, which prevents a committing during the tilting procedure
- Safety grids for all three sides (depending on requirement), which are fixed on the floor

The connections for the electrical and pneumatic interlocking are implemented in the control cabinet.
Schematic diagrams

Pneumatic diagram

FPS15 Tilt table - pneumatic diagram
Power input: 3 kVA
Preliminary fuse: max. 20 A
Short circuit current: 15 kA

The neutral wire is used in this control!
Spare parts list

Ordering spare parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

- Type and serial number of your powder coating equipment
- Order number, quantity and description of each spare part

Example:

- **Type** FPS15 Tilt table
  **Serial number** 1234 5678
- **Order no.** 203 386, 1 piece, Clamp - Ø 18/15 mm

When ordering cable or hose material, the required length must also be given. The spare part numbers of this yard/meter ware is always marked with an *.

The wear parts are always marked with a #.

All dimensions of plastic hoses are specified with the external and internal diameter:

Example:

Ø 8/6 mm, 8 mm outside diameter (o/d) / 6 mm inside diameter (i/d)

**WARNING!**

Only original ITW-Gema spare parts should be used, because the explosion protection will also be preserved that way. The use of spare parts from other manufacturers will invalidate the ITW Gema guarantee conditions!
# FPS15 Tilt table - spare parts list

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clamping element - Ø 40/40 mm</td>
<td>363 910</td>
</tr>
<tr>
<td>2</td>
<td>Pump holder - complete</td>
<td>390 887</td>
</tr>
<tr>
<td>3</td>
<td>PP02 Powder pump - complete (see corresponding documentation)</td>
<td>357 910</td>
</tr>
<tr>
<td>4</td>
<td>Fluidizing/suction unit - complete (see corresponding documentation)</td>
<td>370 843</td>
</tr>
<tr>
<td>5</td>
<td>Vibration damper - Ø 75x55 mm, M12 / 12.20002.7703</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Pedestal bearing - NP 50 DEC</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Buffer stopper - Ø 75x35 mm, M12 / 12.20007.0803</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Vibrator</td>
<td>258 628</td>
</tr>
<tr>
<td>9</td>
<td>Bezel - 0,9 mm</td>
<td>403 652</td>
</tr>
<tr>
<td>10</td>
<td>Ball joint - W 0950 8020 25</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Pneumatic cylinder - 250 S 1000 210 XP-100-210</td>
<td></td>
</tr>
</tbody>
</table>
FPS15 Tilt table - spare parts list

FPS15 Tilt table

FPS15 Tilt table - vibrator

FPS15 Tilt table - pneumatic cylinder
Control cabinet - spare parts list

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Pressure regulator</td>
<td>243 710</td>
</tr>
<tr>
<td>1.2</td>
<td>Pressure gauge</td>
<td>203 289</td>
</tr>
<tr>
<td>1.3</td>
<td>Solenoid valve</td>
<td>259 500</td>
</tr>
<tr>
<td>1.4</td>
<td>Solenoid valve</td>
<td>259 500</td>
</tr>
<tr>
<td>1.5</td>
<td>Solenoid valve</td>
<td>259 500</td>
</tr>
<tr>
<td>1.6</td>
<td>Solenoid valve</td>
<td>259 500</td>
</tr>
<tr>
<td>1.7</td>
<td>Solenoid valve</td>
<td>253 952</td>
</tr>
<tr>
<td>2.1</td>
<td>Silencer for pos. 2.1</td>
<td>251 305</td>
</tr>
<tr>
<td>2.2</td>
<td>Bezel - 0.9 mm (not shown)</td>
<td>403 652</td>
</tr>
<tr>
<td>2.4</td>
<td>Push button - green</td>
<td>267 830</td>
</tr>
<tr>
<td></td>
<td>Valve for pos. 2.4</td>
<td>268 259</td>
</tr>
<tr>
<td></td>
<td>Carrier plate for pos. 2.4</td>
<td>268 240</td>
</tr>
<tr>
<td>2.5</td>
<td>OR-Valve</td>
<td>259 217</td>
</tr>
<tr>
<td>2.6</td>
<td>Pressure display - green</td>
<td>265 705</td>
</tr>
<tr>
<td>2.7</td>
<td>Push button - red</td>
<td>267 848</td>
</tr>
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(The positions in this list are taken from the pneumatic diagram)
Control cabinet - spare parts list

Control cabinet - inside view