PROJECT-OUT WINDOWS
AND TOP HUNG WINDOWS

PARALLEL HINGES

F13.11

01.06.2018
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1. General

1.1. Special characteristics

- Parallel opening windows are provided with parallel hinges which open the window parallel with the curtain wall surface.

- Three or more hinges are mounted in accordance with the size and the weight of the window.
- Parallel vents can be restricted to an opening of only 40 mm and still provide whole perimeter ventilation and effective air exchange. Compared to this window system, other more conventional window systems have to open 100 mm and more to obtain the same ventilation results.
- Small opening gaps ensure greater security for occupants.
- Parallellism is adjustable on the hinges by eccentric cam adjusters.
- Vents weighing up to 200 kg can be operated manually.
- Expensive drive motors and synchronisation systems are not necessary.
- The maximum opening when manually operated is set by means of limit stops which are mounted in the track (of the frame part) of the vertically mounted hinges.
- Long and reliable life, tested to operate for 20,000 cycles.
- Manufactured from high grade Austenitic (AISI 304) stainless steel for maximum lifetime, even in the most corrosive environment.
1.2. **Natural ventilation**

- Due to the increasing demand for balanced and effective natural ventilation, whilst maintaining a safe and secure environment, this window system has been developed.
- A parallel opening window is ideal to ventilate rooms in a natural way: see representation above.
- Parallel opening windows are ideal to ventilate office buildings and high rise buildings.
- As this window type is open at both the top and bottom, it provides an enhanced and effective ventilation in comparatively big rooms with a simple single natural ventilation concept.
- In case of motorised parallel windows, a precise control system makes it possible to secure the airflow needed at any time, without draught.

1.3. **Left hand and right hand version**

- To know whether a parallel hinge is left hand or right hand, you must view from the outside:
  - hinge at the left hand side = left hand hinge (L)
  - hinge at the right hand side = right hand hinge (R)
- Additional conditions:
  - the hinge is mounted with the fixed pivots at the bottom.
  - the twin cross parallel hinges (PX0670 and PX0950) are mounted with the track with the sliding synchronisation tie bar on the vent.
- The single cross parallel hinges (PX0250, PX0350, PX0450) have an identical vent and frame track. This means that they can be transposed so that both tracks can be mounted on either vent profile or frame profile.
- A right hand hinge is provided standard on the horizontal sides of the window. But a left hand hinge is also possible.
- Example: hinge n° PX0350 viewed from the outside.
2. Parallel hinges

2.1. Position and clearances

- The hinges are fitted between 2 flat and parallel rigid faces.

- Parallel hinges do not provide weather sealing:
  - If the window is manually operated, this should be provided by a separate perimeter locking system.
  - If the window is motor operated, this can be provided by either the motors or a synchronised motor operated separate perimeter locking system.

- Attention: locking points, gearboxes and all other cavity fitted parts must be positioned to avoid clash with the hinges when opening the window.

2.2. Parallel hinge PX0250R

- If manually operated, the vertical hinges must be restricted by limit stop n° C8701.
- This hinge is only mounted horizontally (as control hinge). This means that it’s only available as a right hand version.
2.3. Parallel hinge PX0350R or L

- If manually operated, the vertical hinges are restricted by limit stop n° C8700.
- Important: when vertically mounted the hinge is positioned with the fixed pivots at the bottom.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>manual</td>
<td>150 mm</td>
</tr>
<tr>
<td>motor</td>
<td>180 mm</td>
</tr>
</tbody>
</table>

Right hand version
2.4. Parallel hinge PX0450R or L

- If manually operated, the vertical hinges are restricted by limit stop n° C8571.
- Important: when vertically mounted the hinge is positioned with the fixed pivots at the bottom.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>manual</td>
<td>150 mm</td>
</tr>
<tr>
<td>motor</td>
<td>200 mm</td>
</tr>
</tbody>
</table>
2.5. Parallel hinge PX0670R or L

- If manually operated, the vertical hinges are restricted by limit stop n° C8688.
- Important: when vertically mounted the hinge is positioned with the fixed pivots at the bottom.
- The hinge is mounted with the track with the sliding synchronisation tie bar on the vent.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>manual</td>
<td>150 mm</td>
</tr>
<tr>
<td>motor</td>
<td>150 mm</td>
</tr>
</tbody>
</table>
2.6. Parallel hinge PX0950R or L

- If manually operated, the vertical hinges are restricted by limit stop n° C8571.
- Important: when vertically mounted the hinge is positioned with the fixed pivots at the bottom.
- The hinge is mounted with the track with the sliding synchronisation tie bar on the vent.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>manual</td>
<td>150 mm</td>
</tr>
<tr>
<td>motor</td>
<td>200 mm</td>
</tr>
</tbody>
</table>
3. Limit stops

- The maximum opening if manually operated is set by means of plates which are fixed in the track (of the frame part) of the vertically mounted hinges.

- Four plates are available dependant on the used parallel hinge.

<table>
<thead>
<tr>
<th>Parallel hinge</th>
<th>Limit stop</th>
<th>Max. manual opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>PX0350</td>
<td>C8700</td>
<td>150 mm</td>
</tr>
<tr>
<td>PX0450</td>
<td>C8701</td>
<td>120 mm</td>
</tr>
<tr>
<td>PX0450</td>
<td>C8571</td>
<td>150 mm</td>
</tr>
<tr>
<td>PX0670</td>
<td>C8688</td>
<td>150 mm</td>
</tr>
<tr>
<td>PX0950</td>
<td>C8701</td>
<td>120 mm</td>
</tr>
<tr>
<td>PX0950</td>
<td>C8571</td>
<td>150 mm</td>
</tr>
</tbody>
</table>

- All hinges have a maximum opening of 150 mm, except when limit stop n° C8701 is used. This is possible for the parallel hinges PX0250R and PX0450.

- Attention! Hinge PX0250R is only mounted horizontally. In this case the vertically mounted hinges are provided with limit stop n° C8701.

- If required, it is possible to select a smaller fixed opening motion with limit stops n° C8571 (50 mm and 100 mm) and n° C8688 (100 mm).

- When using the hinges in a motorised application, a limit stop is not required. The motor operating devices must arrest the opening motion of the vent at the maximum specified opening distance as mentioned in the table on the next page.

- The opening motion is the movement measured from the closed position to the recommended open position for the type of operation stated.

- Installation example:
4. Size range (manual operation)

Window dimensions:

When using 2 handles
- Maximum vent width: 1500 mm
- Maximum vent height: 3000 mm
- Maximum vent weight: 200 kg

When using 1 handle (bottom)
- Maximum vent width: 2000 mm
- Maximum vent height: 1200 mm
- Maximum vent weight: 100 kg

Maximum opening:

<table>
<thead>
<tr>
<th>Parallel hinge</th>
<th>Manual operation</th>
<th>Motor operation</th>
<th>Absolute maximum opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>PX0250</td>
<td>120 mm</td>
<td>120 mm</td>
<td>120 mm</td>
</tr>
<tr>
<td>PX0350</td>
<td>150 mm</td>
<td>180 mm</td>
<td>180 mm</td>
</tr>
<tr>
<td>PX0450</td>
<td>150 mm</td>
<td>200 mm</td>
<td>250 mm</td>
</tr>
<tr>
<td>PX0670</td>
<td>150 mm</td>
<td>150 mm</td>
<td>150 mm</td>
</tr>
<tr>
<td>PX0950</td>
<td>150 mm</td>
<td>200 mm</td>
<td>250 mm</td>
</tr>
</tbody>
</table>

- The absolute maximum opening is only possible on request.
- The maximum opening motion if manually operated must be restricted by limit stops which are fixed in the vertically hinges. More information about these limit stops, see page F13.11.10.
- If the window is manually operated, a separate perimeter locking system with sufficient locking points must be provided to guarantee the wind and water tightness of the window.
- Two or four synchronised chain drive motors should be provided for motorised applications.

Handle position:

- Centrally on the vertical sides when using 2 handles.
- Centrally at the bottom side when using 1 handle.
- Ideal handle height from the floor level: 1500 mm (maximum 1600 mm).
- Other handle positions are only possible on request.
5. Hinge selection

- The parallel hinges and the limit stops are selected in accordance with this chart for manually operated vents.

- Notes:
  - Handles to be mounted centrally on the vertical sides with a maximum tolerance of +/-15% of the vent height.
  - Vents below 1230 mm high can alternatively, but not preferably, be operated from a single handle at the bottom of the vent.
  - Maximum handle height from floor level: 1500 mm.
  - Maximum width between the 2 handles: 1500 mm.

### Vertically mounted hinges

<table>
<thead>
<tr>
<th>Vent width Fb (mm)</th>
<th>Vent height Fh (mm)</th>
<th>Vertically mounted hinges</th>
<th>Control stays</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Left side</td>
<td>Right side</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>1x PX0350L</td>
<td>1x PX0350R</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>1x PX0450L</td>
<td>1x PX0450R</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>1x PX0670L</td>
<td>1x PX0670R</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>1x PX0950L</td>
<td>1x PX0950R</td>
</tr>
<tr>
<td>E</td>
<td></td>
<td>2x PX0950L</td>
<td>2x PX0950R</td>
</tr>
</tbody>
</table>

- Notes:
  - When using PX0250R control stays, replace C8571 stops with C8701 stops.
  - The maximum opening motion of the parallel hinges is 150 mm, with the exception of PX0250 which has a maximum opening motion of 120 mm.
6. Installation instructions

6.1. Fixing of the hinges

- The parallel hinges should be fitted centrally on both vertical and horizontal sides in order to have maximum adjustment for maintained parallelism. If the set-up requires 2 hinges on the vertical sides, they should be fitted equal about the overall height of the window.

- Position of the fixing holes: see drawings of the parallel hinges on the previous pages.

- Drill holes:
  - Fixing holes on the frame track: we recommend that all frame fixing holes should be pre-drilled.
  - Fixing holes on the vent track: where adjustment of the vent is required, we recommend that only the vent fixings corresponding to the slotted screw holes should be pre-drilled. When no adjustment is required, all vent fixing holes should be pre-drilled.

- We recommend to use metric pan head screws M5 DIN 7985 or tapping pan head screws St4,8 DIN 7981 for the fixing of the frame track and the vent track. Channel dimensions: see drawing.

- All screws should go through sufficient profile thickness or into screw channels. If this can’t be achieved, rivnuts or similar should be used to provide a strong fixing.

- Extreme care must be taken not to strip the thread as deterioration in performance will result.
6.2. Fixing the limit stops

• **ATTENTION!**
  A manual limit stop is only used when the windows are manually operated. A limit stop is absolutely not used with a motorised operation.
  
  • Check whether the limit stop is suitable for the given parallel hinge and for the required opening.
  
  • A limit stop is fitted in each vertically mounted parallel hinge.
  
  • The limit stop is fitted in the frame track of the parallel hinge.
  
  • The limit stop is fixed together with one of the fixing screws of the hinge.
  
  • Limit stops n° C8688 and n° C8571 have 2 or 3 fixing holes giving the option to restrict the opening distance at certain intervals. The holes are marked with the opening distance.
  
  • On the drawings you can notice the orientation of the limit stop in the track. This means that the text will be upside down after assembly.
  
  • The limit stop is fitted at the bottom cross when using twin cross parallel hinges.
7. Adjustment of the hinges

7.1. Adjustment

General

• All parallel hinges feature adjustable pivots (eccentric) at the top and bottom of both frame and vent track.

• Adjustment steps:
  1. Fully open the parallel window to the specified maximum opening position.
  2. Rotate the cam adjuster on the frame track side to move the vent in or out relative to the frame.
  3. If further adjustment is required, rotate the bottom cam adjuster on the frame track side and if necessary the top/bottom cam adjusters on the vent track side.

Adjustment (installing the vent in the building)

• When installing the vent in to the building, the parallelism should be adjusted on the frame track from inside the building. This is achieved by rotating the cam adjuster(s) to move the vent in or out relative to the frame.

• If further adjustment is required, both cam adjusters on the vent track can be adjusted.

Adjustment (installing the hinges in the factory)

• When installing the hinges in the factory, the parallelism should be adjusted on the vent only by rotating the top and bottom cam adjusters to move the vent in or out relative to the frame.
7.2. Anti-tamper device n° R8703

General

- Each parallel hinge is supplied with a set n° S8711 with 4 anti-tamper components (with fitting instructions).
- Device n° R8703 secures the cam adjusters. After adjusting the hinge, the anti-tamper device with hexagonal section is installed in the channel to secure the adjustable pivot.
- To install the anti-tamper devices, please follow the next steps.

**Step 1**

- Rotate the adjustable pivots to achieve the optimum parallelism.
- Ensure that one of the sides of the hexagonal key section is parallel with the end edge of the channel: see drawing right.

**Step 2**

- Align the anti-tamper device so that it can enter the channel in the correct orientation.
- The legs of the device slide into the section of the channel.

**Step 3**

- Once the anti-tamper device is part way within the channel, lift the nose so that it bends up and can be moved further up the channel section.

**Step 4**

- Once the hexagonal pad section is above the hexagonal key section of the cam adjuster, release the pressure and press fit the pad into the hexagonal adjustable cam.
8. General information and maintenance instructions

Materials
- The parallel hinges are made of high quality non-corroding materials:
  - Tracks: stainless steel AISI 304
  - Link arms: stainless steel AISI 304
  - Sliding synchronisation tie bar: stainless steel AISI 304
  - Slider part 1: stainless steel AISI 304
  - Slider part 2: synthetic material (Zytel)
  - Fixed pivots: zinc alloy 5, zinc plated
  - Adjustable pivots (cam adjusters): stainless steel AISI 304 Cu
  - Pivot washer: synthetic material
  - Bushes: phosphor bronze
- Tracks, link arms and tie bar: cold rolled finish.
- Corrosion resistance: when subjected to a 500 hour neutral salt spray test in accordance with the European standard EN ISO 9227 the hinge remains functional. There's no significant surface corrosion. Some surfaces show slight discolouration.

Recommendation
- If the hinges are fitted in an area where they are exposed to a corrosive atmosphere, e.g. coastal areas, we recommend that in addition to the general maintenance and lubrication:
  - All metal surfaces are slightly coated with lubrication oil or sprayed with an anticorrosion spray. It’s important to follow the manufacturer's instructions for any products used.
  - Maintenance operations may need to be carried out more frequently, dependant on the severity of the prevailing conditions.

Environmental constraints
- Normal operating conditions for all parallel hinges are:
  - Operating temperature range: -20°C to +60°C
  - Operating humidity range: 10% to 95% relative humidity
- The materials used will not degrade due to ultra violet light or when using neutral acidity non solvent cleaning chemicals, at a rate faster than other parts of the window assembly.

Heat and smoke ventilation
- Operating temperature: -20°C to 300°C.
- The hinges will resist the maximum temperature for 5 minutes and will operate once to fully opened position when the maximum temperature is achieved in accordance with EN 12101-2.

Maintenance and lubrication
- As with most mechanical devices, the parallel hinges require periodic maintenance and lubrication. The hinge in general and particularly the pivots, sliding parts and tracks must be kept free from dirt and any obstructions at all time.
- At time of installation, lubricate all pivot points with general light oil and wipe away excess. One drop per pivot is sufficient.
- Carry out the following checks every five years (as described above):
  - Clean any dirt and obstructions from the hinges.
  - Lubricate the pivots.
  - Check the tightness and security of all fixing screws and rivets.
9. Installation example

Please note the position of the fixed pivot point.

Control hinge n° PX0450R fitted to the top.

Notes:
We recommend that the parallel hinges should be fitted centrally on both vertical and horizontal sides in order to have maximum adjustment for maintained parallelism of the window.

If the set-up requires 2 hinges on the vertical sides, they should be fitted equal about the overall height of the window.