

Note: to compile the risk analysis check the boxes corresponding to the solutions adopted.

Analysis of gate structure to be moved

Check that the gate structure is suitable for automation

By verifying documentation of the gate manufacturer

or

By means of structural tests and/or calculations and consequent assumption of responsibility by the installer.

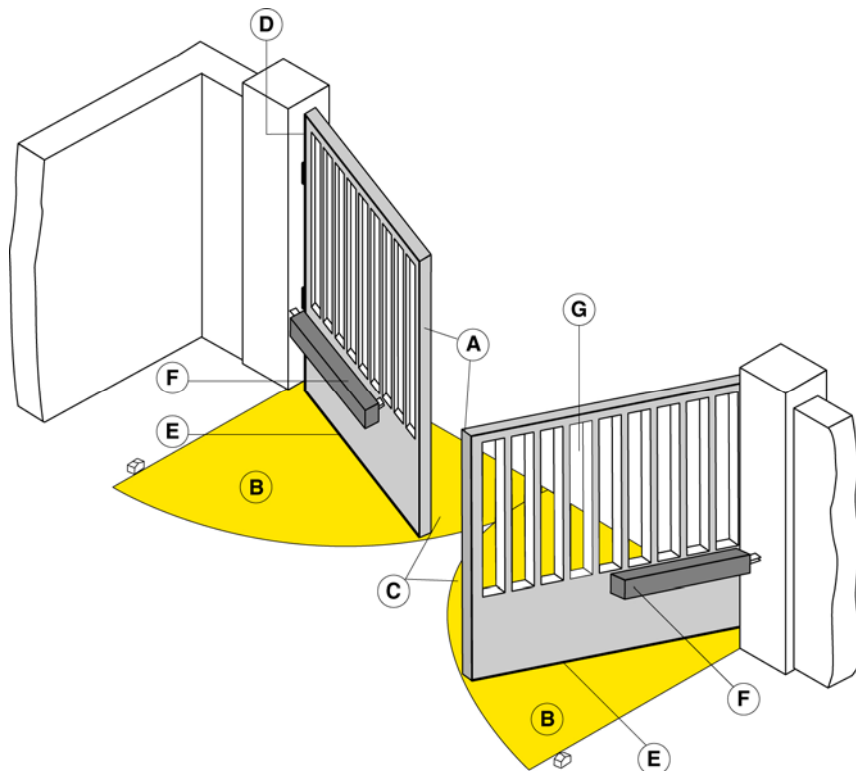
(Reference to standards for "mechanical aspects": EN 12604 and EN 12605. For "climatic" aspects, if applicable: EN 12424; EN 12425; EN 12426; EN 12427; EN 12428; EN 12444; EN 12489)

Also check feasibility of correct fixture of mechanical transmission parts and anchoring of the automation.

Risk assessment

To ensure correct assessment of risks, and therefore consequent operations to obtain an automation to standards, a number of aspects must be taken into account, such as the identification of danger zones and the type of intended use.

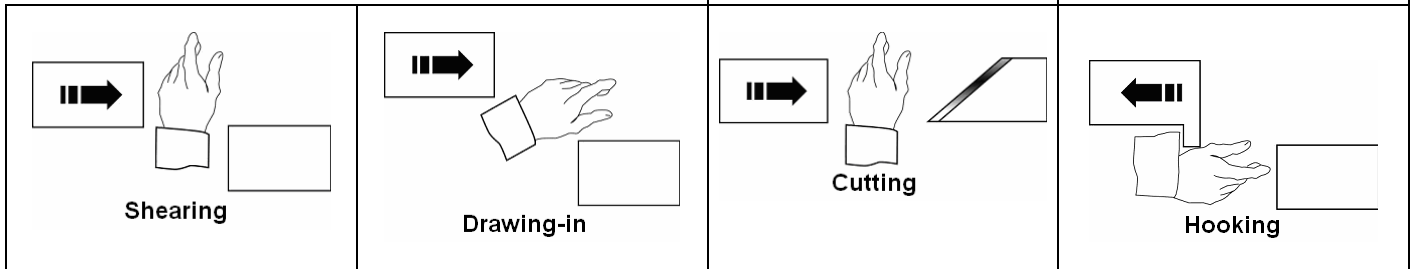
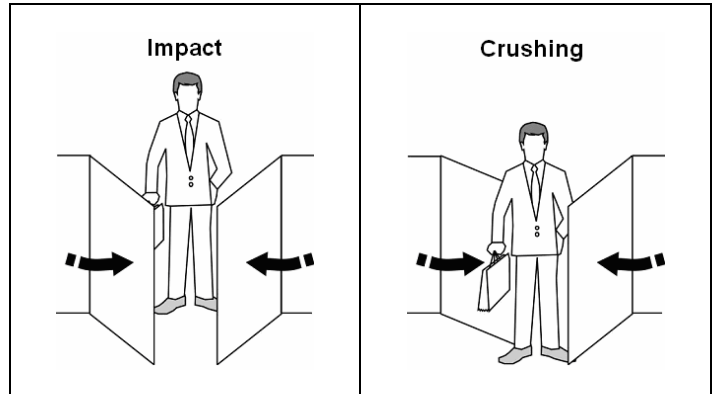
Risk zone of swing gate (figure 1):



Key to mechanical risks due to movement

In accordance with the Machinery Directive the following meanings are used:

- “Danger zones”, any zone within and/or in the vicinity of a machine in which the presence of an exposed person constitutes a risk to the safety and health of this person.
- “Exposed person”, any person fully or partially positioned in a danger zone



Minimum protection level of main edge

Type of activation commands	Intended Use		
	Informed users (private area)	Informed users (public area)	Uninformed users
Hold-to-run controls	<input type="checkbox"/> Pushbutton control	<input type="checkbox"/> Key-operated pushbutton control	Not permitted!
Jog control with door in view	<input type="checkbox"/> Force limitation, or <input type="checkbox"/> Presence detectors	<input type="checkbox"/> Force limitation, or <input type="checkbox"/> Presence detectors	<input type="checkbox"/> Force limitation and photocells, or <input type="checkbox"/> Presence detectors
Jog control with door not in view	<input type="checkbox"/> Force limitation, or <input type="checkbox"/> Presence detectors	<input type="checkbox"/> Force limitation and photocells, or <input type="checkbox"/> Presence detectors	<input type="checkbox"/> Force limitation and photocells, or <input type="checkbox"/> Presence detectors
Automatic control (e.g. timed closing command)	<input type="checkbox"/> Force limitation and photocells, or <input type="checkbox"/> Presence detectors	<input type="checkbox"/> Force limitation and photocells, or <input type="checkbox"/> Presence detectors	<input type="checkbox"/> Force limitation and photocells, or <input type="checkbox"/> Presence detectors

Risk analysis and choice of solutions

In conformity with the Machinery Directive 98/37/EC and applicable parts of the EN standards EN 13241-1; EN 12453; EN 12445; EN 12635

The risks listed below are sorted on the basis of the installation phase sequence. These risks are those commonly present on systems for power-operated doors/gates; therefore possible other risks and the relevancy of those specified must be considered according to the specific situation in hand. The solutions to be adopted are those specified in the above-mentioned standards; in the case of risks not dealt with in these documents, the principles of safety integration must be applied as envisaged in the Machinery Directive (appendix 1 – 1.1.2).

DM Encl. 1	Type of risks	Assessment criteria and solutions to be adopted (Check the box corresponding to the solution adopted).
1.3.1 1.3.2	<i>Mechanical, structural and wear associated risks.</i> [1] Loss of stability and falling of parts.	<input type="checkbox"/> Check stability of the structure present (columns, hinges, and leaves) in relation to the force generated by the motor. Fix the motor in a stable position using adequate materials. If available, check the contents of the CE declaration of conformity supplied with the manual door/gate. <input type="checkbox"/> If necessary, make structural calculations and attach in the Technical Documentation. <input type="checkbox"/> Ensure that leaf stroke is limited (on opening or closing) by means of mechanical stops of adequate capacity.
1.5.15	[2] Tripping.	<input type="checkbox"/> Check that any edges over 5 mm present are visible, highlighted or contoured.

DM Encl. 1	Type of risks	Assessment criteria and solutions to be adopted (Check the box corresponding to the solution adopted).
1.3.7 1.3.8 1.4	<p>Mechanical risks associated with leaf movement (see references in figure 1).</p> <p><input type="checkbox"/> CAUTION – If the door/gate is used exclusively with hold-to-run controls (and complies with the requirements of standard EN 12453), the danger points listed below do not require protection.</p> <p><input type="checkbox"/> CAUTION- If protection devices are installed (compliant with standard EN 12978) which prevent any possible contact between the moving leaf and persons (such as photoelectric barriers, presence detectors), the measurement of operating forces is not necessary.</p>	

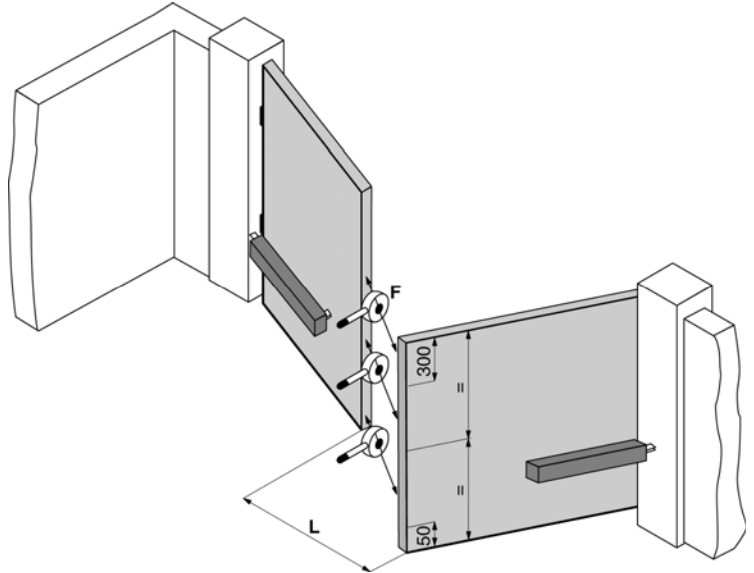
[3] Impact and crushing on main closing edge (figure 1, risk A).

Measure the closing forces (by means of specific instrument required by standard EN 12445) as shown in the figure.
Check that the values measured by the instrument are below those specified in the graph.

Take measurements at the following points:

- L = 50, 300 and 500 mm;
- H = 50 mm,
mid-height of the leaf and
at the height of the leaf minus 300 mm (max. 2500)

N.B. Measurements must be taken three times at each point, and the mean value must be considered as the reference

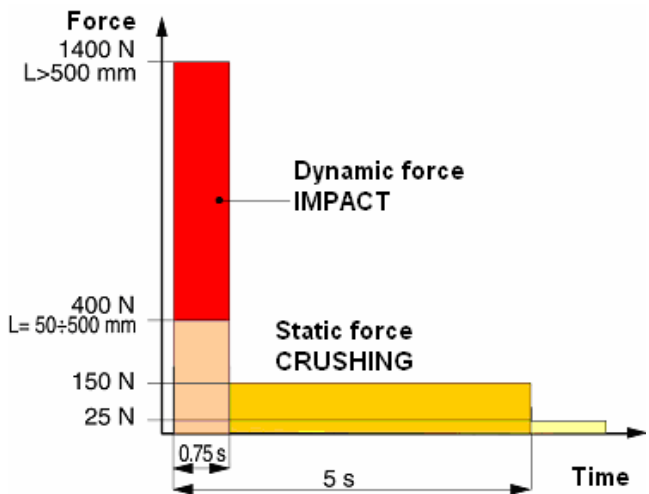


The graph provides the maximum values of the dynamic, static and residual operating forces in relation to the different positions of the leaf.

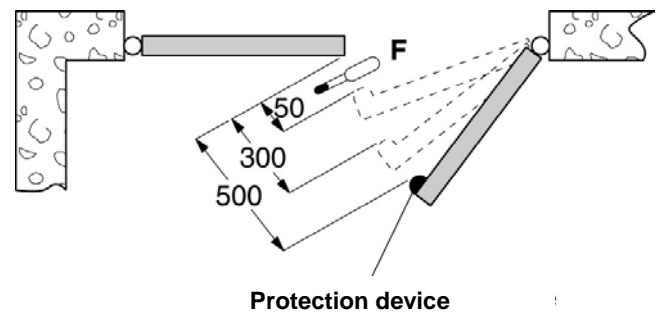
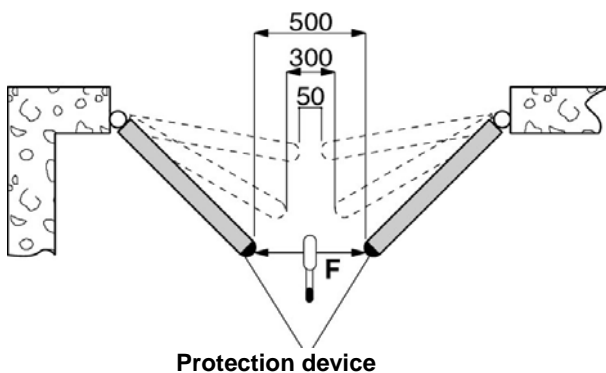
N.B. With reference to the measurement points with L = 50, 300 and 500 mm, the maximum admissible value of dynamic force is 400 N.

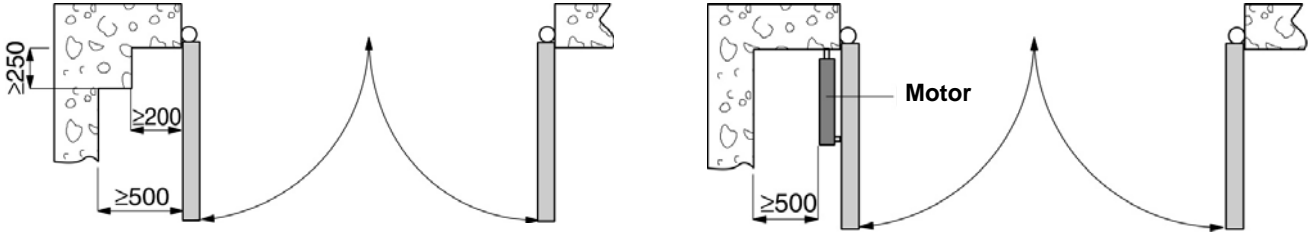
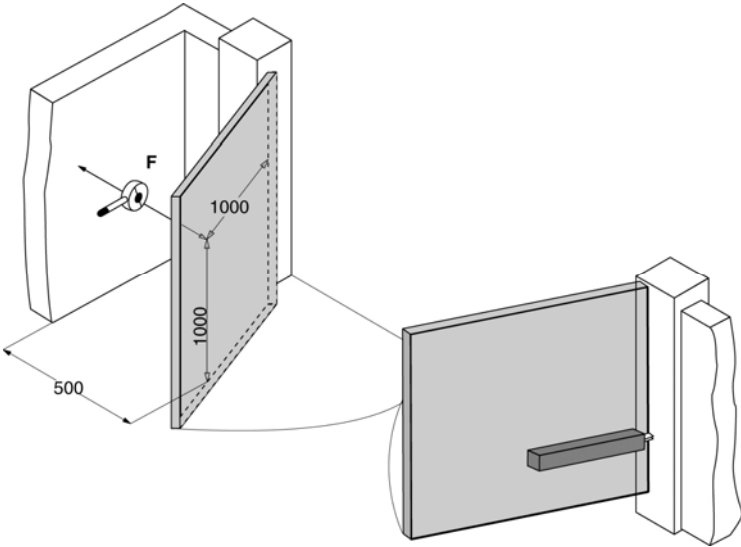
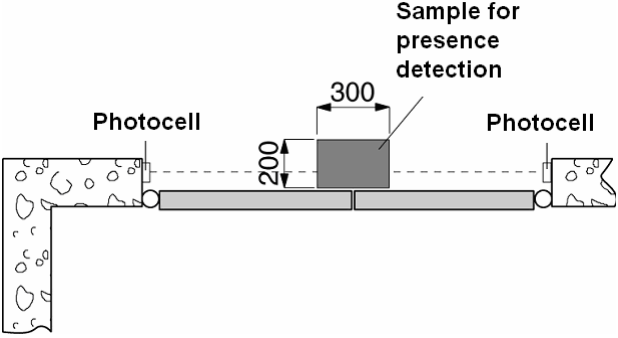
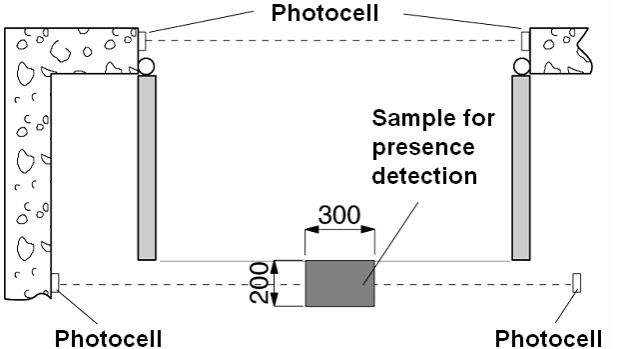
If the force values are higher, install a protection device compliant with standard EN 12978 (such as a sensitive edge) and repeat measurements.


N.B. The reduction in dynamic force is obtainable, for example, by reducing the speed of the leaf by using a sensitive edge with a high level of flexible deformation.

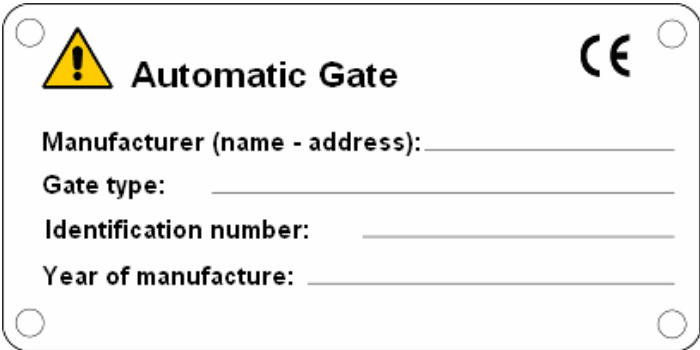


Leaf with overlapped and delayed closure



DM Encl. 1	Type of risks	Assessment criteria and solutions to be adopted (Check the box corresponding to the solution adopted).
<p>[4] Impact and crushing in opening area (figure 1, risk B).</p> <p><input type="checkbox"/> Observe safety distances specified in the figure (at most protruding part of leaf).</p> 		
<p>or</p> <p><input type="checkbox"/> Measure the opening forces (by means of specific instrument required by standard EN 12445) as shown in the figure. Check that the values measured by the instrument are below those shown in the graph above.</p> <p>Take measurements at a height of $H = 1000$ mm (or at the most protruding point of the leaf)</p> <p><i>N.B. Measurements must be taken three times at each point, and the mean value must be considered as the reference</i></p> <p><input type="checkbox"/> If the force values are higher, install a protection device compliant with standard EN 12978 (such as a sensitive edge) and repeat measurements.</p> 		
<p>[5] Impact in closing area (figure 1, risk C).</p> <p><input type="checkbox"/> Install a pair of photocells (recommended height 500 mm) to detect presence of the test parallelepiped (height 700 mm) positioned as shown in the figure.</p> <p><i>N.B. The test sample for presence detection is a parallelepiped (700 x 300 x 200 mm) with 3 faces with a light reflective surface and 3 faces with dark and opaque surface.</i></p> 		
<p>[6] Impact in opening area (figure 1, risk B) and in closing area (figure 1, risk C).</p> <p><input type="checkbox"/> To reduce the risk of impact further in the gate movement areas (A and C), a pair of photocells can be installed (recommended height 500 mm) to detect presence of the test parallelepiped (height 700 mm) positioned as shown in the figure.</p> 		

DM Encl. 1	Type of risks	Assessment criteria and solutions to be adopted (Check the box corresponding to the solution adopted).
1.3.7 1.3.8 1.4	<p><i>Mechanical risks due to leaf movement</i></p> <p>[7] Crushing of hands on hinge side edge (figure 1, risk D).</p> <p>[8] Drawing-in of feet on lower edge (figure 1, risk E).</p> <p>[9] Drawing-in of hands on drive unit (figure 1, risk F).</p> <p>[10] Drawing-in, hooking and cutting due to design of mobile leaf (figure 1, risk G).</p>	<p><input type="checkbox"/> Ensure a clearance of ≥ 25 mm. or <input type="checkbox"/> apply protections that prevent insertion of fingers (such as a rubber profile).</p> <p><input type="checkbox"/> The clearance between the leaf and floor must avoid the risk of drawing-in of feet. <i>N.B. If the clearance is variable, due to reasons such as an inclined floor, suitable protections should be applied (e.g. rubber profiles).</i></p> <p><input type="checkbox"/> If the distances between the drive unit and leaf vary, ensure a clearance of ≥ 25 mm, or apply protections (such as covers or rubber profiles).</p> <p><input type="checkbox"/> Eliminate or protect any sharp edges, handles, protruding parts etc. (for example by covers, or rubber profiles)</p>
1.5.1 1.5.2 1.5.10 1.5.11	<p><i>Electrical and electromagnetic compatibility risks;</i></p> <p>[11] Direct and indirect contact. Dispersion of electricity</p> <p>[12] Electromagnetic compatibility risks;</p>	<p></p> <p><input type="checkbox"/> Use CE marked components and materials in accordance with the Low Voltage Directive (73/23/EEC).</p> <p><input type="checkbox"/> Make electrical connections, mains connections, earthing connections and relative inspections in observance of current standards and as specified in the drive unit installation manual.</p> <p><input type="checkbox"/> Use CE marked components in accordance with the EMC Directive (89/336/EEC). Perform installation as specified in the drive unit installation manual</p>
1.2 1.5.3 1.2.3 1.2.4	<p><i>Safety and reliability of drive unit and control and safety devices</i></p> <p>[13] Safety conditions in the event of faults or power failure.</p> <p>[14] Power sources other than electrical.</p> <p>[15] Drive unit activation/deactivation.</p> <p>[16] Power switch.</p>	<p><input type="checkbox"/> Use drive units compliant with the standard EN 12453 and safety devices compliant with standard EN 12978.</p> <p><input type="checkbox"/> If using hydraulic drive units, these must comply with standard EN 982; or</p> <p><input type="checkbox"/> If using pneumatic drive units, these must comply with standard EN 983.</p> <p><input type="checkbox"/> After a fault or power failure, check that the drive unit resumes safe operation without generating hazardous situations.</p> <p><input type="checkbox"/> Install a single pole switch for shutoff of the electrical power supply of the door/gate, in compliance with current standards. This switch should be positioned and protected against inadvertent or unauthorised activation.</p>

DM Encl. 1	Type of risks	Assessment criteria and solutions to be adopted <i>(Check the box corresponding to the solution adopted).</i>
1.2.5	[17] Consistency of controls.	<input type="checkbox"/> Install controls (such as the key-operated selector switch) so that the user is not located in a danger zone, and ensure full understanding of the controls by the user (e.g. function selector). <input type="checkbox"/> Use CE marked radio controls in accordance with the Directive R&TTE (1999/5/EC) and compliant with the frequencies admitted by legislation in the country of use.
1.5.14	[18] Risk of entrapment.	<input type="checkbox"/> Install a release device for the drive unit to enable manual opening and closing of the leaf with a maximum force of 225 N (for doors/gates in residential areas), or 390 N (for doors/gates in industrial or commercial areas). Provide the user with the means and instructions to perform the release operations, ensure that operation of the release device is simple and does not generate additional risks.
1.2.4	[19] Emergency stop.	<input type="checkbox"/> If deemed necessary, install an emergency stop command in compliance with standard EN 418. <i>N.B. Ensure that the emergency stop device does not generate additional risks, impairing functionality of the other safety devices present.</i>
	<i>Principles of safety integration and information</i>	
1.7.1	[20] Signalling means.	<input type="checkbox"/> Install a flashing light in a visible location to indicate leaf movement. <input type="checkbox"/> Traffic light systems may be installed to regulate vehicle transit. <input type="checkbox"/> Reflectors may also be fitted on the leaf.
1.7.2	[21] Signs.	<input type="checkbox"/> Apply all signs or warning notices deemed necessary to highlight possible residual risks not protected and to indicate any foreseeable improper use.
1.7.3	[22] Marking.	<input type="checkbox"/> Apply the label or dataplate with CE mark and specifying at least the information shown in the figure. <div data-bbox="651 1184 1353 1532" style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;">  </div>
1.7.4	[23] Operation instructions.	<input type="checkbox"/> Supply the user with the operation instructions, safety warnings and the EC declaration of conformity (see facsimile in enclosure G and E).
1.6.1	[24] Maintenance.	<input type="checkbox"/> A maintenance schedule must be drawn up and implemented. Ensure correct operation of safety devices at least every six months. <input type="checkbox"/> Register operations performed in the Maintenance Register in compliance with standard EN 12635 (see facsimile in enclosure F).
1.1.2	[25] Unprotected residual risks.	<input type="checkbox"/> Inform the user in writing (for example in the operation instructions) of the presence of any unprotected residual risks and foreseeable improper use.