

gcode2robot is a PHP script that converts generic gcode to specific robot language movement instructions. As of now, it converts specifically to ABB RAPID language. However, some work has been done to also support KUKA's KRL.

How to use the script

The script is available for use from a web browser at <https://giplt.nl/gcode2robot>. Alternatively you may download the source and run it on your own computer if you have Apache/PHP installed.

Source

The script is written and maintained by Harmen Zijp. The source code can be found at <http://github.com/giplt/gcode2robot>

[index.php](#)

```
<?
error_reporting(E_ALL);

$mass = isset($_POST['mass']) ? $_POST['mass'] : '2';
$offx = isset($_POST['offx']) ? $_POST['offx'] : '1959.0';
$offy = isset($_POST['offy']) ? $_POST['offy'] : '441.0';
$offz = isset($_POST['offz']) ? $_POST['offz'] : '170.0';
$scalex = isset($_POST['scalex']) ? $_POST['scalex'] : '1.0';
$scaley = isset($_POST['scaley']) ? $_POST['scaley'] : '1.0';
$scalez = isset($_POST['scalez']) ? $_POST['scalez'] : '1.0';
$transx = isset($_POST['transx']) ? $_POST['transx'] : '0';
$transy = isset($_POST['transy']) ? $_POST['transy'] : '0';
$transz = isset($_POST['transz']) ? $_POST['transz'] : '0';
$rotq1 = isset($_POST['rotq1']) ? $_POST['rotq1'] : '0';
$rotq2 = isset($_POST['rotq2']) ? $_POST['rotq2'] : '0';
$rotq3 = isset($_POST['rotq3']) ? $_POST['rotq3'] : '1';
$rotq4 = isset($_POST['rotq4']) ? $_POST['rotq4'] : '0';
$cogx = isset($_POST['cogx']) ? $_POST['cogx'] : '0';
$cogy = isset($_POST['cogy']) ? $_POST['cogy'] : '0';
$cogz = isset($_POST['cogz']) ? $_POST['cogz'] : '250';
$aomq1 = isset($_POST['aomq1']) ? $_POST['aomq1'] : '1';
$aomq2 = isset($_POST['aomq2']) ? $_POST['aomq2'] : '0';
$aomq3 = isset($_POST['aomq3']) ? $_POST['aomq3'] : '0';
$aomq4 = isset($_POST['aomq4']) ? $_POST['aomq4'] : '0';
$ix = isset($_POST['ix']) ? $_POST['ix'] : '2';
$iy = isset($_POST['iy']) ? $_POST['iy'] : '2';
$iz = isset($_POST['iz']) ? $_POST['iz'] : '2';
$uframex = isset($_POST['uframex']) ? $_POST['uframex'] : '1500';
$uframey = isset($_POST['uframey']) ? $_POST['uframey'] : '500';
$uframez = isset($_POST['uframez']) ? $_POST['uframez'] : '0';
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$uframeq1 = isset($_POST['uframeq1']) ? $_POST['uframeq1'] : '1';
$uframeq2 = isset($_POST['uframeq2']) ? $_POST['uframeq2'] : '0';
$uframeq3 = isset($_POST['uframeq3']) ? $_POST['uframeq3'] : '0';
$uframeq4 = isset($_POST['uframeq4']) ? $_POST['uframeq4'] : '0';
$oframex = isset($_POST['oframex']) ? $_POST['oframex'] : '0';
$oframey = isset($_POST['oframey']) ? $_POST['oframey'] : '0';
$oframez = isset($_POST['oframez']) ? $_POST['oframez'] : '0';
$oframeq1 = isset($_POST['oframeq1']) ? $_POST['oframeq1'] : '1';
$oframeq2 = isset($_POST['oframeq2']) ? $_POST['oframeq2'] : '0';
$oframeq3 = isset($_POST['oframeq3']) ? $_POST['oframeq3'] : '0';
$oframeq4 = isset($_POST['oframeq4']) ? $_POST['oframeq4'] : '0';
$speed = isset($_POST['speed']) ? $_POST['speed'] : 'v100';
$zone = isset($_POST['zone']) ? $_POST['zone'] : 'z5';
$moveorig = isset($_POST['submit']) ? (isset($_POST['moveorig']) &&
$_POST['moveorig']=='on') : true;
$params = isset($_POST['submit']) ? (isset($_POST['paramz']) &&
$_POST['paramz']=='on') : false;
$tool0 = isset($_POST['tool']) && $_POST['tool']=='tool0' ? true :
false;
$limit = isset($_POST['limit']) ? $_POST['limit'] : '100000';

$error = '';
if (isset($_POST['submit']) &&
isset($_FILES['gcodefile']['tmp_name']))
switch($_FILES["gcodefile"]["error"]) {
    case UPLOAD_ERR_INI_SIZE:
        $error = 'The uploaded file exceeds
'.ini_get('upload_max_filesize').'<br/>';
        break;
    case UPLOAD_ERR_PARTIAL:
        $error = 'The uploaded file was only partially
uploaded.<br/>';
        break;
    case UPLOAD_ERR_NO_FILE:
        $error = 'No file was uploaded.<br/>';
        break;
    case UPLOAD_ERR_OK:
        // protection against uploading of serverside scripts
        if
(preg_match('/\.(php|asp|pl|cgi|java|cfm)$/i',$_FILES['gcodefile']['tmp
_name'])) $error.= "Not allowed to upload serverside scripts!<br/>";
        else {
            $gcodefile = fopen($_FILES['gcodefile']['tmp_name'],
"r");
            if (!$gcodefile) $error.= 'Could not open the gcode
file (.'. $gcodefile .').<br/>';
            else {
                $filename = str_replace(' ', '_',
pathinfo($_FILES['gcodefile']['name'])['filename']);
                header('Content-Type: application/json;
charset=UTF-8');

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        header('Content-Disposition: attachment;
filename="'. $filename. '.mod.' ');
        echo "%%%\r\n";
        echo "  VERSION:1\r\n";
        echo "  LANGUAGE:ENGLISH\r\n";
        echo "%%%\r\n";
        echo "! gcode2rapid conversion tool by Harmen G.
Zijp\r\n";

        echo "! www.giplt.nl/cgcode2robot\r\n";
        echo "MODULE ". $filename. "\r\n";
        if (!$tool0) echo "  LOCAL PERS tooldata
gTool:=[TRUE,[[[". $transx.", ". $transy.", ". $transz."],[". $rotq1.", ". $rotq
2.", ". $rotq3.", ". $rotq4."]],[". $mass.",[". $cogx.", ". $cogy.", ". $cogz."],
[". $aomq1.", ". $aomq2.", ". $aomq3.", ". $aomq4."], ". $ix.", ". $iy.", ". $iz."]]
;\r\n";

        echo "  LOCAL PERS wobjdata
gWobj:=[FALSE,TRUE, "\",[[[". $uframex.", ". $uframey.", ". $uframez."],[". $u
frameq1.", ". $uframeq2.", ". $uframeq3.", ". $uframeq4."]],[[[". $oframex.", ".
$oframey.", ". $oframez."],[". $oframeq1.", ". $oframeq2.", ". $oframeq3.", ". $
oframeq4."]]];\r\n";

        echo "\r\n";
        echo "  LOCAL VAR orient gOrient:=[1,0,0,0];\r\n";
        echo "  LOCAL VAR confdata
gConfData:=[0,-1,0,0];\r\n";
        echo "  LOCAL VAR extjoint
gExtJoint:=[9E+09,9E+09,9E+09,9E+09,9E+09,9E+09];\r\n";
        echo "\r\n";
        echo "  PROC ". $filename. "_proc()\r\n";
        echo "    VAR iodev serial;";
        echo "    Open \"COM3:\", serial\\Write;";

        while (($line = fgets($gcodefile)) != false) {
            $words = explode(' ', $line);
            switch($words[0][0]) {
                case ';':
                    break;
                case 'G':
                    switch(substr($words[0], 1)) {
                        case '0':
                        case '1':
                            foreach($words as $word) if
($word) switch($word[0]) {
                                case 'X':
                                    $x = substr($word, 1);
                                    break;
                                case 'Y':
                                    $y = substr($word, 1);
                                    break;
                                case 'Z':
                                    $z = substr($word, 1);
                                    break;

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        case 'F':
            break;
        case 'E':
            $e = substr($word, 1);
            break;
        default:
            break;
    }
    if (isset($x) && isset($y) &&
isset($z)) $path[] = Array("x"=>$x, "y"=>$y, "z"=>$z, "e"=>$e);
        break;
        default:
            break;
    }
    break;
    case 'M':
        break;
    default:
        break;
}
}
$minx = $maxx = $path[0]['x'];
$miny = $maxy = $path[0]['y'];
$minz = $maxz = $path[0]['z'];
if ($paramz) {
    $zvals = array();
    $dzvals = array();
}
foreach($path as $position) {
    if ($paramz) {
        if (!isset($zvals[$position['z']]))
$zvals[$position['z']] = 1;
        else $zvals[$position['z']] ++;
    }
    $minx = min($minx, $position['x']);
    $maxx = max($maxx, $position['x']);
    $miny = min($miny, $position['y']);
    $maxy = max($maxy, $position['y']);
    $minz = min($minz, $position['z']);
    $maxz = max($maxz, $position['z']);
}
if ($paramz) {
    $zvals = array_keys($zvals);
    $j = 0;
    for($i=1; $i<count($zvals); $i++) {
        $dz = $zvals[$i] - $zvals[$i-1];
        if (!isset($dzvals[$dz])) {
            $dzvals[$dz] = 'dh' . $j;
            $j++;
        }
    }
}

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        foreach($dzvals as $dz => $varname) echo "
LOCAL VAR num ".$varname." := ".$dz.";\r\n";
    }
    $steps = 0;
    $lastz = 0;
    foreach($path as $position) {
        $x = $moveorig ? $position['x'] - $minx :
$position['x'];
        $y = $moveorig ? $position['y'] - $miny :
$position['y'];
        $z = $moveorig ? $position['z'] - $minz :
$position['z'];
        if ($paramz) {
            if($steps==0) echo "    LOCAL VAR num
h:=".$z.";\r\n";
            elseif($z!=$lastz) echo "
h:=h+ ".$dzvals[$z-$lastz].";\r\n";
        }
        echo "    Write serial,
NumToStr(".$position['e'].", 3);";
        if ($tool0) echo "    MoveL
[[".$x.", ".$y.", ".$($paramz?"h":$z)."],gOrient,gConfData,gExtJoint], ".$$
peed.", ".$zone.", tool0\\WObj:=gWobj;\r\n";
        else echo "    MoveL
[[".$x.", ".$y.", ".$($paramz?"h":$z)."],gOrient,gConfData,gExtJoint], ".$$
peed.", ".$zone.", gTool\\WObj:=gWobj;\r\n";

        $lastz = $z;
        $steps++;
        if ($steps==$limit) {
            $error = 'Rapid output limited to
'.$limit.' move instructions.<br/>';
            break;
        }
    }
    fclose($gcodefile);

    echo "    Close serial;";
    echo "    ENDPROC\r\n";
    echo "\r\n";
    echo "    PROC Main()\r\n";
    echo "    ENDPROC\r\n";
    echo "ENDMODULE\r\n";
    exit;
}
}
break;
default:
    $error = 'Unknown error with uploading file.<br/>';
    break;
}

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if (isset($rapidfile) && file_exists($filename.".mod")) {
    header('Content-Type: application/octet-stream');
    header("Content-Disposition: attachment;
filename=".$filename.".mod");
    readfile($filename.".mod");
    exit;
}
?>

<!DOCTYPE html>
<html lang="nl">
    <head>
        <meta charset="UTF-8" />
        <title>gcode2robot</title>
        <style>
            th td {vertical-align:top;}
            .l {text-align:left;}
            .r {text-align:right;}
            .number {width:70px; text-align:right;}
            .tool {display:none;}
        </style>
        <script>
            function setToolState(state) {
                var trs = document.getElementsByTagName("tr");
                for(var i=0; i<trs.length; i++)
if(trs[i].className=="tool") trs[i].style.display = (state=="show" ?
"table-row" : "none");
            }
        </script>
    </head>
    <body>
        <h1>gcode2robot conversion</h1>
        <?if ($error) echo '<span style="color:red;">Error:
' . $error . '</span>';?>
        <form method="post" action="" enctype="multipart/form-data">
            <table>
                <tr>
                    <td class="r">Source file</td>
                    <td class="l" colspan="7"><input type="file"
name="gcodefile"/></td>
                </tr>
                <tr>
                    <td class="r">Limit (steps)</td>
                    <td class="l"><input type="text" class="number"
name="limit" value="<?echo $limit;?>"/></td>
                    <td class="r">Speed</td>
                    <td class="l"><input type="text" class="number"
name="speed" value="<?echo $speed;?>"/></td>
                    <td class="r">Zone</td>
                    <td class="l"><input type="text" class="number"
name="zone" value="<?echo $zone;?>"/></td>
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        </tr>
        <tr>
            <td></td>
            <td class="l" colspan="5"><input type="checkbox"
name="moveorig" <?if ($moveorig) echo 'checked="checked"';?>/> Offset
gcode to origin of work object</td>
        </tr>
        <tr>
            <td></td>
            <td class="l" colspan="5"><input type="checkbox"
name="paramz" <?if ($paramz) echo 'checked="checked"';?>/> Parametrize
layer height</td>
            <td colspan="2"><input type="submit" name="submit"
value="Create ABB RAPID file"/></td>
        </tr>
        <tr>
            <td>&nbsp;</td>
        </tr>
        <tr>
            <th class="l">Tool data</th>
            <td colspan="7"><input type="radio" name="tool"
value="tool0" checked="checked" onclick="setToolState('hide');"/>tool0
<input type="radio" name="tool" value="gtool"
onclick="setToolState('show');"/>custom</td>
        </tr>
        <tr class="tool">
            <th></th>
            <th colspan="3" style="text-align:center;">coordinates (mm)</th>
            <th colspan="4" style="text-align:center;">orientation (quaternions)</th>
        </tr>
        <tr class="tool">
            <td></td>
            <th>x</th>
            <th>y</th>
            <th>z</th>
            <th>q1</th>
            <th>q2</th>
            <th>q3</th>
            <th>q4</th>
        </tr>
        <tr class="tool">
            <td class="r">Tool Center Point</td>
            <td><input type="text" class="number" name="transx"
value="<?echo $transx;?>"/></td>
            <td><input type="text" class="number" name="transy"
value="<?echo $transy;?>"/></td>
            <td><input type="text" class="number" name="transz"
value="<?echo $transz;?>"/></td>
            <td><input type="text" class="number" name="rotq1"

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value="<?echo $rotq1;?>" /></td>
      <td><input type="text" class="number" name="rotq2"
value="<?echo $rotq2;?>" /></td>
      <td><input type="text" class="number" name="rotq3"
value="<?echo $rotq3;?>" /></td>
      <td><input type="text" class="number" name="rotq4"
value="<?echo $rotq4;?>" /></td>
    </tr>
    <tr class="tool">
      <td class="r">Center Of Gravity</td>
      <td><input type="text" class="number" name="cogx"
value="<?echo $cogx;?>" /></td>
      <td><input type="text" class="number" name="cogy"
value="<?echo $cogy;?>" /></td>
      <td><input type="text" class="number" name="cogz"
value="<?echo $cogz;?>" /></td>
      <td><input type="text" class="number" name="aomq1"
value="<?echo $aomq1;?>" /></td>
      <td><input type="text" class="number" name="aomq2"
value="<?echo $aomq2;?>" /></td>
      <td><input type="text" class="number" name="aomq3"
value="<?echo $aomq3;?>" /></td>
      <td><input type="text" class="number" name="aomq4"
value="<?echo $aomq4;?>" /></td>
    </tr>
    <tr class="tool">
      <td class="r">Moment Of Inertia</td>
      <td><input type="text" class="number" name="ix"
value="<?echo $ix;?>" /></td>
      <td><input type="text" class="number" name="iy"
value="<?echo $iy;?>" /></td>
      <td><input type="text" class="number" name="iz"
value="<?echo $iz;?>" /></td>
    </tr>
    <tr class="tool">
      <td class="r">Mass (kg)</td>
      <td class="l"><input type="text" class="number"
name="mass" value="<?echo $mass;?>" /></td>
    </tr>
    <tr>
      <td>&nbsp;</td>
    </tr>
    <tr>
      <th class="l">Work object data</th>
      <th colspan="3" style="text-align:center;">coordinates (mm)</th>
      <th colspan="4" style="text-align:center;">orientation (quaternions)</th>
    </tr>
    <tr>
      <td></td>

```



```

        <th>x</th>
        <th>y</th>
        <th>z</th>
        <th>q1</th>
        <th>q2</th>
        <th>q3</th>
        <th>q4</th>
    </tr>
    <tr>
        <td class="r">User Frame</td>
        <td><input type="text" class="number"
name="uframex" value="<?echo $ufamex;?>" /></td>
        <td><input type="text" class="number"
name="uframey" value="<?echo $uframey;?>" /></td>
        <td><input type="text" class="number"
name="uframez" value="<?echo $uframez;?>" /></td>
        <td><input type="text" class="number"
name="uframeq1" value="<?echo $uframeq1;?>" /></td>
        <td><input type="text" class="number"
name="uframeq2" value="<?echo $uframeq2;?>" /></td>
        <td><input type="text" class="number"
name="uframeq3" value="<?echo $uframeq3;?>" /></td>
        <td><input type="text" class="number"
name="uframeq4" value="<?echo $uframeq4;?>" /></td>
    </tr>
    <tr>
        <td class="r">Object Frame</td>
        <td><input type="text" class="number"
name="oframex" value="<?echo $oframex;?>" /></td>
        <td><input type="text" class="number"
name="oframey" value="<?echo $oframey;?>" /></td>
        <td><input type="text" class="number"
name="oframez" value="<?echo $oframez;?>" /></td>
        <td><input type="text" class="number"
name="oframeq1" value="<?echo $oframeq1;?>" /></td>
        <td><input type="text" class="number"
name="oframeq2" value="<?echo $oframeq2;?>" /></td>
        <td><input type="text" class="number"
name="oframeq3" value="<?echo $oframeq3;?>" /></td>
        <td><input type="text" class="number"
name="oframeq4" value="<?echo $oframeq4;?>" /></td>
    </tr>
    <tr>
        <td></td>
        <td colspan="7" rowspan="4"></td>
    </tr>
</table>
</form>
<?if (isset($rapidfile) && file_exists($filename.".mod")) echo

```

```
'<p/>download <a  
href="'. $filename. '.mod">' . $filename. '.mod</a></br/>' ;?>  
  </body>  
</html>
```

From:

<http://wiki.bouwkoppel.nl/> -

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