> ø 16 … 80 mm
> New lightweight design extrusion with universal mounting grooves
> Proved and patented sealing system

> Dust protection as standard (ø 25 … 63 mm)
> Interchangeability with series M/46000

Technical features
Medium: Compressed air, filtered, lubricated or non-lubricated
Operation: Double acting, with adjustable cushioning
M/146000/M, M/146100/M, M/146200/M
Double acting with adjustable cushioning and magnetic piston
Models:
M/146000 with internal guide
M/146100 with external adjustable guide
M/146200 with precision roller guide

Operating pressure:
1 … 8 bar (14 … 116 psi)
Cylinder diameters:
16, 20, 25, 32, 40, 50, 63, 80 mm
Max strokes:
ø 16 … 40 mm 8500 mm
ø 50 and 63 mm 8000 mm
ø 80 mm 5500 mm

Operating temperature:
-30 … +80°C max.
(-22 … +176°F)
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (+35°F).

Materials:
End covers: aluminium diecast, moulded plastic (ø 16) and anodised aluminium (ø 20 & 80)
Yoke: anodised aluminium, moulded plastic (ø 16 & 20)
Carriage, closer & cover: aluminium diecast
Guiding bridge and profile barrel: anodised aluminium
Seal strip, wiper and piston seal: PUR
Cover strip: PA
Other seals: NBR
Mounting screws: A2E
Shim ring: stainless steel (A2)

Technical data
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<th>Cylinder Ø (mm)</th>
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<th>20</th>
<th>25</th>
<th>32</th>
<th>40</th>
<th>50</th>
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<td>Port size</td>
<td>M5</td>
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<td>G1/8</td>
<td>G1/4</td>
<td>G1/4</td>
<td>G3/8</td>
<td>G1/2</td>
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<td>Cushion length (mm)</td>
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<td>35</td>
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<td>Theoretical thrusts at 6 bar outstroke (N)</td>
<td>120</td>
<td>188</td>
<td>294</td>
<td>482</td>
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<td>0.035</td>
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<td>500</td>
<td>900</td>
<td>1500</td>
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<tr>
<td>Activ (L1 + L3) at 6 bar</td>
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<td>375</td>
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<td>Passive (L2 + L4)</td>
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Alternative variants

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<tr>
<th>Symbol</th>
<th>Model (non-magnetic piston)</th>
<th>Symbol</th>
<th>Model (magnetic piston)</th>
<th>Description</th>
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Corrosion resistant cylinders see page N/en 1.6.011

Options selector

Guiding system Substitute
Internal 0
External 1
Precision roller guide 2

Cylinder Ø (mm) Substitute
16 16
20 20
25 25
32 32
40 40
50 50
63 63
80 80

Note:
Disregard option positions not used.
For combinations of cylinder variants consult our Technical Service.
This options selector explains only the cylinder variants. Additional variants/options are not possible.

Strokes (mm)
On request

Variants (non-magnetic piston) Substitute
Alternative ports IC
Active brake L1
Passive brake L2
With added caged ball linear motion guide P
Double carriages *1) ID

Distance between carriage centres (mm)

Variants (magnetic piston) Substitute
Alternative ports MC
Active brake L3
Passive brake L4
With added caged ball linear motion guide PM
With linear position sensor F1
Double carriages *1) MD

Distance between carriage centres (mm)

*1) For M/146100 & M/146200 only
Mountings and Accessories

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<th>C</th>
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<th>UW *2)</th>
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*1) Suitable for internally guided models only (M/146000), *2) Suitable for external guided models only (M/146100)

Assembly kit for caged ball linear motion guide
Adjustable stop
Assembly kit for shock absorbers
Groove key for profile barrel
Groove key for guiding bridge
Magnetically operated switches

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### Service kit

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</table>

* Insert stroke length in mm
** Insert cylinder diameters for the service kit.
Cushioning performance

The dynamic energy of a LINTRA® cylinder is caused by direct or partial external loads which must be absorbed by pneumatic cushioning. The cushioning ability depends to a large extent on the pneumatic circuit (e.g. counter pressure, pre-exhaust). The values given in the diagram were tested with an operation pressure of 6 bar using a 5/2 control valve. When installed horizontally, depending upon the speed, dynamic energy can be absorbed by the cylinder. Whenever the values given in the diagram are exceeded, the transported mass must be cushioned by additional shock absorbers. These have to be located at the center of gravity of the mass.

Cylinder deflection

Deflection due to external forces

Deflection due to cylinder weight

Example:
Cylinder ø 32 mm, stroke length 3500 mm, external load 200 N and a deflection about 1 mm

Maximum distance between supports = 1830 mm (see diagrams).
Therefore an additional support is required.

Example:
Cylinder ø 40 mm, external force 180 N, distance between supports 3000 mm

Required: total deflection
1. Deflection due to external force (f1)
see Diagram 1 (1 mm/100 N) · 180 N
1.8 mm
2. Deflection due to cylinder weight diagram 2
+ 0.9 mm
Total deflection: 2.7 mm

Max. permitted deflection (f1 + f2) <1 mm
1000 mm Hub

A deflection of more than 3 mm is not permitted.
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**Loading values for LINTRA® cylinders**

The values given in the table below show the single forces in the directions Fy and Fz and the maximum moments Mx, My and Mz. All values are applicable only for speeds of max. 0.2 m/s. A requirement for using these values is a constant movement (no jerking) of the mass over the whole stroke length of the cylinder. The reference point from which the moments for all cylinders should be calculated is the centre line of the pistons.

For speeds up to 2 m/s please use our calculation programme LINTRA® PNEUCALC. It is available upon request.

When a LINTRA® cylinder has to take several loads and moments, an additional calculation is necessary using this formula:

\[
\frac{M_x}{M_{x\text{ max}}} + \frac{M_y}{M_{y\text{ max}}} + \frac{M_z}{M_{z\text{ max}}} + \frac{F_y}{F_{y\text{ max}}} + \frac{F_z}{F_{z\text{ max}}} \leq 1
\]

---

### Table: Loading values for LINTRA® cylinders

<table>
<thead>
<tr>
<th>Ø mm</th>
<th>Fy (N)</th>
<th>Fz (N)</th>
<th>Mx (Nm)</th>
<th>My (Nm)</th>
<th>Mz (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
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<td>0,3</td>
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<td>25</td>
<td>125</td>
<td>385</td>
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<td>5,6</td>
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<td>165</td>
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<td>3</td>
<td>33</td>
<td>10</td>
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<tr>
<td>40</td>
<td>330</td>
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<td>24</td>
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<tr>
<td>50</td>
<td>440</td>
<td>1320</td>
<td>11</td>
<td>120</td>
<td>35</td>
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<tr>
<td>63</td>
<td>690</td>
<td>2000</td>
<td>20</td>
<td>240</td>
<td>70</td>
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<tr>
<td>80</td>
<td>760</td>
<td>2300</td>
<td>27</td>
<td>360</td>
<td>100</td>
</tr>
</tbody>
</table>

---

M/146000, M/146100, M/146200, LINTRA®PLUS rodless cylinder
Magnetic & Non-magnetic piston, double acting

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en 1.6.009.06
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M/146000 – cylinder with internal guide (ø 25 ... 63 mm)

<table>
<thead>
<tr>
<th>Ø</th>
<th>A</th>
<th>AC</th>
<th>AE</th>
<th>AG</th>
<th>B</th>
<th>C</th>
<th>CA</th>
<th>D</th>
<th>E</th>
<th>E1</th>
<th>F</th>
<th>G</th>
<th>J</th>
<th>Ø</th>
<th>K</th>
<th>D7</th>
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<tr>
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<td>100</td>
<td>36</td>
<td>60</td>
<td>20</td>
<td>23</td>
<td>8,5</td>
<td>–</td>
<td>G1/8</td>
<td>130</td>
<td>–</td>
<td>90</td>
<td>45</td>
<td>4,7</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>120</td>
<td>46</td>
<td>76</td>
<td>25</td>
<td>28,5</td>
<td>10,5</td>
<td>18</td>
<td>G1/4</td>
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<td>120</td>
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<td>7</td>
<td>7</td>
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<tr>
<td>40</td>
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<td>52,5</td>
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<td>25</td>
<td>28,5</td>
<td>11,5</td>
<td>18</td>
<td>G1/4</td>
<td>215</td>
<td>–</td>
<td>160</td>
<td>80</td>
<td>7</td>
<td>7</td>
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<tr>
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<td>G3/8</td>
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<td>9</td>
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<tr>
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<td>215</td>
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<td>125</td>
<td>25</td>
<td>38</td>
<td>17</td>
<td>24</td>
<td>G1/2</td>
<td>320</td>
<td>–</td>
<td>240</td>
<td>120</td>
<td>9,5</td>
<td>9</td>
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<td></td>
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M/146000 – cylinder with internal guide (ø 25 ... 63 mm)

<table>
<thead>
<tr>
<th>Ø</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>O1</th>
<th>P</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>W</th>
<th>Y</th>
<th>Z</th>
<th>Weight at 0 mm</th>
<th>Weight per 100 mm</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>32</td>
<td>M5</td>
<td>40</td>
<td>46</td>
<td>16</td>
<td>48</td>
<td>37</td>
<td>M5 - 13(^*1)</td>
<td>16</td>
<td>7</td>
<td>16</td>
<td>0,7 kg</td>
<td>0,25 kg</td>
<td>M/146025/...</td>
</tr>
<tr>
<td>32</td>
<td>45</td>
<td>M5</td>
<td>52</td>
<td>56</td>
<td>20</td>
<td>60</td>
<td>47</td>
<td>M6 - 17(^*1)</td>
<td>20</td>
<td>8</td>
<td>20</td>
<td>1,40 kg</td>
<td>0,30 kg</td>
<td>M/146032/...</td>
</tr>
<tr>
<td>40</td>
<td>45</td>
<td>M6</td>
<td>65</td>
<td>68</td>
<td>20</td>
<td>74,5</td>
<td>58</td>
<td>M8 - 20(^*1)</td>
<td>25</td>
<td>8</td>
<td>25</td>
<td>2,50 kg</td>
<td>0,42 kg</td>
<td>M/146040/...</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>M8</td>
<td>80</td>
<td>84</td>
<td>25,5</td>
<td>89</td>
<td>70</td>
<td>M8 - 20(^*1)</td>
<td>30</td>
<td>11</td>
<td>29,5</td>
<td>4,40 kg</td>
<td>0,82 kg</td>
<td>M/146050/...</td>
</tr>
<tr>
<td>63</td>
<td>50</td>
<td>M8</td>
<td>95</td>
<td>97</td>
<td>25</td>
<td>105</td>
<td>84</td>
<td>M10 - 24(^*1)</td>
<td>35</td>
<td>11</td>
<td>35</td>
<td>6,86 kg</td>
<td>0,9 kg</td>
<td>M/146063/...</td>
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</table>

\(^*1\) deep
M/146100 – cylinder with external adjustable guide (Ø 25 ... 63 mm)

<table>
<thead>
<tr>
<th>Ø</th>
<th>A</th>
<th>AB</th>
<th>AE</th>
<th>E</th>
<th>E1</th>
<th>EB</th>
<th>ED</th>
<th>EC</th>
<th>EF</th>
<th>J</th>
<th>ØK</th>
<th>L</th>
<th>R 2</th>
<th>Y</th>
<th>Weight at 0 mm</th>
<th>Weight per 100 mm</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>100</td>
<td>70</td>
<td>67,5</td>
<td>130</td>
<td>-</td>
<td>50</td>
<td>102</td>
<td>32</td>
<td>20</td>
<td>34</td>
<td>5</td>
<td>5,5</td>
<td>52</td>
<td>-</td>
<td>9,5</td>
<td>0,75kg</td>
<td>0,20 kg</td>
</tr>
<tr>
<td>32</td>
<td>120</td>
<td>90</td>
<td>82</td>
<td>160</td>
<td>4</td>
<td>70</td>
<td>138</td>
<td>45</td>
<td>25</td>
<td>36,5</td>
<td>5</td>
<td>5,5</td>
<td>64</td>
<td>52</td>
<td>6,5</td>
<td>1,50 kg</td>
<td>0,38 kg</td>
</tr>
<tr>
<td>40</td>
<td>150</td>
<td>120</td>
<td>97,5</td>
<td>215</td>
<td>-</td>
<td>105</td>
<td>193</td>
<td>45</td>
<td>25</td>
<td>43</td>
<td>5</td>
<td>6,8</td>
<td>79</td>
<td>60</td>
<td>9,5</td>
<td>2,60 kg</td>
<td>0,42 kg</td>
</tr>
<tr>
<td>50</td>
<td>180</td>
<td>160</td>
<td>116,5</td>
<td>250</td>
<td>-</td>
<td>135</td>
<td>228</td>
<td>50</td>
<td>25</td>
<td>47,5</td>
<td>6,5</td>
<td>9</td>
<td>92</td>
<td>72</td>
<td>11,5</td>
<td>4,50 kg</td>
<td>0,82 kg</td>
</tr>
<tr>
<td>63</td>
<td>215</td>
<td>190</td>
<td>137</td>
<td>320</td>
<td>-</td>
<td>150</td>
<td>292</td>
<td>50</td>
<td>25</td>
<td>59</td>
<td>7,5</td>
<td>9</td>
<td>110</td>
<td>84,5</td>
<td>11,5</td>
<td>7,20kg</td>
<td>0,90 kg</td>
</tr>
</tbody>
</table>

*1) deep

M/146100/ID, .../MD – cylinder with external adjustable guide and double carriages (Ø 25 ... 63 mm)

<table>
<thead>
<tr>
<th>Ø</th>
<th>A</th>
<th>E</th>
<th>E1</th>
<th>X min.</th>
<th>X max.</th>
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<th>Weight per 100 mm</th>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>25</td>
<td>100</td>
<td>130</td>
<td>-</td>
<td>130</td>
<td>500</td>
<td>1,50 kg</td>
<td>0,20 kg</td>
<td>M/146125/D/...</td>
</tr>
<tr>
<td>32</td>
<td>120</td>
<td>160</td>
<td>4</td>
<td>168</td>
<td>500</td>
<td>2,00 kg</td>
<td>0,38 kg</td>
<td>M/146132/D/...</td>
</tr>
<tr>
<td>40</td>
<td>150</td>
<td>115</td>
<td>-</td>
<td>215</td>
<td>500</td>
<td>3,20 kg</td>
<td>0,42 kg</td>
<td>M/146140/D/...</td>
</tr>
<tr>
<td>50</td>
<td>180</td>
<td>250</td>
<td>-</td>
<td>250</td>
<td>500</td>
<td>5,40 kg</td>
<td>0,62 kg</td>
<td>M/146150/D/...</td>
</tr>
<tr>
<td>63</td>
<td>215</td>
<td>320</td>
<td>-</td>
<td>320</td>
<td>500</td>
<td>8,40 kg</td>
<td>1,00 kg</td>
<td>M/146163/D/...</td>
</tr>
</tbody>
</table>

Missing cylinder dimensions, see previous page 8
M/146200, .../M – cylinder with precision roller guide (Ø 25 ... 63 mm)

Missing cylinder dimensions, see previous page 8

<table>
<thead>
<tr>
<th>Ø</th>
<th>A</th>
<th>CA</th>
<th>CB</th>
<th>CC</th>
<th>CD</th>
<th>CE</th>
<th>CF</th>
<th>CG</th>
<th>CH</th>
<th>E</th>
<th>EA ±0.05</th>
<th>Weight at 0 mm</th>
<th>Weight per 100 mm</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>100</td>
<td>45</td>
<td>90</td>
<td>M6-14*1)</td>
<td>36</td>
<td>42</td>
<td>66</td>
<td>60</td>
<td>85</td>
<td>150</td>
<td>70</td>
<td>1,50 kg</td>
<td>0,20 kg</td>
<td>M/146225/...</td>
</tr>
<tr>
<td>32</td>
<td>120</td>
<td>60</td>
<td>120</td>
<td>M8-16*1)</td>
<td>38</td>
<td>50</td>
<td>80</td>
<td>75</td>
<td>98</td>
<td>180</td>
<td>90</td>
<td>2,80 kg</td>
<td>0,40 kg</td>
<td>M/146232/...</td>
</tr>
<tr>
<td>40</td>
<td>150</td>
<td>80</td>
<td>150</td>
<td>M8-16*1)</td>
<td>42</td>
<td>57.5</td>
<td>95</td>
<td>92</td>
<td>118</td>
<td>215</td>
<td>115</td>
<td>4,50 kg</td>
<td>0,45 kg</td>
<td>M/146240/...</td>
</tr>
<tr>
<td>50</td>
<td>180</td>
<td>90</td>
<td>180</td>
<td>M10-20*1)</td>
<td>44</td>
<td>67</td>
<td>111.5</td>
<td>100</td>
<td>132</td>
<td>250</td>
<td>135</td>
<td>8,20 kg</td>
<td>0,90 kg</td>
<td>M/146250/...</td>
</tr>
<tr>
<td>63</td>
<td>215</td>
<td>120</td>
<td>240</td>
<td>M10-20*1)</td>
<td>47</td>
<td>74.5</td>
<td>127</td>
<td>110</td>
<td>140</td>
<td>320</td>
<td>200</td>
<td>12,50 kg</td>
<td>1,00 kg</td>
<td>M/146263/...</td>
</tr>
</tbody>
</table>

*1) deep

M/146200/ID and .../MD – cylinder with precision roller guide and double carriages (Ø 25 ... 63 mm)

Missing cylinder dimensions, see previous page 8

<table>
<thead>
<tr>
<th>Ø</th>
<th>A</th>
<th>E</th>
<th>X min.</th>
<th>X max.</th>
<th>Weight at 0 mm</th>
<th>Weight per 100 mm</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>100</td>
<td>150</td>
<td>150</td>
<td>500</td>
<td>2,60 kg</td>
<td>0,20 kg</td>
<td>M/146225/...</td>
</tr>
<tr>
<td>32</td>
<td>120</td>
<td>180</td>
<td>180</td>
<td>500</td>
<td>4,20 kg</td>
<td>0,40 kg</td>
<td>M/146232/...</td>
</tr>
<tr>
<td>40</td>
<td>150</td>
<td>215</td>
<td>215</td>
<td>500</td>
<td>7,00 kg</td>
<td>0,45 kg</td>
<td>M/146240/...</td>
</tr>
<tr>
<td>50</td>
<td>180</td>
<td>250</td>
<td>250</td>
<td>500</td>
<td>11,1 kg</td>
<td>0,90 kg</td>
<td>M/146250/...</td>
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<td>63</td>
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<td>320</td>
<td>500</td>
<td>20,6 kg</td>
<td>1,00 kg</td>
<td>M/146263/...</td>
</tr>
</tbody>
</table>
M/146200/P and M/146200/PM

cylinder with added caged ball linear motion guide (ø 25 ... 63 mm)

QM/146200/P/70 – assembly kit for caged ball linear motion guide (Ø 25 ... 63 mm)

Recommended supplier/series for caged ball linear motion guide

<table>
<thead>
<tr>
<th>Cylinder Ø 25</th>
<th>Cylinder Ø 32 &amp; 40</th>
<th>Cylinder Ø 50 &amp; 63</th>
</tr>
</thead>
<tbody>
<tr>
<td>THK/SHW12CAM</td>
<td>IKO/LWF33</td>
<td>IKO/LWF42</td>
</tr>
<tr>
<td>NK/LW17ELZ</td>
<td>NK/LW27ELZ</td>
<td>THK/SHW17CAM</td>
</tr>
</tbody>
</table>

Dimensions in mm

Projection/First angle
M/146000/IC, .../MC; M/146100/IC, .../MC; M/146200/IC, .../MC

cylinder with alternative ports (Ø 25 ... 63 mm)

<table>
<thead>
<tr>
<th>Ø</th>
<th>W</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>28</td>
<td>M/146.25/..</td>
</tr>
<tr>
<td>32</td>
<td>34.5</td>
<td>M/146.32/..</td>
</tr>
<tr>
<td>40</td>
<td>43.5</td>
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<td>50</td>
<td>53</td>
<td>M/146.50/..</td>
</tr>
<tr>
<td>63</td>
<td>59.5</td>
<td>M/146.63/..</td>
</tr>
</tbody>
</table>

Missing cylinder dimensions and weights, see previous page 8 & 9
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M/146000/L1, M/146000/L3 – cylinder with active brake (ø 25 ... 63 mm)

<table>
<thead>
<tr>
<th>Ø</th>
<th>AF</th>
<th>AG</th>
<th>AK</th>
<th>AL</th>
<th>AM</th>
<th>AN</th>
<th>AO</th>
<th>AP</th>
<th>AR</th>
<th>AU</th>
<th>AY</th>
<th>AZ</th>
<th>CO</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>Ø U</th>
<th>Weight at 0 mm</th>
<th>Weight per 100 mm</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>62</td>
<td>75</td>
<td>12</td>
<td>52</td>
<td>28,5</td>
<td>73,5</td>
<td>13,5</td>
<td>45</td>
<td>37,5</td>
<td>73</td>
<td>16,5</td>
<td>30</td>
<td>6</td>
<td>130</td>
<td>90</td>
<td>45</td>
<td>6,6</td>
<td>1,60 kg</td>
<td>0,2 kg</td>
<td>M/146025/L/...</td>
</tr>
<tr>
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<td>78</td>
<td>92</td>
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<td>0,35 kg</td>
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<td>0,75 kg</td>
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<td>115</td>
<td>6</td>
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<td>240</td>
<td>120</td>
<td>13</td>
<td>11,5 kg</td>
<td>1,0 kg</td>
<td>M/146063/L/...</td>
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Missing cylinder dimensions, see previous page 8

M/146000/L2, M/146000/L4 – cylinder with passive brake (ø 25 ... 63 mm)

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<th>AZ</th>
<th>CO</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>Ø U</th>
<th>Weight at 0 mm</th>
<th>Weight per 100 mm</th>
<th>Model</th>
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<td>45</td>
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<td>0,2 kg</td>
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<td>2,60 kg</td>
<td>0,35 kg</td>
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<td>7,20 kg</td>
<td>0,75 kg</td>
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<td>115</td>
<td>42</td>
<td>320</td>
<td>240</td>
<td>120</td>
<td>13</td>
<td>12,40 kg</td>
<td>1,0 kg</td>
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</table>
M/146000, M/146100, M/146200, LINTRA®PLUS rodless cylinder
Magnetic & Non-magnetic piston, double acting

M/146200/L1, M/146200/L3 – cylinder with precision roller guide and active brake
(Ø 25 ... 63 mm)

Missing cylinder dimensions, see previous page 8 & 10

| Ø | AF | AG | AK | AL | AM | AN | AO | AP | AR | AU | AY | AZ | CO | E | F | G | Ø U | Weight at 0 mm | Weight per 100 mm | Model |
| 25 | 62 | 75 | 12 | 52 | 28,5 | 79,5 | 13,5 | 40 | 37,5 | 73 | 16,5 | 30 | 6 | 130 | 90 | 45 | 6,6 | 1,55 kg | 0,2 kg | M/146225/L/... |
| 32 | 78 | 92 | 12 | 64 | 29 | 94 | 14 | 55 | 44 | 89,5 | 17,5 | 32,5 | 6 | 160 | 120 | 60 | 9 | 3,90 kg | 0,35 kg | M/146232/L/... |
| 40 | 94 | 112 | 12 | 81 | 34,5 | 108,5 | 13,5 | 65 | 51 | 103 | 18 | 52,5 | 6 | 215 | 160 | 80 | 9 | 6,20 kg | 0,50 kg | M/146240/L/... |
| 50 | 112 | 132 | 12 | 94 | 35,5 | 126,5 | 14,5 | 75 | 59,5 | 124 | 18,5 | 65 | 6 | 250 | 190 | 95 | 11 | 10,70 kg | 0,75 kg | M/146250/L/... |
| 63 | 132 | 150 | 12 | 112 | 42,5 | 142,5 | 15,5 | 80 | 68 | 140 | 20,5 | 115 | 6 | 320 | 240 | 120 | 13 | 11,50 kg | 1,00 kg | M/146263/L/... |

M/146200/L2, M/146200/L4 – cylinder with precision roller guide and passive brake (Ø 25 ... 63 mm)

Missing cylinder dimensions, see previous page 8 & 10

| Ø | AF | AG | AK | AL | AM | AN | AO | AP | AR | AU | AY | AZ | CO | E | F | G | Ø U | Weight at 0 mm | Weight per 100 mm | Model |
| 25 | 62 | 75 | 22 | 52 | 38,5 | 89,5 | 23,5 | 40 | 47,5 | 83 | 26,5 | 30 | 16 | 130 | 90 | 45 | 6,6 | 1,29 kg | 0,20 kg | M/146225/L/... |
| 32 | 78 | 92 | 24 | 64 | 41 | 106 | 26 | 55 | 56 | 101,5 | 28,5 | 32,5 | 18 | 160 | 120 | 60 | 9 | 4,00 kg | 0,35 kg | M/146232/L/... |
| 40 | 94 | 112 | 24 | 81 | 46,5 | 120,5 | 25,5 | 65 | 63 | 115 | 30 | 52,5 | 18 | 215 | 160 | 80 | 9 | 6,70 kg | 0,50 kg | M/146240/L/... |
| 50 | 112 | 132 | 30 | 94 | 53,5 | 144,5 | 32,5 | 75 | 77,5 | 142 | 36,5 | 65 | 24 | 250 | 190 | 95 | 11 | 11,00 kg | 0,75 kg | M/146250/L/... |
| 63 | 132 | 150 | 30 | 112 | 60,5 | 160,5 | 33,5 | 80 | 86 | 158 | 36,5 | 115 | 24 | 320 | 240 | 120 | 13 | 12,40 kg | 1,00 kg | M/146263/L/... |
M/146000, M/146100, M/146200, LINTRA® PLUS rodless cylinder
Magnetic & Non-magnetic piston, double acting

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M/146000/F1 – cylinder with linear sensor and internal guide

Dimensions in mm
Projection/First angle

M/146100/F1 – cylinder with linear sensor and external adjustable guide

M/146200/F1 – cylinder with linear sensor and precision roller guide

Missing cylinder dimensions and weights, see previous page 10 & 11
Electrical features see option selector on page 2

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<th>Ø</th>
<th>KA</th>
<th>KB</th>
<th>KC</th>
<th>KD</th>
<th>KE</th>
<th>KF</th>
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<td>50,5</td>
<td>56</td>
<td>56,5</td>
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<td>74</td>
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<td>64</td>
<td>62,5</td>
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<td>50</td>
<td>104</td>
<td>54</td>
<td>65,5</td>
<td>68,5</td>
<td>75</td>
<td>70</td>
<td>M/146.50/F1/...</td>
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<td>139</td>
<td>61</td>
<td>72</td>
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<td>69,5</td>
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Connector details

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<td>Brown (BN)</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>White (WH)</td>
<td>Program input</td>
</tr>
<tr>
<td>3</td>
<td>Blue (BU)</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Black (BK)</td>
<td>Output +</td>
</tr>
<tr>
<td>5</td>
<td>Grey (GY)</td>
<td>Output -</td>
</tr>
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</table>
M/146080 – cylinder with internal guide (ø 80 mm)

![Diagram of M/146080](image1)

<table>
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<th>Weight at 0 mm</th>
<th>Weight per 100 mm</th>
<th>Model</th>
</tr>
</thead>
<tbody>
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<td>80</td>
<td>13.20 kg</td>
<td>1.50 kg</td>
<td>M/146090/...</td>
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M/146180 – cylinder with external adjustable guide (ø 80 mm)

![Diagram of M/146180](image2)

<table>
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<th>Weight at 0 mm</th>
<th>Weight per 100 mm</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>13.40 kg</td>
<td>1.50 kg</td>
<td>M/146190/...</td>
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</tbody>
</table>

M/146180/ID, .../MD – cylinder with external adjustable guide and double carriages (ø 80 mm)

![Diagram of M/146180/ID](image3)

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<th>X max.</th>
<th>Weight at 0 mm</th>
<th>Weight per 100 mm</th>
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<tr>
<td>80</td>
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<td>390</td>
<td>500</td>
<td>15.90 kg</td>
<td>1.50 kg</td>
<td>M/146180/2/...</td>
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</table>
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**Foot mounting C**

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<th>AA</th>
<th>AB</th>
<th>AC</th>
<th>AD</th>
<th>AE</th>
<th>R</th>
<th>Ø U (kg)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
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<td>16</td>
<td>10</td>
<td>15</td>
<td>3</td>
<td>16</td>
<td>27</td>
<td>5,5</td>
<td>GM146016/21</td>
</tr>
<tr>
<td>20</td>
<td>17</td>
<td>5</td>
<td>10</td>
<td>10</td>
<td>21,5</td>
<td>40</td>
<td>5,5</td>
<td>GM146020/21</td>
</tr>
<tr>
<td>25</td>
<td>18</td>
<td>7</td>
<td>15</td>
<td>13,5</td>
<td>24 (26,5)</td>
<td>48</td>
<td>7</td>
<td>GM146025/21</td>
</tr>
<tr>
<td>32</td>
<td>26</td>
<td>11</td>
<td>22</td>
<td>16,5</td>
<td>30,5(33)</td>
<td>60</td>
<td>9</td>
<td>GM146032/21</td>
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<tr>
<td>40</td>
<td>30</td>
<td>11</td>
<td>22</td>
<td>19,5</td>
<td>37,5(40,5)</td>
<td>75</td>
<td>9</td>
<td>GM146040/21</td>
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<tr>
<td>50</td>
<td>42</td>
<td>12</td>
<td>25</td>
<td>24</td>
<td>45 (49)</td>
<td>90</td>
<td>11</td>
<td>GM146050/21</td>
</tr>
<tr>
<td>63</td>
<td>48</td>
<td>13</td>
<td>25</td>
<td>27,5</td>
<td>54 (57,5)</td>
<td>105</td>
<td>13</td>
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<tr>
<td>80</td>
<td>64</td>
<td>12,5</td>
<td>25</td>
<td>35</td>
<td>70</td>
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**Centre support V**

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<th>AG</th>
<th>AH</th>
<th>AJ</th>
<th>AK</th>
<th>AM</th>
<th>Ø U1 (kg)</th>
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<td>28,3</td>
<td>14</td>
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Attention: Foot mounts can be attached to give different distances AE. When used together with a centre support mounting the word TOP should be visible on the top face of the mount.

**Carriage plate mounting UV**

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**Groove key for carriage**

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<td>63</td>
<td>7,5</td>
<td>M8</td>
<td>23</td>
<td>7,5</td>
<td>13,5</td>
<td>M/P41858</td>
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</table>

**Groove key for profile barrel**

<table>
<thead>
<tr>
<th>Ø</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E (kg)</th>
<th>Model</th>
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<tbody>
<tr>
<td>16</td>
<td>80</td>
<td>4</td>
<td>M5</td>
<td>12</td>
<td>4,25</td>
<td>8,01</td>
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</table>
Swinging bridge S
For cylinders with internal guiding only

<table>
<thead>
<tr>
<th>Ø</th>
<th>AQ</th>
<th>AR</th>
<th>AS</th>
<th>AT</th>
<th>AU</th>
<th>AV</th>
<th>AW</th>
<th>AX</th>
<th>IE</th>
<th>Fx (N)</th>
<th>(kg)</th>
<th>Model</th>
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<tbody>
<tr>
<td>16</td>
<td>40</td>
<td>–</td>
<td>26</td>
<td>–</td>
<td>12</td>
<td>30</td>
<td>M 4</td>
<td>48 +4</td>
<td>100</td>
<td>0,02</td>
<td></td>
<td>QM/146016/37</td>
</tr>
<tr>
<td>20</td>
<td>50</td>
<td>35</td>
<td>–</td>
<td>38</td>
<td>DN74-Bm5</td>
<td>20</td>
<td>40</td>
<td>M 5</td>
<td>55,5+5</td>
<td>150</td>
<td>0,10</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>60</td>
<td>40</td>
<td>44</td>
<td>20</td>
<td>45</td>
<td>M 5</td>
<td>70 +5</td>
<td>250</td>
<td>0,20</td>
<td></td>
<td>QM/146025/37</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>80</td>
<td>50</td>
<td>59</td>
<td>30</td>
<td>60</td>
<td>M 6</td>
<td>5,5</td>
<td>88,5+5</td>
<td>410</td>
<td>0,30</td>
<td></td>
<td>QM/146032/37</td>
</tr>
<tr>
<td>40</td>
<td>80</td>
<td>50</td>
<td>59</td>
<td>30</td>
<td>60</td>
<td>M 6</td>
<td>5,5</td>
<td>102,5+5</td>
<td>640</td>
<td>0,30</td>
<td></td>
<td>QM/146032/37</td>
</tr>
<tr>
<td>50</td>
<td>100</td>
<td>60</td>
<td>65</td>
<td>40</td>
<td>80</td>
<td>M 6</td>
<td>6,5</td>
<td>124 +5</td>
<td>1000</td>
<td>0,50</td>
<td></td>
<td>QM/146050/37</td>
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<tr>
<td>63</td>
<td>100</td>
<td>60</td>
<td>65</td>
<td>40</td>
<td>80</td>
<td>M 6</td>
<td>6,5</td>
<td>139 +5</td>
<td>1500</td>
<td>0,50</td>
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<td>QM/146050/37</td>
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<tr>
<td>80</td>
<td>100</td>
<td>60</td>
<td>65</td>
<td>40</td>
<td>80</td>
<td>M 8</td>
<td>6,5</td>
<td>168,5 +5</td>
<td>2400</td>
<td>0,50</td>
<td></td>
<td>QM/146080/37</td>
</tr>
</tbody>
</table>

Secondary carriage W
Side mounting plate UW

Adjustable stop - for M/146100, /.., /..M, M/146200/..., .../M

Missing cylinder dimensions and weights see pages 9 & 10
Assembly kit for shock absorber - for cylinder series M/146100, M/146100/M

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For cylinder series M/146200, M/146200/M

Please order shock absorber and plate separately.

Attention: When using M/146200 cylinders (ø 40 to 63 mm) an extra top plate must be mounted onto the carriage as the centre line of the shock absorbers has to be within the surface of the carriage.

Please order shock absorber and plate separately.
Technical data - Reed switches - additional informations see data sheet N/en 4.3.005

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage (V a.c.)</th>
<th>Voltage (V d.c.)</th>
<th>Current maximum (mA)</th>
<th>Function</th>
<th>Operating temperature (°C)</th>
<th>LED</th>
<th>Protection class</th>
<th>Plug</th>
<th>Cable length (m)</th>
<th>Cable type</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Symbol]</td>
<td>10 ... 240</td>
<td>10 ... 170</td>
<td>100</td>
<td>Closer</td>
<td>-25 ... +80</td>
<td>-</td>
<td>IP66</td>
<td>—</td>
<td>2, 5 or 10</td>
<td>PVC 2 x 0,25</td>
<td>37</td>
<td>M50/LSU/V</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>10 ... 240</td>
<td>10 ... 170</td>
<td>100</td>
<td>Closer</td>
<td>-25 ... +80</td>
<td>-</td>
<td>IP66</td>
<td>—</td>
<td>5</td>
<td>PUR 2 x 0,25</td>
<td>37</td>
<td>M50/LSU/S</td>
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<tr>
<td>![Symbol]</td>
<td>10 ... 240</td>
<td>10 ... 170</td>
<td>100</td>
<td>Closer</td>
<td>-25 ... +150</td>
<td>—</td>
<td>IP66</td>
<td>—</td>
<td>2</td>
<td>Silicon 2 x 0,25</td>
<td>37</td>
<td>TM/50/RAU/2S</td>
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<tr>
<td>![Symbol]</td>
<td>10 ... 240</td>
<td>10 ... 170</td>
<td>100</td>
<td>Changeover</td>
<td>-25 ... +80</td>
<td>—</td>
<td>IP66</td>
<td>—</td>
<td>5</td>
<td>PVC 3 x 0,25</td>
<td>37</td>
<td>M50/RAC/5V</td>
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<tr>
<td>![Symbol]</td>
<td>10 ... 60</td>
<td>10 ... 60</td>
<td>100</td>
<td>Closer</td>
<td>-25 ... +80</td>
<td>-</td>
<td>IP66</td>
<td>M8 x 1, 0,3</td>
<td>PVC 3 x 0,25</td>
<td>16</td>
<td>M50/LSU/CP *1</td>
<td></td>
</tr>
</tbody>
</table>

* Insert cable length; *1) Plug-in connector see page 11; Color code: BK = black; BN = brown; BU = blue

Drawings

M/50/LSU/V, M/50/LSU/SU, TM/50/RAU/2S
Cable length L = 2, 5 or 10 m

M/50/RAC/5V
Cable length L = 5 m

M/50/LSU/CP

Fixing screw
1: BN = brown; - BU = blue (output)
2: BK = black; + BN = brown; - BU = blue
3: Plug M8 x 1, color code: BK = black; BN = brown; BU = blue

Dimensions in mm
Projection/First angle

en 1.6.009.20

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M/146000, M/146100, M/146200, LINTRA®PLUS rodless cylinder
Magnetic & Non-magnetic piston, double acting

Technical data - Solid state - additional informations see data sheet N/en 4.3.007

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage (V d.c.)</th>
<th>Current maximum (mA)</th>
<th>Function</th>
<th>Operating temperature (°C)</th>
<th>LED Protection class</th>
<th>Plug</th>
<th>Cable length (m)</th>
<th>Cable type</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>BN + BK</td>
<td>10 ... 30</td>
<td>150</td>
<td>PNP</td>
<td>-40 ... +80</td>
<td>IP67</td>
<td>—</td>
<td>2, 5 or 10</td>
<td>PVC 3 x 0,12</td>
<td>37</td>
<td>M/50/EAP/*V</td>
</tr>
<tr>
<td>BN + BK</td>
<td>10 ... 30</td>
<td>150</td>
<td>PNP</td>
<td>-40 ... +80</td>
<td>IP67</td>
<td>—</td>
<td>5</td>
<td>PUR 3 x 0,14</td>
<td>37</td>
<td>M/50/EAP/5U</td>
</tr>
<tr>
<td>BN + BK</td>
<td>10 ... 30</td>
<td>150</td>
<td>PNP</td>
<td>-40 ... +80</td>
<td>IP67</td>
<td>M8 x 1</td>
<td>0,3</td>
<td>PVC 3 x 0,14</td>
<td>16</td>
<td>M/50/EAP/CP *1)</td>
</tr>
<tr>
<td>BN + BK</td>
<td>10 ... 30</td>
<td>150</td>
<td>PNP</td>
<td>-40 ... +80</td>
<td>IP67</td>
<td>M12 x 1</td>
<td>0,3</td>
<td>PVC 3 x 0,14</td>
<td>16</td>
<td>M/50/EAP/CC *1)</td>
</tr>
<tr>
<td>BN + BK</td>
<td>10 ... 30</td>
<td>150</td>
<td>NPN</td>
<td>-40 ... +80</td>
<td>IP67</td>
<td>—</td>
<td>2, 5 or 10</td>
<td>PVC 3 x 0,12</td>
<td>37</td>
<td>M/50/EAN/*V</td>
</tr>
<tr>
<td>BN + BK</td>
<td>10 ... 30</td>
<td>150</td>
<td>NPN</td>
<td>-40 ... +80</td>
<td>IP67</td>
<td>M8 x 1</td>
<td>0,3</td>
<td>PVC 3 x 0,14</td>
<td>16</td>
<td>M/50/EAN/CP *1)</td>
</tr>
</tbody>
</table>

* Insert cable length; *1) Plug-in connector below; Color code: BK = black, BN = brown, BU = blue

Drawings
M/50/EAP*/V,
M/50/EAN*/V
Cable length L = 2, 5 or 10 m

Dimensions in mm
Projection/First angle

Accessories
Plug-in connector cable with nut

<table>
<thead>
<tr>
<th>Outer cover</th>
<th>Cable length (m)</th>
<th>Weight (kg)</th>
<th>Connector</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC 3 x 0,25</td>
<td>5 m</td>
<td>0,18</td>
<td>M8 x 1</td>
<td>MP73001/5</td>
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<tr>
<td>PUR 3 x 0,25</td>
<td>5 m</td>
<td>0,18</td>
<td>M8 x 1</td>
<td>MP73002/5</td>
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<tr>
<td>PUR 3 x 0,34</td>
<td>5 m</td>
<td>0,21</td>
<td>M12 x 1</td>
<td>MP34594/5</td>
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</table>

Fixing screw
Color code: BK = black; BN = brown; BU = blue
Plug M8 x 1
Plug M12 x 1
Warning

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under «Technical features/data». Before using these products with fluids other than those specified, for non-industrial applications, life-support systems or other applications not within published specifications, consult IMI Precision Engineering, Norgren GmbH.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure. System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided. System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products.