

DGS 35/34: Incremental Encoders for rough environmental conditions




Select your individual encoder!

Possible product variations:

1/4" and 3/8" in solid shafts with square flange or servo mount, through or blind hollow shafts with connector or cable outlet, TTL or HTL interface.

Thanks to this wide variety of products, there are numerous possible uses, for example in:

- machine tools
- textile machines
- woodworking machines
- packaging machines

| | |
|---|--|
|  | Number of lines 120 to 16,384 |
| Incremental Encoder | |

Incremental encoders in the DGS series are in use world-wide under the toughest environmental conditions.

The rugged construction – up to IP 67 degree protection – and the individual adaptation of the design to the requirements of the user are the outstanding features of this series.

Resolutions up to 16,384 lines are available.

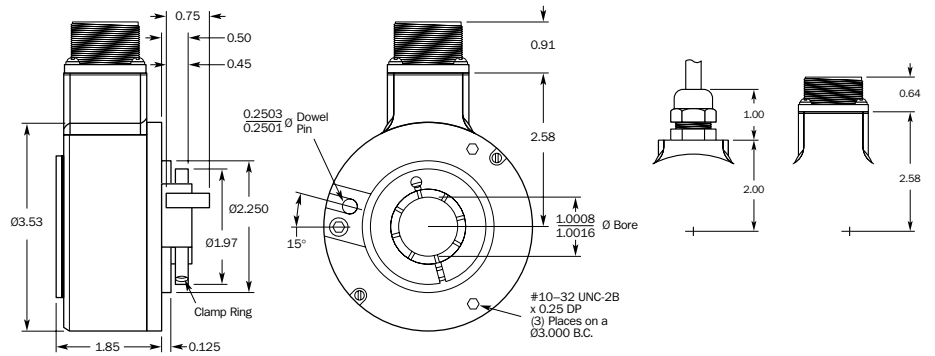
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Number of lines
120 to 16,384

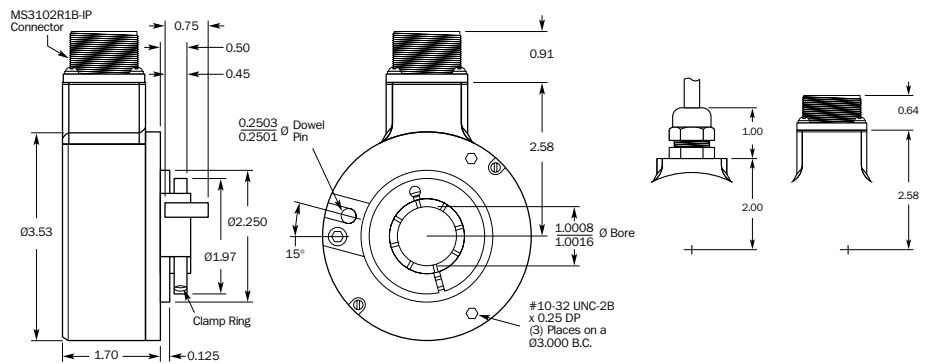
Incremental Encoder

- Blind through hollow shaft
- Connector or cable outlet
- Protection class up to IP66
- Electrical interfaces, line drivers and open collectors

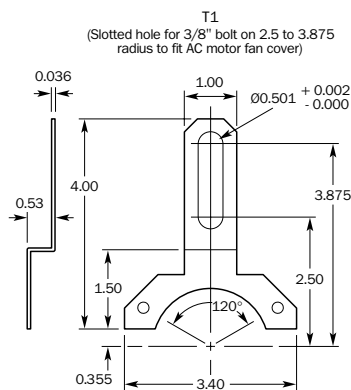
Dimensional drawing blind shaft (anti-rotation pin shown)



Dimensional drawing through shaft (anti-rotation pin shown)



Dimensional drawing tether option



Accessories
 Connection Systems


| Technical Data | | DGS 35/34 | | | | | | | | | | | | |
|---|---|-----------|--|--|--|--|--|--|--|--|--|--|--|--|
| Hollow Shaft | 1", 30 mm | | | | | | | | | | | | | |
| Number of lines (Z) per revolution | 00120 to 16384, see order info | | | | | | | | | | | | | |
| Electrical Interface | | | | | | | | | | | | | | |
| | +5V/5V line driver (3487) | | | | | | | | | | | | | |
| | +8...24V/5V line driver (3487) | | | | | | | | | | | | | |
| | +8...24V/+8...24V line driver (7272) | | | | | | | | | | | | | |
| | +8...24V/5V open collector (7273) | | | | | | | | | | | | | |
| | +5V...15V/+5V...15V line driver (4469) | | | | | | | | | | | | | |
| Mass¹⁾ | 16 oz (1.1 kg) | | | | | | | | | | | | | |
| Moment of inertia of the rotor | 490 gcm ² | | | | | | | | | | | | | |
| Measuring step | 90°/number of lines | | | | | | | | | | | | | |
| Error limits | 45/Z ° | | | | | | | | | | | | | |
| Measuring step deviation | 45/Z ° | | | | | | | | | | | | | |
| Max. output frequency | 300 kHz (1-8192 PPR) | | | | | | | | | | | | | |
| | 600 kHz (x 2 multiplication) (above 8192 PPR) | | | | | | | | | | | | | |
| Max. operating speed | 3,000 rpm; | | | | | | | | | | | | | |
| | higher rpms available, please consult factory | | | | | | | | | | | | | |
| Max. angular acceleration | 1-x-10 ⁵ rad/s ² | | | | | | | | | | | | | |
| Operating torque | 9.91 oz-in (7.0 Ncm) | | | | | | | | | | | | | |
| Start up torque | 12.78 oz-in (9.0 Ncm) | | | | | | | | | | | | | |
| Permissible shaft movement | | | | | | | | | | | | | | |
| radial (static/dynamic) | 0.020in (0.5mm)/0.004in (0.1mm) | | | | | | | | | | | | | |
| axial (static/dynamic) | 0.020in (0.5mm)/0.020in (0.5mm) | | | | | | | | | | | | | |
| Bearing lifetime | 4.5-x-10 ⁹ revolutions | | | | | | | | | | | | | |
| Working temperature range | -20 ... + 70 °C | | | | | | | | | | | | | |
| Storage temperature range | -30 ... + 85 °C | | | | | | | | | | | | | |
| Permissible relative humidity³⁾ | 95 % | | | | | | | | | | | | | |
| Resistance | | | | | | | | | | | | | | |
| to shocks | 50/11 g/ms | | | | | | | | | | | | | |
| to vibration | 5/2000 Hz at 20 g | | | | | | | | | | | | | |
| Protection class | | | | | | | | | | | | | | |
| Conn | IP 66 | | | | | | | | | | | | | |
| Cable | IP 66 | | | | | | | | | | | | | |
| Operating current range at no load | | | | | | | | | | | | | | |
| 24 V | 100 mA | | | | | | | | | | | | | |
| 5 V | 120 mA | | | | | | | | | | | | | |

1) For an encoder with connector outlet

3) Condensation not permitted

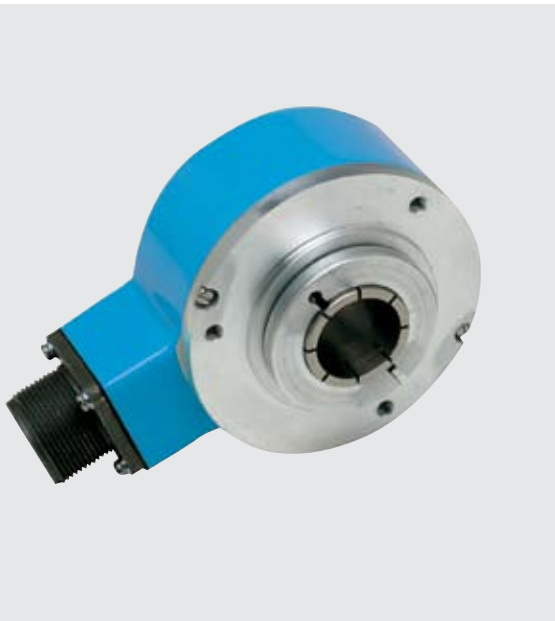
2) At speeds > 3000 rpm the shaft seal must be removed

4) with muting connector fitted

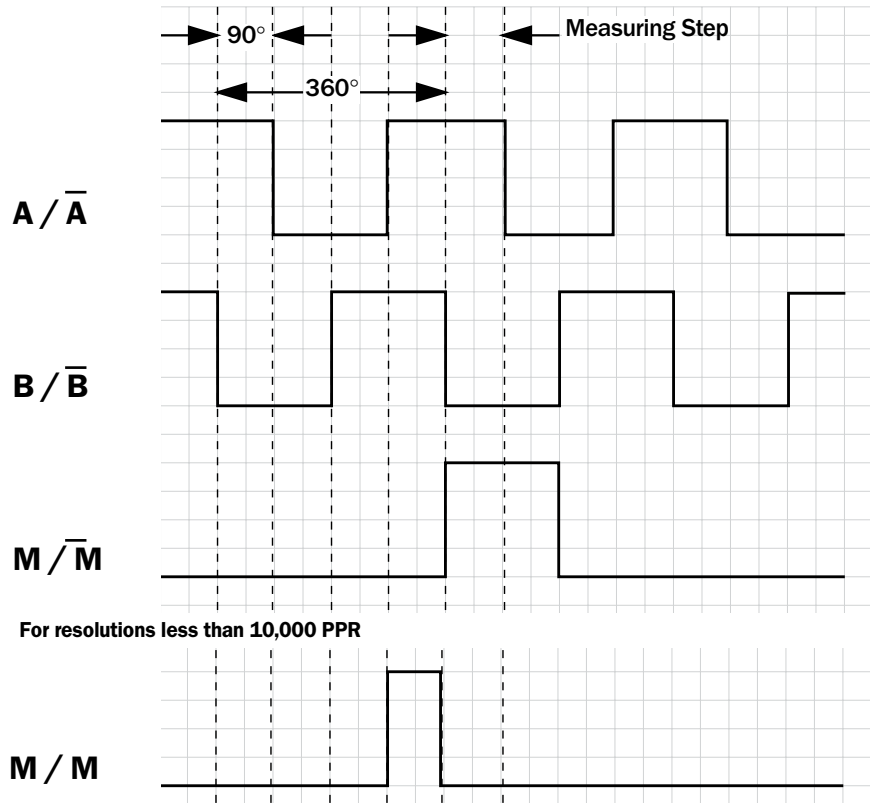
 **Number of lines**
120 to 16,384

Incremental Encoder

- Blind through hollow shaft
- Connector or cable outlet
- Protection class up to IP66
- Electrical interfaces, line drivers and open collectors



Incremental pulse diagram



For resolutions less than 10,000 PPR

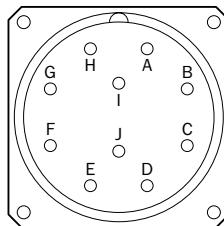
M / M

For resolutions greater than or equal to 10,000 PPR and push-pull driver option

Electrical interfaces

| | | | |
|--------------------|--------------|--------------|----------------|
| Supply voltage | 4.75...5.25V | 8.0...24.0 V | 8.0...24.0 V |
| Interfaces/drivers | Line drivers | Line drivers | Open collector |

Connection type



10 Pin MS3102R

PIN and wire allocation

| Function | 10 pin | Cable |
|-------------|--------|--------|
| A | A | White |
| B | B | Pink |
| M | C | Lilac |
| A not | H | Brown |
| B not | I | Black |
| M not | J | Yellow |
| +Vs | D | Red |
| Common | F | Blue |
| Case ground | G | N/A |
| Shield | N/A | N/A |



Accessories

Connection Systems

Order information

Incremental Encoder DGS 35, Through Hollow Shaft

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|---------|---------|---------|----------|----------|----------|----------|----------|
| Point 1 | Point 2 | Point 3 | Point 4 | Point 5 | Point 6 | Point 7 | Point 8 | Point 9 | Point 10 | Point 11 | Point 12 | Point 13 | Point 14 |
| D | G | S | 3 | 5 | - | | | | | | | | |

| Electrical interface | |
|--|-----|
| 5 V, 5 V, 3487, marker 180 | = 1 |
| 8-24V, 5V, 3487, marker 180 | = 3 |
| 8-24V, 8/24V, 7272, marker 180 | = 5 |
| 5-15V, 5-15V, 4469, marker 180 | = 7 |
| 8-24 V, open collector (7273) marker 180 | = 9 |
| 5 V, 5 V, 3487, marker 90* | = Y |
| 8-24V, 5V, 3487, marker 90* | = 2 |
| 8-24V, 8/24V, 7272, marker 90* | = 4 |
| 5-15V, 5-15V, 4469, marker 90* | = 6 |
| 8-24 V, open collector (7273) marker 90* | = 8 |

| Mechanical interface | |
|---|-----|
| T1 Tether, 1in bore (see collets below, sold separately) | = H |
| P block, 1in bores (see collets below, sold separately) | = J |
| T1 Tether, 30mm bore | = K |
| P block, 30mm bore | = L |

| Connection type | |
|---------------------------------|-----|
| Radial Cable 1.0 m | = 2 |
| Radial Cable 1.5 m | = K |
| Radial Cable 3 m | = L |
| Radial Cable 5 m | = M |
| Radial Cable 10 m ¹⁾ | = N |
| Radial Connector MS 10-pin | = 4 |

| Number of lines | |
|---|--|
| Always five characters in clear text. (see chart) | |

1) n/a on open collector outputs

* Note: 10,000 and 16,384ppr only come with 90° marker

| Number of lines (Z) per revolution | | | | | | | |
|------------------------------------|-------|-------|-------|-------|-------|--------|--------|
| 00120 | 00600 | 02048 | 03600 | 05000 | 08192 | 10000* | 16384* |
| 00360 | 01024 | 02500 | 04096 | | | | |

* Note: 10,000 and 16,384ppr only come with 90° marker

Order example: Incremental Encoder DGS 35

5 V, 5 V (3487 line driver) 180° marker; T1 tether with 1" bore shaft; 1 meter cable, radial; number of steps: 2500

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Point 1 | Point 2 | Point 3 | Point 4 | Point 5 | Point 6 | Point 7 | Point 8 | Point 9 | Point 10 | Point 11 | Point 12 | Point 13 | Point 14 |
| D | G | S | 3 | 5 | - | 1 | H | 2 | 0 | 2 | 5 | 0 | 0 |

Please enter your individual encoder here

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|---------|---------|---------|----------|----------|----------|----------|----------|
| Point 1 | Point 2 | Point 3 | Point 4 | Point 5 | Point 6 | Point 7 | Point 8 | Point 9 | Point 10 | Point 11 | Point 12 | Point 13 | Point 14 |
| D | G | S | 3 | 5 | - | | | | | | | | |

Collets for DGS 35 encoder with Through Hollow Shaft

| Type for 1" Bore | Part no. | Shaft Diameter |
|------------------|-----------|----------------|
| SPZ-1E2-DD35-AD | 7 102 155 | 1/2" |
| SPZ-5E8-DD35-AD | 7 102 156 | 5/8" |
| SPZ-3E4-DD35-AD | 7 102 157 | 3/4" |
| SPZ-7E8-DD35-AD | 7 102 158 | 7/8" |

| Type for 30 mm Bore | Part no. | Shaft Diameter |
|---------------------|-----------|----------------|
| SPZ-024-MD35-AD | 7 130 587 | 24 mm |
| SPZ-025-MD35-AD | 7 130 588 | 25 mm |

| Type for 1" Bore | Part no. | Shaft Diameter |
|------------------|-----------|----------------|
| SPZ-010-DD35-AD | 7 130 582 | 10 mm |
| SPZ-012-DD35-AD | 7 130 583 | 12 mm |
| SPZ-014-DD35-AD | 7 130 584 | 14 mm |
| SPZ-015-DD35-AD | 7 127 328 | 15 mm |
| SPZ-018-DD35-AD | 7 130 585 | 18 mm |
| SPZ-020-DD35-AD | 7 130 529 | 20 mm |
| SPZ-022-DD35-AD | 7 130 586 | 22 mm |

Order information

Incremental Encoder DGS 34, blind hollow shaft

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|---------|---------|---------|----------|----------|----------|----------|----------|
| Point 1 | Point 2 | Point 3 | Point 4 | Point 5 | Point 6 | Point 7 | Point 8 | Point 9 | Point 10 | Point 11 | Point 12 | Point 13 | Point 14 |
| D | G | S | 3 | 4 | - | | | | | | | | |

| Electrical interface | Mechanical interface | Connection type | Number of lines |
|---|--|-------------------------------------|---|
| 5 V, 5 V, 3487, marker 180 = 1 | T1 Tether, 1in bore | Radial Cable 1.0 m = 2 | Always five characters in clear text. (see chart) |
| 8-24V, 5V, 3487, marker 180 = 3 | (see collets below, sold separately) = H | Radial Cable 1.5 m = K | |
| 8-24V, 8/24V, 7272, marker 180 = 5 | P block, 1in bores | Radial Cable 3 m = L | |
| 5-15V, 5-15V, 4469, marker 180 = 7 | (see collets below, sold separately) = J | Radial Cable 5 m = M | |
| 8-24 V, open collector (7406/7273) marker 180 = 9 | T1 Tether, 30mm bore = K | Radial Cable 10 m ¹⁾ = N | |
| 5 V, 5 V, 3487, marker 90* = Y | P block, 30mm bore = L | Radial Connector MS 10-pin = 4 | |
| 8-24V, 5V, 3487, marker 90* = 2 | | | |
| 8-24V, 8/24V, 7272, marker 90* = 4 | | | |
| 5-15V, 5-15V, 4469, marker 90* = 6 | | | |
| 8-24 V, open collector (7406/7273) marker 90* = 8 | | | |

1) n/a on open collector outputs

* Note: 10,000 and 16,384ppr only come with 90° marker

| Number of lines (Z) per revolution | | | | | | | |
|------------------------------------|-------|-------|-------|-------|-------|--------|--------|
| 00120 | 00600 | 02048 | 03600 | 05000 | 08192 | 10000* | 16384* |
| 00360 | 01024 | 02500 | 04096 | | | | |

* Note: 10,000 and 16,384ppr only come with 90° marker

Order example: Incremental Encoder DGS 34

5 V, 5 V (3487 line driver) 180° marker; T1 tether with 1" bore shaft; 1 meter cable, radial; number of steps: 2500

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Point 1 | Point 2 | Point 3 | Point 4 | Point 5 | Point 6 | Point 7 | Point 8 | Point 9 | Point 10 | Point 11 | Point 12 | Point 13 | Point 14 |
| D | G | S | 3 | 4 | - | 1 | H | 2 | 0 | 2 | 5 | 0 | 0 |

Please enter your individual encoder here

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|---------|---------|---------|----------|----------|----------|----------|----------|
| Point 1 | Point 2 | Point 3 | Point 4 | Point 5 | Point 6 | Point 7 | Point 8 | Point 9 | Point 10 | Point 11 | Point 12 | Point 13 | Point 14 |
| D | G | S | 3 | 4 | - | | | | | | | | |

Collets for DGS 35 encoder with Through Hollow Shaft

| Type for 1" Bore | Part no. | Shaft Diameter |
|------------------|-----------|----------------|
| SPZ-1E2-DD35-AD | 7 102 155 | 1/2" |
| SPZ-5E8-DD35-AD | 7 102 156 | 5/8" |
| SPZ-3E4-DD35-AD | 7 102 157 | 3/4" |
| SPZ-7E8-DD35-AD | 7 102 158 | 7/8" |

| Type for 30 mm Bore | Part no. | Shaft Diameter |
|---------------------|-----------|----------------|
| SPZ-024-MD35-AD | 7 130 587 | 24 mm |
| SPZ-025-MD35-AD | 7 130 588 | 25 mm |

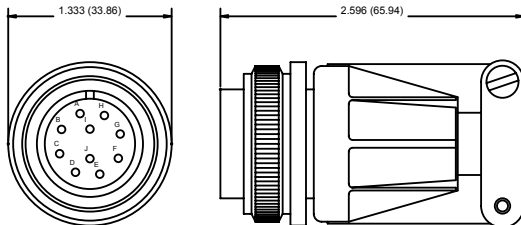
| Type for 1" Bore | Part no. | Shaft Diameter |
|------------------|-----------|----------------|
| SPZ-010-DD35-AD | 7 130 582 | 10 mm |
| SPZ-012-DD35-AD | 7 130 583 | 12 mm |
| SPZ-014-DD35-AD | 7 130 584 | 14 mm |
| SPZ-015-DD35-AD | 7 127 328 | 15 mm |
| SPZ-018-DD35-AD | 7 130 585 | 18 mm |
| SPZ-020-DD35-AD | 7 130 529 | 20 mm |
| SPZ-022-DD35-AD | 7 130 586 | 22 mm |

Dimensional drawings and order information

Connector systems, MS 10 pin

Cable connector MS 3105 female, 10 pin, straight

| Type | Part No. | Contacts |
|------------|-----------|----------|
| DOS-MS10-G | 7 102 129 | 10 |

Connector MS 3105 female, 10 pin, straight, cable 11 core, $4 \times 2 \times 0.25 + 2 \times 0.5 + 1 \times 0.14 \text{ mm}^2$ with screening, cable diameter 7.5 mm

| Type | Part no. | Contacts | Cable length |
|------------------|-----------|----------|--------------|
| DOL-MS10-G1M5MA2 | 7 102 130 | 10 | 1.5 m |
| DOL-MS10-G03MMA2 | 7 102 131 | 10 | 3.0 m |
| DOL-MS10-G05MMA2 | 7 102 132 | 10 | 5.0 m |
| DOL-MS10-G10MMA2 | 7 102 133 | 10 | 10.0 m |
| DOL-MS10-G20MMA2 | 7 102 134 | 10 | 20.0 m |
| DOL-MS10-G30MMA2 | 7 102 135 | 10 | 30.0 m |

Cable 8 core, per meter, $4 \times 2 \times 0.15 \text{ mm}^2$ with screening,
cable diameter 5.6 mm

| Type | Part no. | Cores |
|----------------|-----------|-------|
| LTG-2308-MWENC | 6 027 529 | 8 |

Cable 11 core, per meter, $4 \times 2 \times 0.25 + 2 \times 0.5 + 1 \times 0.14 \text{ mm}^2$
with screening, cable diameter 7.5 mm

| Type | Part no. | Cores |
|-------------|-----------|-------|
| LTG-2411-MW | 6 027 530 | 11 |

Cable 12 core, per meter, $4 \times 2 \times 0.25 + 2 \times 0.5 + 2 \times 0.14 \text{ mm}^2$
with screening, capable of being dragged, cable diameter 7.8 mm

| Type | Part no. | Cores |
|-------------|-----------|-------|
| LTG-2512-MW | 6 027 531 | 12 |

Australie
Tél. +61 3 94 97 41 00
008 33 48 02 – toll free
Fax +61 3 94 97 11 87

Belgique/Luxembourg
Tél. +32 24 66 55 66
Fax +32 24 63 31 04

Bésil
Tél. +55 11 55 61 26 83
Fax +55 11 55 35 41 53

Chine
Tél. +8 52 27 63 69 66
Fax +8 52 27 63 63 11

Danemark
Tél. +45 45 82 64 00
Fax +45 45 82 64 01

Allemagne
Tél. +49 2 11 53 01 2 50
Fax +49 2 11 53 01 1 00

Finlande
Tél. +3 58 9-7288500
Fax +3 58 9-72885055

France
Tél. +33 3 90 22 66 88
Fax +33 3 90 22 66 80

Grande-Bretagne
Tél. +44 17 27-83 11 21
Fax +44 17 27-85 67 67

Italie
Tél. +39 02 92 14 20 62
Fax +39 02 92 14 20 67

Japon
Tél. +8 13 33 58 13 41
Fax +8 13 33 58 90 48

Corée
Tél. +82 2 786 63 21/4
Fax +82 2 786 63 25

Pays-Bas
Tél. +31 30 229 25 44
Fax +31 30 229 39 94

Norvège
Tél. +47 67 56 75 00
Fax +47 67 56 66 10

Autriche
Tél. +43 2 23 66 22 88-0
Fax +43 2 23 66 22 88-5

Pologne
Tél. +48 22 8 37 40 50
Fax +48 22 8 37 43 88

Suède
Tél. +46 8 6 80 64 50
Fax +46 8 7 10 18 75

Suisse
Tél. +41 4 16 19 29 39
Fax +41 4 16 19 29 21

Singapour
Tél. +65 67 44 37 32
Fax +65 68 41 77 47

Espagne
Tél. +34 93 4 80 31 00
Fax +34 93 4 73 44 69

Taiwan
Tél. +88 62 23 65 62 92
Fax +88 62 23 68 73 97

République tchèque
Tél. +42 02 578 10 561
Fax +42 02 578 10 559

USA/Canada/Mexique
Tél. +1 (952) 9 41-67 80
Fax +1 (952) 9 41-92 87

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