

# ABB drives

## Product guide for low voltage AC drives





# ABB drives

Applications where drives are used vary widely in terms of control requirements and environmental conditions. To meet the different demands ABB has designed an extensive portfolio of products that is available through ABB sales offices and channel partners. This product guide gives an overview of ABB's portfolio of low voltage AC drives.

## ABB component drives

ABB component drives are designed for machine building. These drives are components that are bought, together with other components, from a logistical distributors. The drives are stocked, and the number of options and variants is optimized for logistical distribution.

## ABB general machinery drives

ABB general machinery drives are designed for machine building. In serial type manufacturing the consumed time per unit is critical. The drives are designed to be the fastest drives in terms of installation, setting parameters and commissioning. The basic products have been made as user-friendly as possible, yet providing high intelligence. The drives offer diverse functionality to cater for the most demanding needs.

## ABB standard drives

ABB standard drives are simple to buy, install, configure and use, saving considerable time. They are widely available through ABB's distributors, hence the use of the term standard. The drives have common user and process interface with fieldbus, common software tools for sizing, commissioning, maintenance and common spare parts.

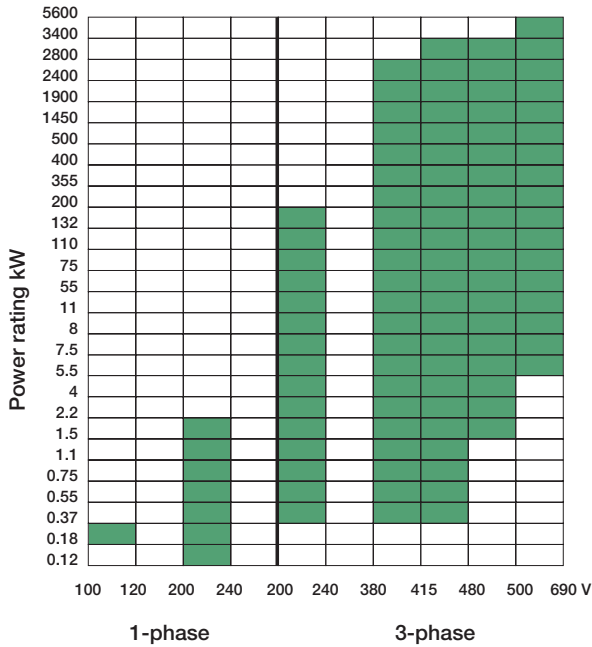
## ABB industrial drives

ABB industrial drives are designed for industrial applications, and especially for applications in process industries such as the pulp & paper, metals, mining, cement, power, chemical, and oil & gas. ABB industrial drives are available both as complete AC drives and as modules to meet the requirements of the users, OEMs and system integrators. These drives are highly flexible AC drives that can be configured to meet the precise needs of industrial applications, and hence order-based configuration is an integral part of the offering. The complete drives and drive modules cover a wide range of powers and voltages, including industrial voltages up to 690 V. ABB industrial drives come with a wide range of inbuilt options. A key feature of these drives is programmability, which makes adaptation to different applications easy.

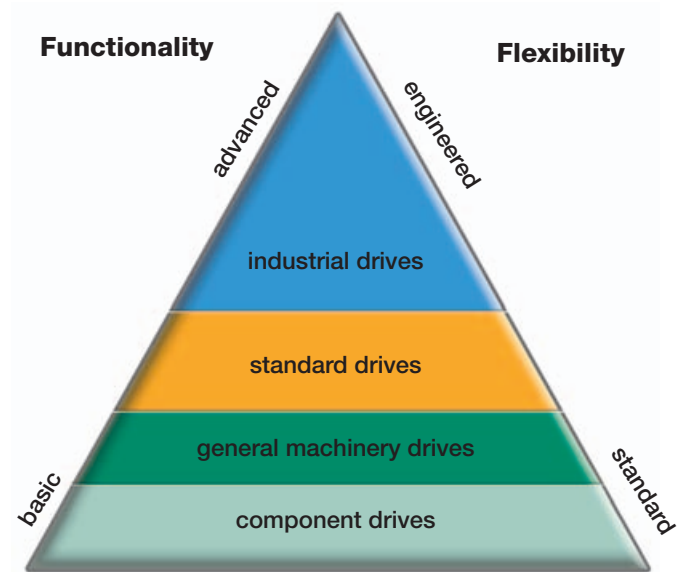
## ABB drives for specific industries and applications

In order to meet the requirements of our different customers, ABB offers a wide range of segment and application specific solutions, ranging from pump and HVAC applications to demanding crane and marine solutions.

Please contact ABB or one of ABB's channel partners for more information.



ABB's portfolio of low voltage AC drives.



The figure shows how each class of drives is positioned with regard to flexibility and functionality.

**www.abb.com/motors&drives**

You will find the latest information on ABB low voltage AC drives from these pages.

**ABB drives contacts** (points to CONTACT US)

**Products** (points to Product Guide)

**Industry specific drives** (points to INDUSTRY SPECIFIC DRIVES)

**Channel partner information** (points to ABB drives Channel Partner network)

**Energy saving** (points to ACS 100, ACS 601 etc...)

**ABB training courses** (points to Training courses)

**Optimization PC tools** (points to Drive PC Tools)

**Programming tools** (points to Drive editors (manuals))

**Technology** (points to CLASSIC, LIMITED AND OBSOLETE PRODUCTS)

**Service contacts** (points to World wide service contacts)

**Documents** (points to Document Library)



# Quickfinder

The table below lists some important features of the ABB's low voltage AC drives. Its main purpose is to highlight the differences between the different product categories. For each category of products it is indicated whether a

Features		ABB component drives	ABB general machinery drives
Voltage & power		1-ph 100 - 120 V: 0.18 - 0.37 kW	1-ph 200 - 240 V: 0.37 - 2.2 kW
		1-ph 200 - 240 V: 0.12 - 2.2 kW	3-ph 200 - 240 V: 0.37 - 4 kW
		3-ph 200 - 240 V: 0.37 - 2.2 kW	3-ph 380 - 480 V: 0.37 - 7.5 kW
		3-ph 380 - 480 V: 0.37 - 4 kW	
Supply options	12 pulse diode Low harmonic Regenerative	- - -	- - -
Enclosure class	IP00	-	-
	IP20	●	●
	IP21	-	-
	IP22	-	-
	IP42	-	-
	IP54/ IP54R/ IP55	-	-
Mechanical construction	Module	●	●
	Wall-mounted	○**	○
	Free-standing	-	-
	Cabinet-built	-	-
Motor control	DTC (open/closed)	-	-
	Vector control (open/closed)	-	●
	Scalar	●	●
Software functionality/features	Basic	●	-
	Medium	-	●
	Advanced	-	-
Programmability	Parameter programming	●**	●
	Block programming	-	●
	Control solutions for specific applications	-	-
I/O	Analogue input/output	1 / 0	2 / 1
	Digital input/output	3(5**) / 1	5 / 2
	Speed feedback	-	○
	Inbuilt-motor thermal protection relay	-	-
Fieldbuses	Modbus	-	○
	PROFIBUS	-	○
	DeviceNet	-	○
	LONWORKS®	-	-
	Ethernet (Modbus/TCP, Ethernet IP)	-	-
	ControlNet	-	-
	CANopen	-	○
	InterBus-S	-	-
	TCP/IPconnection	-	-
Cooling method	Direct air-cooling	●	●
	Liquid-cooled	-	-
EMC compliance (EN 61800-3)	No EMC filter	●	-
	2 <sup>nd</sup> unrestricted, C3	●	●
	1 <sup>st</sup> restricted, radiated only, C2	●	●
	1 <sup>st</sup> restricted, C2	●	○
	1 <sup>st</sup> unrestricted, conductive only, C1	●	○
Harmonic filter/choke	Choke	○	○
	Swinging choke	-	-
	Low harmonic filter	-	-
Dynamic (resistor) braking		○**	○
HW options	du/dt filters	○	○
	Sine filters	-	-
	Coated boards	●	●
	Common mode filter	-	-
	Cabinet options	-	-
Switching frequency		up to 16 kHz	up to 16 kHz
Safety options	Prevention of unexpected start-up	-	-
	Emergency stop	-	-
PC tools	DriveWindow Light in PC	-	○
	DriveWindow	-	-
	DriveOPC	-	-
	DriveSize	-	-
	DriveAP	-	-
	DrivePM	○**	○
Approvals	CE	●	●
	UL	●	●
	cUL	●	●
	CSA	-	-
	C-Tick	●	●
	GOST R	●	●
	Go-Mark	-	-





# ABB component drives

## ABB component drives

ABB component drives meet the requirements of OEMs, installation companies and panel builders.

- Series ACS50
- Power range 0.18 to 0.37 kW (1-ph 100 to 120 V)
- Power range 0.18 to 2.2 kW (1-ph 200 to 240 V)
- IP20 as standard
- No programming - easy and descriptive interface
- Suitable for domestic environment as standard



For further information, see technical catalogue  
"ABB component drive, ACS50, 0.18 to 2.2 kW",  
code: 3AFE68216061 EN

- Series ACS150
- Power range 0.37 to 2.2 kW (1-ph/ 3-ph 200 to 240 V)
- Power range 0.37 to 4 kW (3-ph 380 to 480 V)
- IP20 as standard (UL type 1 as option)
- Integrated user interface
- Unpowered drive configuration in 2 sec.



For further information, see technical catalogue,  
"ACS150, 0.37 kW to 4 kW",  
code: 3AFE68596114 EN

# ABB general machinery drives



## ABB general machinery drives

ABB general machinery drives are designed to meet the requirements of a wide range of machinery applications.

- Series ACS350
- Power range 0.37 to 2.2 kW (1-ph 200 to 240 V), 0.37 to 4 kW (3-ph 200 to 240 V)
- Power range 0.37 to 7.5 kW (3-ph 380 to 480 V)
- IP20 as standard (UL type 1 as option)
- Advanced functionality with sequence programming
- Unpowered drive configuration in 2 sec.



For further information, see technical catalogue,  
"ACS350, 0.37 to 7.5 kW",  
code: 3AFE68596106 EN



# ABB standard drives

ABB standard drives are simple to buy, install, configure and use, saving considerable time. They are widely available through ABB's distributors.

## Wall-mounted drives

- Series ACS550-01
- Power range 0.75 to 110 kW (3-ph 200 to 240 V, 380 to 480 V)
- IP21 as standard (UL type 1), IP54 as option (UL type 12 in frame sizes R1-R4)
- Swinging choke to reduce harmonics
- Assistant control panel
- Sensorless vector control



For further information, see technical catalogue "ABB standard drive ACS550, 0.75 to 355 kW", code: 3AFE64792857 EN

## Free-standing drives

- Series ACS550-02
- Power range 132 to 355 kW (3-ph 200 to 240 V, 380 to 480 V)
- IP21 as standard (UL type 1)
- Assistant control panel
- Sensorless vector control



For further information, see technical catalogue "ABB standard drive ACS550, 0.75 to 355 kW", code: 3AFE64792857 EN

## ■ ABB drives for HVAC applications



For further information, see sales brochure "ABB drives for HVAC applications, ACH550, 0.75 to 355 kW", code: 3AFE68295378 EN

ABB single drives are complete AC drives, which can be installed without any additional cabinet or enclosure.

## Wall-mounted drives

- Series ACS800-01
- Power range 0.55 to 110 kW (230 to 690 V)
- IP21 as standard (UL type 1), IP55 as option (UL type 12)
- Wide range of inbuilt options

For further information, see technical catalogue "ABB industrial drives, ACS800, single drives, 0.55 to 2800 kW", code: 3AFE68375126 EN



## ■ Marine type approved design available as option

- ABS, BV, DNV, GL, Lloyd's, Rina

For further information about the ACS800-01 marine type approved design, see technical catalogue "ABB drives for marine applications, ACS800-01/-04, 0.55 to 132 kW", code: 3AFE68326753 EN



- Series ACS800-11, regenerative drives
- Power range 5.5 to 110 kW (230 to 690 V)
- IP21 as standard (UL type 1)
- Full scope regenerative drive in one package

For further information, see technical catalogue "ABB industrial drives, ACS800, single drives, 0.55 to 2800 kW", code: 3AFE68375126 EN



- Series ACS800-31, low harmonic drives
- Power range 5.5 to 110 kW (230 to 690 V)
- IP21 as standard (UL type 1)
- Harmonics solution incorporated into the drive

For further information, see technical catalogue "ABB industrial drives, ACS800, single drives, 0.55 to 2800 kW", code: 3AFE68375126 EN



## Free-standing drives

- Series ACS800-02
- Power range 45 to 560 kW (380 to 690 V)
- IP21 as standard (UL type 1)
- Extremely compact

For further information, see technical catalogue "ABB industrial drives, ACS800, single drives, 0.55 to 2800 kW", code: 3AFE68375126 EN



ABB single drives are complete AC drives, which can be installed without any additional cabinet or enclosure.

## Cabinet-built drives

- Series ACS800-07
- Power range 45 to 2800 kW (380 to 690 V)
- IP21 as standard, IP22, IP42 (UL type 1), IP54 and IP54R as option (UL type 12)
- Up to 500 kW, based on a single module including rectifier and inverter
- Above 500 kW, separate rectifier and inverter modules



- Series ACS800-17, regenerative drives
- Power range 45 to 2500 kW (380 to 690 V)
- IP21 as standard, IP22, IP42 (UL type 1), IP54 and IP54R as option (UL type 12)
- Regenerative supply unit can feed energy back to the mains



- Series ACS800-37, low harmonic drives
- Power range 45 to 2800 kW (380 to 690 V)
- IP21 as standard, IP22, IP42 (UL type 1), IP54 and IP54R as option (UL type 12)
- Low harmonic solution integrated in the drive.



For further information, see technical catalogue "ABB industrial drives, ACS800, single drives, 0.55 to 2800 kW", code: 3AFE68375126 EN

- Series ACS800-07LC, liquid-cooled single drives
- Power range 200 to 5600 kW (380 to 690 V)
- Totally enclosed cabinet, IP42 as standard, IP54 as option
- Provides reliable operation under extremely harsh conditions
- Silent operation
- Compact size



For further information, see technical catalogue "ACS800-07LC, liquid-cooled single drive, 200 to 5600 kW", code: 3AFE68697981 EN

ABB multidrives are types of industrial drives built from industrial drive modules connected to a common DC bus. The common DC bus is used to supply the drive modules with DC power. The DC power is derived from a single supply unit built into the same installation. This construction simplifies the total installation and results in many benefits: savings in cabling, reduced installation and maintenance costs, reduced line currents, and more.

## Multidrives

- Power range 1.5 to 5600 kW (380 to 690 V)
- IP21 as standard, IP22, IP42 (UL type 1), and IP54 as option (UL type 12)
- Plug-in power connectors for easy maintenance and redundancy
- Wide range of inbuilt options, including brake choppers, EMC filters, fuse switches, contactors, communication options etc.



An ABB multidrive is made up of several different units. These sections are called multidrive units and the most important units are:

- Drive units ACS800-107
- Regenerative IGBT supply units, ACS800-207
- Diode supply units, 6- and 12-pulse ACS800-307 and -507
- Regenerative thyristor supply units, 6- and 12-pulse ACS800-407 and -807
- Braking unit, ACS800-607
- Control units as option

For further information, see the technical catalogue  
"ABB industrial drive, ACS800, multidrive,  
1.5 to 5600 kW", code: 3AFE68248531 EN

- Series ACS800, liquid-cooled multidrives
- Power range 160 to 5600 kW (690 V)
- Totally enclosed cabinet, IP42 as standard, IP54 as option
- Solution for harsh environment location
- Silent operation
- Compact size



For further information, see technical catalogue  
"ACS800, liquid-cooled multidrives,  
160 to 5600 kW", code: 3AFE68727081 EN

## Single drive modules

ABB single drive modules are designed to be installed into a customer's own cabinet. Modules enable OEMs, system integrators and panel builders to build their own drive solutions using ABB drive technology. This gives many of the advantages of ABB drives e.g. DTC motor control, adaptive programming and a wide range of options: both inbuilt and external. ABB provides detailed cabinet installation instructions and other support material to help customers build their own solutions. Modules for single drives require an AC supply.

- Series ACS800-04
- Power range 0.55 to 1900 kW (230 to 690 V)
- IP00, IP20
- Depending on the size, various compact constructions are available, see pictures
- Motion control



For further information, see technical catalogue "ABB industrial drives, ACS800, drive modules, 0.55 to 2000 kW", code: 3AFE68404592 EN

### ■ Marine type approved design available as option

- Frame sizes R2-R6
- ABS, DNV and Lloyd's

For further information about the ACS800-04 marine type approved design, see technical catalogue "ABB drives for marine applications, ACS800-01/-04, 0.55 to 132 kW", code: 3AFE68326753 EN

## Multidrive modules

ABB multidrive modules are designed for drive systems that feature a common DC bus for the flow of energy from the supply modules to the drive modules. Several types of modules are available: inverter modules that contain all the drive technology and different types of supply units that convert the AC supply from the mains into a DC supply for the inverter modules.

### Inverter modules

- Series ACS800-104
- Power range 1.1 to 2000 kW (380 to 690 V)

### 6-/12-pulse diode supply modules

- Series ACS800-304 (6-pulse) and ACS800-704 (6-/12-pulse)
- Power range 145 to 4200 kW (380 to 690 V)

### Thyristor supply modules

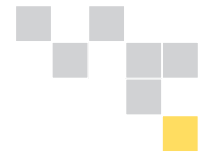
- Series ACS800-404
- Power range 470 to 3150 kW (380 to 690 V)
- Provide regenerative capacity

### IGBT supply modules + LCL filters

- IGBT supply ACS800-204 modules + LCL filters
- Power range 60 to 1817 kW (380 to 690 V)
- Provide regenerative capacity plus additional filtering of harmonics in the supply.



For further information, see technical catalogue "ABB industrial drives, ACS800, drive modules, 0.55 to 2000 kW", code: 3AFE68404592 EN



# Services

## All the support you need

The ABB drive product lifecycle management model provides proactive service offerings for maximizing drive availability and performance. This four-phase model provides not only optimum support to you but also a smooth transition to a new drive when the service life of your current drive ends. It also provides ABB with a well-structured means of managing different drive generations. With complete lifecycle support, you will always be aware of the support plans for your valuable assets.

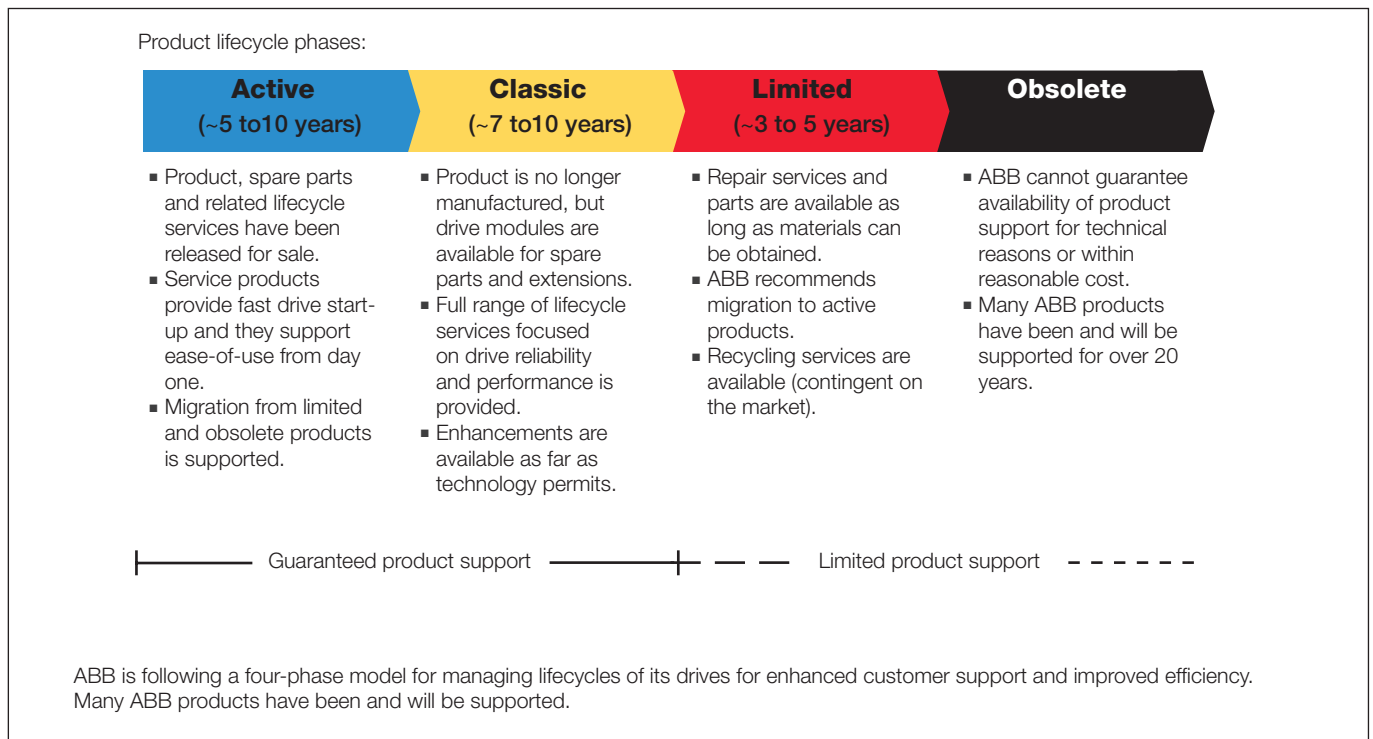
All drive product families have product-specific support programs and maintenance schedules with corresponding service kits and upgrade packages, which contribute to ease of ordering, planning and budgeting maintenance activities.

## Globally local

ABB has the largest drive service team of all drive suppliers with service engineers located throughout the world. In addition, the ABB drives channel partners - the technical partner network with outlets in many countries - provide you with round-the-clock support and service. All ABB's and its channel partners' drive specialists have been trained, audited and certified to exacting standards allowing each to provide fast and professional support where and when you need it.

More details and specific information about our support and service offerings is available in product specific brochures, from local ABB representatives and on the ABB internet pages [www.abb.com/motors&drives](http://www.abb.com/motors&drives).

## Drives product lifecycle management





# Contact and web information

[www.abb.com/motors&drives](http://www.abb.com/motors&drives)



ABB's worldwide presence is built on strong local companies working together with the channel partner network. By combining the experience and know-how gained in local and global markets, ABB ensures that its customers in all industries gain the full benefit from its products.

For further details about all ABB low voltage AC drives and services, please contact your nearest ABB office or ABB drives channel partner or visit the websites [www.abb.com/motors&drives](http://www.abb.com/motors&drives) and [www.abb.com/drivespartners](http://www.abb.com/drivespartners).

## Albania (Tirana)

Tel: +355 4 234 368, 363 854  
Fax: +355 4 363 854

## Algeria

Tel: +212 2224 6168  
Fax: +212 2224 6171

## Argentina (Valentin Alsina)

Tel: +54 (0)114 229 5707  
Fax: +54 (0)114 229 5593

## Australia (Victoria - Notting Hill)

Tel: +1800 222 435  
Tel: +61 3 8544 0000  
Fax: +61 3 8544 0004

## Austria (Vienna)

Tel: +43 1 60109 0  
Fax: +43 1 60109 8312

## Azerbaijan (Baku)

Tel: +994 12 498 54 75  
Fax: +994 12 493 73 56

## Bahrain (Manama)

Tel: +973 725 377  
Fax: +973 725 332

## Bangladesh (Dhaka)

Tel: +88 02 8856468  
Fax: +88 02 8850906

## Belarus (Minsk)

Tel: +375 228 12 40, 228 12 42  
Fax: +375 228 12 43

## Belgium (Zaventem)

Tel: +32 2 718 6313  
Fax: +32 2 718 6664

## Bolivia (La Paz)

Tel: +591 2 278 8181  
Fax: +591 2 278 8184

## Bosnia Herzegovina (Tuzla)

Tel: +387 35 246 020  
Fax: +387 35 255 098

## Brazil (Osasco)

Tel: 0800 014 9111  
Tel: +55 11 3688 9282  
Fax: +55 11 3688 9421

## Bulgaria (Sofia)

Tel: +359 2 981 4533  
Fax: +359 2 980 0846

## Canada (Montreal)

Tel: +1 514 215 3006  
Fax: +1 514 332 0609

## Chile (Santiago)

Tel: +56 2 471 4391  
Fax: +56 2 471 4399

## China (Beijing)

Tel: +86 10 5821 7788  
Fax: +86 10 5821 7618

## Colombia (Bogotá)

Tel: +57 1 417 8000  
Fax: +57 1 413 4086

## Costa Rica (San Jose)

Tel: +506 288 5484  
Fax: +506 288 5482

## Croatia (Zagreb)

Tel: +385 1 600 8550  
Fax: +385 1 619 5111

## Czech Republic (Prague)

Tel: +420 234 322 327  
Fax: +420 234 322 310

## Denmark (Skovlunde)

Tel: +45 44 504 345  
Fax: +45 44 504 365

## Dominican Republic (Santo Domingo)

Tel: +809 561 9010  
Fax: +809 562 9011

## Ecuador (Quito)

Tel: +593 2 2500 645  
Fax: +593 2 2500 650

## Egypt (Cairo)

Tel: +202 6251630  
Fax: +202 6251638

## El Salvador (San Salvador)

Tel: +503 2264 5471  
Fax: +503 2264 2497

## Estonia (Tallinn)

Tel: +372 6801 800  
Fax: +372 6801 810

## Ethiopia (Addis Abeba)

Tel: +251 1 669506, 669507  
Fax: +251 1 669511

## Finland (Helsinki)

Tel: +358 10 22 11  
Tel: +358 10 222 1999  
Fax: +358 10 222 2913

## France (Montluel)

Tel: +33 (0)4 37 40 40 00  
Fax: +33 (0)4 37 40 40 72

## Germany (Ladenburg)

Tel: +01805 222 580  
Tel: +49 (0)6203 717 717  
Fax: +49 (0)6203 717 600

## Greece (Athens)

Tel: +30 210 289 1 651  
Fax: +30 210 289 1 792

## Guatemala (Guatemala City)

Tel: +502 363 3814  
Fax: +502 363 3624

## Hungary (Budapest)

Tel: +36 1 443 2224  
Fax: +36 1 443 2144

## India (Bangalore)

Tel: +91 80 837 0416  
Fax: +91 80 839 9173

## Indonesia (Jakarta)

Tel: +62 21 590 9955  
Fax: +62 21 590 0115, 590 0116

## Iran (Tehran)

Tel: +98 21 2222 5120  
Fax: +98 21 2222 5157

## Ireland (Dublin)

Tel: +353 1 405 7300  
Fax: +353 1 405 7312

## Israel (Haifa)

Tel: +972 4 850 2111  
Fax: +972 4 850 2112

## Italy (Milan)

Tel: +39 02 2414 3085  
Fax: +39 02 2414 3979

## Ivory Coast (Abidjan)

Tel: +225 21 35 42 65  
Fax: +225 21 35 04 14

## Japan (Tokyo)

Tel: +81(0)3 5784 6010  
Fax: +81(0)3 5784 6275

## Jordan (Amman)

Tel: +962 6 562 0181  
Fax: +962 6 5621369

## Kazakhstan (Almaty)

Tel: +7 3272 583838  
Fax: +7 3272 583839

## Kenya (Nairobi)

Tel: +254 20 828811/13 to 20  
Fax: +254 20 828812/21

## Kuwait (Kuwait city)

Tel: +965 2428626 ext. 124  
Fax: +965 2403139

## Latvia (Riga)

Tel: +371 7 063 600  
Fax: +371 7 063 601

## Lithuania (Vilnius)

Tel: +370 5 273 8300  
Fax: +370 5 273 8333

## Luxembourg (Leudelange)

Tel: +352 493 116  
Fax: +352 492 859

## Macedonia (Skopje)

Tel: +389 2 118 010  
Fax: +389 2 118 774

## Malaysia (Kuala Lumpur)

Tel: +603 5628 4888  
Fax: +603 5635 8200

## Mauritius (Casablanca)

Tel: +230 208 7644, 211 8624  
Fax: +230 211 4077

## Mexico (Mexico City)

Tel: +52 (55) 5328 1400 ext. 3008  
Fax: +52 (55) 5328 7467

## Morocco (Casablanca)

Tel: +212 2224 6168  
Fax: +212 2224 6171

## The Netherlands (Rotterdam)

Tel: +31 (0)10 407 8886  
Fax: +31 (0)10 407 8433

## New Zealand (Auckland)

Tel: +64 9 356 2170  
Fax: +64 9 357 0019

## Nigeria (Ikeja, Lagos)

Tel: +234 1 4937 347  
Fax: +234 1 4937 329

## Norway (Oslo)

Tel: +47 03500  
Fax: +47 22 872 541  
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## Oman (Muscat)

Tel: +968 2456 7410  
Fax: +968 2456 7406

## Pakistan (Lahore)

Tel: +92 42 6315 882-85  
Fax: +92 42 6368 565

## Panama (Panama City)

Tel: +507 209 5400, 2095408  
Fax: +507 209 5401

## Peru (Lima)

Tel: +51 1 561 0404  
Fax: +51 1 561 3040

## The Philippines (Metro Manila)

Tel: +63 2 821 7777  
Fax: +63 2 823 0309, 824 4637

## Poland (Lodz)

Tel: +48 42 299 3000  
Fax: +48 42 299 3340

## Portugal (Oeiras)

Tel: +351 21 425 6000  
Fax: +351 21 425 6390, 425 6354

## Qatar (Doha)

Tel: +974 444 1789  
Fax: +974 444 6189

## Romania (Bucharest)

Tel: +40 21 310 4377  
Fax: +40 21 310 4383

## Russia (Moscow)

Tel: +7 495 960 22 00  
Fax: +7 495 913 96 96/95

## Saudi-Arabia (Al Khobar)

Tel: +966 (0)3 882 9394,  
Extensions 240, 254, 247  
Fax: +966 (0)3 882 4603

## Senegal (Dakar)

Tel: +221 832 1242, 832 3466  
Fax: +221 832 2057, 832 1239

## Serbia and Montenegro (Belgrade)

Tel: +381 11 3094 320, 3094 300  
Fax: +381 11 3094 343

## Singapore (Singapore)

Tel: +65 6776 5711  
Fax: +65 6778 0222

## Slovakia (Banska Bystrica)

Tel: +421 48 410 2324  
Fax: +421 48 410 2325

## Slovenia (Ljubljana)

Tel: +386 1 2445 440  
Fax: +386 1 2445 490

## South Africa (Johannesburg)

Tel: +27 11 617 2000  
Fax: +27 11 908 2061

## South Korea (Seoul)

Tel: +82 2 528 2794  
Fax: +82 2 528 2338

## Spain (Barcelona)

Tel: +34 (9)3 728 8700  
Fax: +34 (9)3 728 8743

## Sri Lanka (Colombo)

Tel: +94 11 2399304/6  
Fax: +94 11 2399303

## Sweden (Västerås)

Tel: +46 (0)21 32 90 00  
Fax: +46 (0)21 14 86 71

## Switzerland (Zürich)

Tel: +41 (0)58 586 0000  
Fax: +41 (0)58 586 0603

## Syrian Arab Republic

Tel: +9626 5620181 ext. 502  
Fax: +9626 5621369

## Taiwan (Taipei)

Tel: +886 2 2577 6090  
Fax: +886 2 2577 9467, 2577 9434

## Tanzania (Dar es Salaam)

Tel: +255 51 2136750, 2136751,  
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