



# ECODRIVE03

## Drive For General Automation with Fieldbus-Interfaces

Firmware Version Notes: FGP 02VRS

DOK-ECODR3-FGP-02VRS\*\*-FVN1-EN-P

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<b>What is the purpose of this documentation</b>	<p>This documentation is a supplement to the function description DOK-ECODR3-FGP-02VRS**-FKB1-EN-P Drive for General Automation with with Fieldbus-Interfaces.</p> <p>It describes the differences between ECODRIVE03-Version FWA-ECODR3-FGP-02VRS and the previous ECODRIVE-Version FWA-ECODR-FGP-01VRS.</p>

**Editing sequence**

Document identification of previous and present editions	Release Date	Note
DOK-ECODR3-FGP-02VRS**-FVN1-EN-P	10.98	first release

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# Contents

<b>1 General Information</b>	<b>1-1</b>
1.1 Product Family .....	1-1
1.2 Documentation .....	1-1
1.3 Notes on Replacing the Firmware.....	1-2
1.4 Release Notes.....	1-3
<b>2 Version Notes FWA-ECODR3-FGP-02VRS-MS</b>	<b>2-4</b>
2.1 New Functions .....	2-4
Clearing Error F276.....	2-4
Command Communication CAN-Open.....	2-4
Command Communication Interbus-S.....	2-4
Setting Absolute Dimension via Hardware Input.....	2-4
Motor Types .....	2-5
2.2 Expanded/Changed Functions.....	2-6
Password Protection .....	2-6
Command Communications Profibus .....	2-6
Supported Profile Types.....	2-6
Automatic Control Loop Settings.....	2-7
Dynamic Cam Switch Group .....	2-9
2.3 New / Removed Parameters.....	2-10
New Parameters .....	2-10
Parameters Removed .....	2-10
2.4 Expanded/Changed Parameters.....	2-11

## Sales & Service Facilities

## Notes

# 1 General Information

## 1.1 Product Family

The product release description refers to the product family:

<b>ECODRIVE03</b> DKC03.3; DKC04.3; DKC05.3; FWA-ECODR3-FGP-02VRS-MS
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The following drive controls can be operated with this software:

- DKC03.3
- DKC04.3
- DKC05.3

This document describes the differences between ECODRIVE03 -Version FWA-ECODR3-FGP-02VRS and the previous ECODRIVE03-Version FWA-ECODR3-FGP-01VRS.

## 1.2 Documentation

The document for **FWA-ECODR3-FGP-02VRS** is available as follows:

- in paper form
- or as a Windows help system.

The following table contains a summary of available items.

POS	Type	Document style	Part number	Symbol number
1	DOK-ECODR3-FGP-02VRS**-7301-EN-P	Box 73-02V-EN	282560	120-1000-B302-01-EN
2	DOK-ECODR3-FGP-02VRS**-FKB1-EN-P	Functional Description	282561	209-0088-4362-01
3	DOK-ECODR3-DKC**.3****-PRJ*-EN-P	Project Planning	280107	209-0088-4301-**
4	DOK-ECODR3-FGP-02VRS**-WAR1-EN-P	Troubleshooting GuidePaper	282562	209-0088-4364-01
5	DOK-ECODR3-FGP-02VRS**-FVN1-EN-P	Firmware Versionsnote	282563	209-0088-4365-01
6	DOK-GENERL-DRIVEHELP**-GEN1-MS-D0600	Windows-Help-System	282411	209-0069-4114-**

Fig. 1-1: Documentation for FWA-ECODRV-FGP-02VRS

## 1.3 Notes on Replacing the Firmware

Note the following before replacing the firmware:

1. The drive controller is on.
2. Secure the current parameters.
3. Switch the controller into phase 2.
4. Replace firmware with Dolfi,  
SWA-DOL\*PC-INB-01VRS-MS-C1.44-COPY, part number 279804.

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**Note:** 24V control voltage may not be switched off during the firmware exchange procedure.

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- a) Switch drive into phase 2.
- b) Start Dolfi.
- c) Input the following with the settings specified:

- **Interface:**

- select interface (COM 1 - 4)
- set baudrate for connect to 9.6 kB (always)
- set baudrate for download (9.6 to 115 kB)

- **Addresses**

- Set **sender** to value < 128
  - do not select the address set on the programming module via switches S2 and S3
  - Sender and receiver addresses must be different.
- Set **receiver** to a value < 128
  - do not select the address set on the programming module via switches S2 and S3
  - Sender and receiver addresses must be different.
- Enter the address set via switches S2 and S3 in field **unit address**.

- **Language**

- Select language (German/English)

- d) Press connect button

→ Header of the programmed module is read out.

- Look at header by selecting the header button.

- then change into window messages by selecting the message button.

- e) Press transmit button

→ \*.ibf-file for update must be selected

f) Start firmware update with ok (must be pressed after every programmed firmware module, generally, one FWA contains three firmware modules).

- g) Press separate button after successful update

→ drive firmware is started

- h) end Dolfi

5. If the number of parameters to be backed up has changed, then "PL" appears in the display. (If errors are pending, then these must be cleared first). If the S1 key is now pressed, then all backed up parameters are set to their default values. During this time "C8 load default parameters" appears on the display.
6. If command "C8 load default parameters" was started or the motor type changed, then "UL" appears prior to transition check from phase 3 to 4. The S1 key must now be pressed, or the command clear error started. The control default settings are then loaded out of the motor feedback into the drive controller.
7. Load the desired parameter file.

## 1.4 Release Notes

Firmware version **FWA-ECODR3-FGP-02V02** represents the first official edition of version 02. It was released on

18.12.1998

The following drive controllers can be operated with the released software:

- DKC03.3-040-7-FW
- DKC03.3-100-7-FW
- DKC04.3-040-7-FW
- DKC04.3-100-7-FW
- DKC05.3-040-7-FW
- DKC05.3-100-7-FW

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**Note:** To commission drive firmware version **FWA-ECODR3-FGP-02VRS-MS** then DriveTop version **SWA-DTOP\*\*\*-INB-10VRS-MS-C1,44-COPY** is needed.

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## 2 Version Notes FWA-ECODR3-FGP-02VRS-MS

### 2.1 New Functions

#### Clearing Error F276

If the **drive is locked** (customer password activated) then it is **not possible** to clear error F276.

As soon as the drive is **unlocked**, then error **F276** can be **cleared by**

- pressing the reset key (S1 key)
- or starting command S-0-0099, C5 Reset class 1 diagnostics (C1D).

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**Note:** The error is **not cleared** by switching the voltage source off (24V)!

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This ensures that an unauthorized user cannot delete **error F276** in a drive that is protected by a customer password.

#### Command Communication CAN-Open

**General features:**

- Protocol : CANopen as per CiA DS301
- Baudrate: 10 kbps to 1 Mbps
- Length of cyclical channel maximum of 16 bytes
- Use of Predefined Connection Set
- Parameter transmission via SDO
- Potential isolation of the interface

#### Command Communication Interbus-S

**General features:**

- Protocol : Interbus-S as per DIN 19258
- Connected to remote bus
- Length of cyclical channel maximum 15 words
- Transmission of parameters via PCP
- Interface potential isolated

#### Setting Absolute Dimension via Hardware Input

The option has been created of establishing the absolute dimension in the drive to an initiator mounted in the machine in the event that a **0 -> 1 flank** occurs at the **zero switch input (X3 Pin1)**.



This makes it possible to establish the reference

- with a **single procedure** (setup mode)
- or in **cyclical operations** (system with slip).

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**Note:** **Bit 1** and **Bit 2** in **P-0-0612, Control word for setting absolute measurement** are used for this purpose.

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**P-0-0612, Bit1 ,  
Activating set absolute dimension**

**Bit 1 =1:** Given a 0->1 flank at the zero switch input, the actual position is stored and command P-0-0012 automatically, internally started!

**Bit 1 =0:** Flank evaluation is switched off.

**P-0-0612, Bit2, Coordinate  
system switch**

**Bit 2 =1:** If command P-0-0012 was started with a zero switch input or by writing "11b" into P-0-0012, then the coordinate system is automatically switched and the command value channel is re-initialized.

**Bit 2 =0:** The coordinate system is not automatically switched. It waits for command "S-0-0148" to be externally started.

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**Note:** **Bit 2** of **P-0-0612** is only relevant if the drive enable is applied (drive in control)!

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## Motor Types

With version FGP-02VRS, linear motors (type LDL) are operated with a combination of sine and Hall encoders.

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**Note:** This corresponds to encoder type 14 in the selection list!

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## 2.2 Expanded/Changed Functions

### Password Protection

By editing **S-0-0279, IDN-list of password-protected operation data** the user himself can select that parameter which is to be protected by the password.

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**Note:** The default value of **S-0-0279, ID list of password-protected operating data** corresponds to the contents of **S-0-0192, IDN-list of backup operation data**.

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### Command Communications Profibus

Data exchange via Profibus-DP is only possible if there is a plug-in card (PBK2.1).

#### General features:

- Protocol : Profibus-DP as per DIN EN 50170/2
- Baudrate: 9.6 kbps to 12 Mbps
- Length of cyclical channel maximum 32 bytes
- Interface potential isolated

#### Firmware-specific features:

- Acyclical transmission of parameters in cyclical channel (parameter channel).

### Supported Profile Types

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**Note:** By specifying **P-0-4084, Profile type**, the command to move from phase 2 to 3 also automatically sets an operating mode (S-0-0032). The only exception hereto is **P-0-4084=0xFFFE!**

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#### CAN, Interbus and Profibus

FWA-ECODR3-FGP-02VRS supports the following profile types independent of the relevant fieldbus:

- **P-0-4084 = 0xFF80**, I/O mode (downward compatible to DKC3.1)
- **P-0-4084 = 0xFF81**, I/O mode (with cam status)
- **P-0-4084 = 0xFF82**, I/O mode (expandable real time channel)
- **P-0-4084 = 0x0001**, position target default (profile 22)
- **P-0-4084 = 0x0003**, velocity control 2
- **P-0-4084 = 0xFF91**, **Drive-Internal Interpolation** (with Indramat-specific control and status words!)
- **P-0-4084 = 0xFF93**, **Velocity control** (with Indramat-specific control and status words!)
- **P-0-4084 = 0xFFFE**, freely-configurable mode (with Indramat-specific control and status words!)

**CAN and Interbus** The following additional profile types are possible with CANopen and Interbus-S:

- **P-0-4084 = 0xFF92 , Cyclical position control**  
(with Indramat-specific control and status words!)

## Automatic Control Loop Settings

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**Note:** As of version FGP02VRS those parameters used for automatic control loop settings will be stored in the EEPROM (NOVRAM).

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### Definition of Travel Range for Control Loop Settings

As the axis must be moved to identify and set the control loop it is necessary to define the allowed travel range. There are two ways to do this:

- define a travel range by inputting limits P-0-0166, P-0-0167 (downward compatible)
- input the travel range, P-0-0169, while referencing the present actual position (necessary with modulo axes)!

Set the choice of mode in parameter **P-0-0165, Selection for autom. control loop adjust.**

**P-0-0165, Bit15=0** The range over which the axis may move during an automatic control loop setting is defined with

- a lower limit position **P-0-0166**
- and an upper on **P-0-0167**

The travel range is calculated based on this and displayed in P-0-0169.

**P-0-0165, Bit15=1** The range over which the axis may move during an automatic control loop setting is defined with

- a right and left allowable **Travel range P-0-0169**
- relates in terms of actual (start) position at start of the command

This results in a lower (start position - travel range) and an upper limit position (start position + travel range) within which the axis may move.

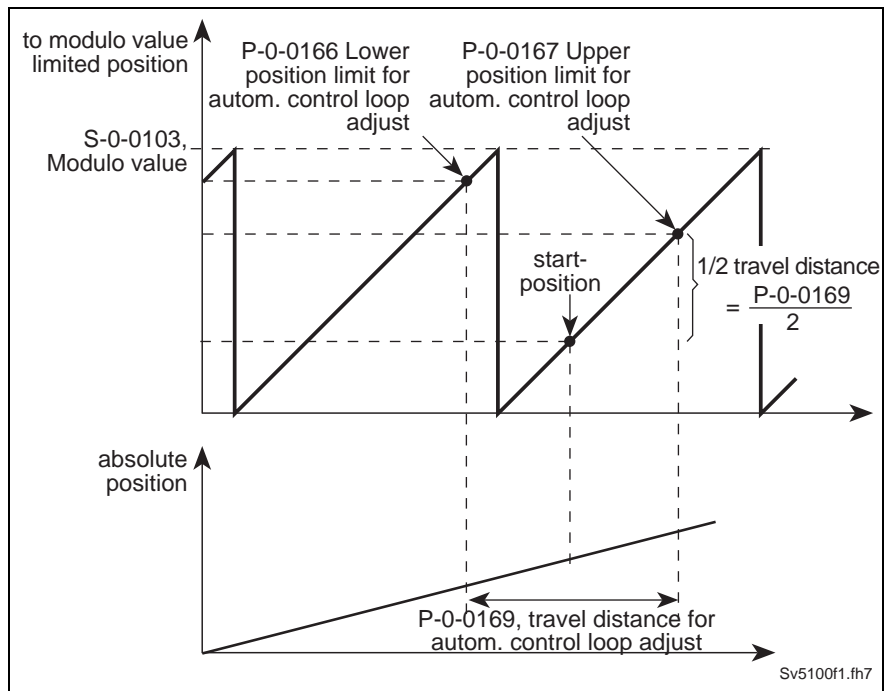


Fig. 2-1: Travel range bei automatic control loop settings with modulo scaling

**Note:** The monitoring of the defined travel range is only effective while command "Automatic control loop setting" is effective.

**Selection Options**

With version 02, the user has the option of setting optimization with parameter P-0-0165.

The following table describes the options:

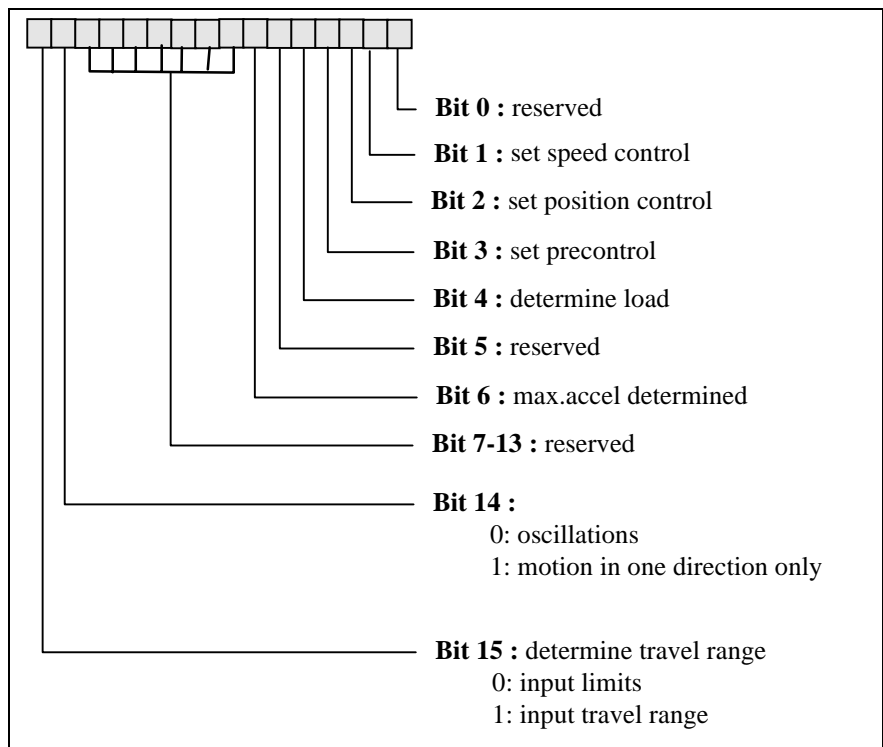


Fig. 3-2 Selection parameter for automatic control loop settings

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**Note:** With a **Default setting P-0-0165=0x0016** only speed and position controllers are set in addition to determining load inertia.

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## Dynamic Cam Switch Group

### Function Changes

The already used cam switch group with its **8 cams** is being **expanded to 16**. The basic function of generating cam bits has been retained. This means that **every 500µs a cam bit** is generated. If all 16 are used then the cams are processed with a **cycle time of 8 ms**. If only two are used, for example, then both cams are processed with the shorter cycle time of **1ms**.

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**Note:** If all cams are used, then the **longer total cycle time** must be acceptable.

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## 2.3 New / Removed Parameters

### New Parameters

<b>Fieldbus interface</b>	<p>It was necessary to introduce the following parameters for the fieldbus interface:</p> <ul style="list-style-type: none"> <li>• <b>P-0-4075, Fieldbus watchdog time</b></li> <li>• <b>P-0-4076, Fieldbus container object</b></li> <li>• <b>P-0-4077, Fieldbus control word</b></li> <li>• <b>P-0-4078, Fieldbus status word</b></li> <li>• <b>P-0-4079, Fieldbus baudrate</b></li> <li>• <b>P-0-4087, Length of real-time data channel Out</b></li> </ul> <p>In contrast to FGP01vrs P-0-4082 and P-0-4087 various lengths can be set for the cyclical input or output channel.</p>
<b>Automatic control loop setting</b>	<p>To be able to use the "Automatic control loop setting" command with modulo axes also, parameter:</p> <ul style="list-style-type: none"> <li>• <b>P-0-0169, Travel distance for autom. control loop adjust</b></li> </ul> <p>has been introduced.</p>
<b>Set absolute dimension</b>	<p>Due to the expansion of command "Set absolute dimension" parameter</p> <ul style="list-style-type: none"> <li>• <b>P-0-0612, Control word for setting absolute measurement</b></li> </ul> <p>has been introduced.</p>
<b>Password protection</b>	<p>Due to the expansion of the password protection, parameter</p> <ul style="list-style-type: none"> <li>• <b>S-0-0279, IDN-list of password-protected operation data.</b></li> </ul>

### Parameters Removed

<b>Compatibility class C</b>	<p>For fieldbus units, all parameters that meet compatibility class C have been removed as the bit information there is also in parameters <b>S-0-0012, C2D</b> or <b>S-0-0013, C3D</b>.</p> <p>These include:</p> <ul style="list-style-type: none"> <li>• <b>S-0-0310, Overload warning</b></li> <li>• <b>S-0-0311, Amplifier overtemperature warning</b></li> <li>• <b>S-0-0312, Motor overtemperature warning</b></li> <li>• <b>S-0-0315, Positioning speed &gt; n_limit</b></li> <li>• <b>S-0-0323, Target position beyond position limits</b></li> <li>• <b>S-0-0330, Message 'n_actual = n_command'</b></li> <li>• <b>S-0-0331, Status 'n_feedback = 0'</b></li> <li>• <b>S-0-0332, Message 'nactual &lt; nx'</b></li> <li>• <b>S-0-0334, Message 'T &gt;= Tlimit'</b></li> <li>• <b>S-0-0336, Message In position</b></li> <li>• <b>S-0-0342, Target position reached</b></li> </ul>
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- Real time control and status bits** As real time control and status bits are not supported in fieldbus drives, parameters:
- **S-0-0301, Allocation of real-time control Bit 1**
  - **S-0-0303, Allocation of real-time control Bit 2**
  - **S-0-0305, Allocation of real-time status Bit 1**
  - **S-0-0307, Allocation of real-time status Bit 2**
- have been dropped.

## 2.4 Expanded/Changed Parameters

- **P-0-0164, Application for autom. control loop adjust:** Further options have been limited here!
- **P-0-0165, Selection for autom. control loop adjust**  
This parameter was present but not significant.
- **P-0-4062, Power supply monitor**  
Definition, name and structure of parameter is completely changed in contrast to version FGP01vrs. Till now, the value of the DC bus was specified in this parameter as of which the unit-internal brake resistor is switched on.  
Now external mains section monitoring is activated/deactivated there via bit 0!
- **P-0-4080, Real-time input object structure** or **P-0-4081, Real-time output object structure** were not used in FGP01vrs. Both lists were filled with "1" which is now valid as per FGP02vrs.
- **P-0-4084, profile type** used to be selection code operating mode.

The following parameters are backed up as of Version FGP02vrs in EEPROM (NOVRAM).

- **P-0-0163, Damping factor for autom. control loop adjust**
- **P-0-0164, Application for autom. control loop adjust**
- **P-0-0165, Selection for autom. control loop adjust**
- **P-0-0166, Lower position limit for autom. control loop adjust**
- **P-0-0167, Upper position limit for autom. control loop adjust**





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<p><b>Spain</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Goimendi S.A. División Indramat Jolastokieta (Herrera) Apartado 11 37 E - 20017 San Sebastian</p> <p>Telefon: +34 9 43/40 01 63 Telefax: +34 9 43/39 17 99</p>	<p><b>Sweden</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Rexroth Mecman Svenska AB INDRAMAT Division Varuvägen 7 S - 125 81 Stockholm</p> <p>Telefon: +46 (0)8/727 92 00 Telefax: +46 (0)8/64 73 277</p>	<p><b>Switzerland - West</b> <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service</p> <p>Mannesmann Rexroth SA Département INDRAMAT Chemin de l'Ecole 6 CH-1036 Sullens</p> <p>Telefon: +41 (0)21/731 43 77 Telefax: +41 (0)21/731 46 78</p>	<p><b>Switzerland - East</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Mannesmann Rexroth AG Geschäftsbereich INDRAMAT Gewerbstraße 3 CH-8500 Frauenfeld</p> <p>Telefon: +41 (0)52/720 21 00 Telefax: +41 (0)52/720 21 11</p>
<p><b>Russia</b> <input type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Tschudnenko E.B. Arsenia 22 RUS - 153000 Ivanovo Rußland</p> <p>Telefon: +7 093/223 96 33 oder/for +7 093/223 95 48 Telefax: +7 093/223 46 01</p>	<p><b>Slowenia</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>DOMEL Elektromotorji in gospodinjski aparati d. d. Otoki 21 SLO - 64 228 Zelezniki</p> <p>Telefon: +386 64/61 73 32 Telefax: +386 64/64 71 50</p>	<p><b>Turkey</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Mannesmann Rexroth Hidropar A..S. Fevzi Cakmak Cad No. 3 TR - 34630 Sefaköy Istanbul</p> <p>Telefon: +90 212/541 60 70 Telefax: +90 212/599 34 07</p>	

Europäische Kundenbetreuungsstellen (ohne Deutschland)  
European Service agencies (without Germany)

## Außerhalb Europa - outside Europe

<b>Argentina</b> <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service Mannesmann Rexroth S.A.I.C. Division INDRAMAT Acassuso 48 41/7 RA - 1605 Munro (Buenos Aires) Telefon: +54 (0)1/756 01 40 +54 (0)1/756 01 36	<b>Argentina</b> <input type="checkbox"/> V/S <input checked="" type="checkbox"/> Service NAKASE Asesoramiento Tecnico Calle 49, No. 5764-66 RA - 1653 Villa Balester Provincia de Buenos Aires Telefon: +54 (0) 1/768 24 13 Telefax: +54 (0) 1/768 36 43	<b>Australia</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service AIMS - Australian Industrial Machinery Services Pty. Ltd. Unit 3/45 Horne ST Campbellfield 3061 AUS - Melbourne, VIC Telefon: +61 (0)3/93 59 02 28 Telefax: +61 (0)3/93 59 02 66	<b>Brazil</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service Mannesmann Rexroth Automação Ltda. Divisão INDRAMAT Rua Georg Rexroth, 609 Vila Padre Anchieta BR - 09951-270 Diadema-SP [ Caixa Postal 377 ] [ BR-09901-970 Diadema-SP ] Telefon: +55 (0)11/745 90 60 +55 (0)11/745 90 70 Telefax: +55 (0)11/745 90 50
<b>Canada</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service Basic Technologies Corporation Burlington Division 3426 Mainway Drive Burlington, Ontario Canada L7M 1A8 Telefon: +1 905/335 55 11 Telefax: +1 905/335-41 84	<b>China</b> <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service Mannesmann Rexroth (China) Ltd. Shanghai Office - Room 206 Shanghai Internat. Trade Centre 2200 Yanan Xi Lu PRC - Shanghai 200335 Telefon: +86 21/62 75 53 33 Telefax: +86 21/62 75 56 66	<b>China</b> <input type="checkbox"/> V/S <input checked="" type="checkbox"/> Service Mannesmann Rexroth (China) Ltd. Shanghai Parts & Service Center 199 Wu Cao Road, Hua Cao Minhang District PRC - Shanghai 201 103 Telefon: +86 21/62 20 00 58 Telefax: +86 21/62 20 00 68	<b>China</b> <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service Mannesmann Rexroth (China) Ltd. 15/F China World Trade Center 1, Jianguomenwai Avenue PRC - Beijing 100004 Telefon: +86 10/65 05 03 80 Telefax: +86 10/65 05 03 79
<b>China</b> <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service Mannesmann Rexroth (China) Ltd. A-5F., 123 Lian Shan Street Sha He Kou District PRC - Dalian 116 023 Telefon: +86 411/46 78 930 Telefax: +86 411/46 78 932	<b>Honkong</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service Rexroth (China) Ltd. 19 Cheung Shun Street 1st Floor, Cheung Sha Wan, Kowloon, Honkong Telefon: +852 27/41 13 51/-54 oder/or +852 27/41 14 30 Telefax: +852 27/86 07 33	<b>India</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service Mannesmann Rexroth (India) Ltd. INDRAMAT Division Plot. 96, Phase III Peenya Industrial Area IND - Bangalore - 560058 Telefon: +91 (0)80/8 39 21 01 Telefax: +91 (0)80/8 39 43 45	<b>India</b> <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service Mannesmann Rexroth (India) Ltd. INDRAMAT Division Plot. A-58, TTC Industrial Area Thane Turbhe Midc Road Mahape Village IND - Navi Mumbai - 400 701 Telefon: +91 (0)22/7 61 46 22 Telefax: +91 (0)22/7 68 15 31
<b>Indonesia</b> <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service PT. Rexroth Wijayakusuma Jl. Raya Bekasi Km 21 Pulogadung RI - Jakarta Timur 13920 Telefon: +62 21/4 61 04 87 +62 21/4 61 04 88 Telefax: +62 21/4 60 01 52	<b>Japan</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service Rexroth Automation Co., Ltd. INDRAMAT Division 1F, I.R. Building Nakamachidai 4-26-44 Tsuzuki-ku, Yokohama-shi J - Kanagawa-ken 224-004 Telefon: +81 459/42-72 10 Telefax: +81 459/42-03 41	<b>Korea</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service Mannesmann Rexroth-Seki Co Ltd. 1500-12 Da-Dae-Dong ROK - Saha-Ku, Pusan, 604-050 Telefon: +82 (0)51/2 60 06 18 Telefax: +82 (0)51/2 60 06 19	<b>Korea</b> <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service Seo Chang Corporation Ltd. Room 903, Jeail Building 44-35 Yeouido-Dong Yeoungdeungpo-Ku C.P.O.Box 97 56 ROK - Seoul Telefon: +82 (0)2/7 80 82 08 +82 (0)2/7 80 82 09 Telefax: +82 (0)2/7 84 54 08
<b>Mexico</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service Motorización y Diseño de Controles SA de CV Ant. Camino a Sta. Monica No. 7 San Lucas Tepetlaco MEX - 54060 Tlalnepanitla Telefon: +52 53/97 86 44 Telefax: +52 53/98 98 88	<b>New Zealand</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service Engineering Computer Services Ltd. P. O. box 20 204 Te Rapa NZ - Hamilton Telefon: +64 (0)7/8 49 22 11 Telefax: +64 (0)7/8 49 22 20	<b>South Africa</b> <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service HYTEC Automation (Pty) Ltd. 28 Banfield Road, Industria North RSA - Maraisburg 1700 Telefon: +27 (0)11/673 20 80 Telefax: +27 (0)11/673 72 69	<b>Taiwan</b> <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service Rexroth Uchida Co., Ltd. No.1, Tsu Chiang Street Tu Cheng Ind. Estate Taipei Hsien, Taiwan, R.O.C. Telefon: +886 2/2 68 13 47 Telefax: +886 2/2 68 53 88

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**Außerhalb Europa / USA - outside Europe / USA**

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<p>USA <span style="float: right;">☑ V/S ☑ Service</span></p> <p>Mannesmann Rexroth Corporation                  INDRAMAT Division                  Charlotte Regional Sales Office                  14001 South Lakes Drive                  USA - Charlotte,                  North Carolina 28273</p> <p>Telefon: +1 704/5 83 97 62                  +1 704/5 83 14 86</p>			

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