

MTC200 / MT-CNC

Teleservice

Remote Diagnostics

Application Information

DOK-MTC200-TELESER*V17-ANW1-EN-P



Title	MTC200 / MT-CNC Teleservice - Remote Diagnostics
Type of document	Application Information
Document code	DOK-MTC200-TELESER*V17-ANW1-EN-P
Purpose of this document	This documentation describes the possibilities of Remote Diagnostics and Teleservice in conjunction with PC-based control systems like MTC200 or MT-CNC. Besides the hardware requirements, a customary software product is described including its installation and parameter settings.

Configuration control

Documentation identification of previous releases	Release date	Comment
109-1041-4106-01	02.98	New issue

Trademarks MS-DOS, Windows, Windows95 and WindowsNT are registered trademarks of Microsoft Corporation.
 IBM is a registered trademark of International Business Machines Corporation.
 pcANYWHERE is a registered trademark of Symantec Corporation.

Copyright © INDRAMAT GmbH, 1998
 Copying this document, and giving it to others and the use or communication of the contents thereof without express authority are forbidden. Offenders are liable for the payment of damages. All rights are reserved in the event of the grant of a patent or the registration of a utility model or design (DIN 34-1).

Validity All rights are reserved with respect to the content of this documentation and the availability of the product.

Published by INDRAMAT GmbH • Bgm.-Dr.-Nebel-Str. 2 • D-97816 Lohr a. Main
 Phone +49 (0)9352/40-0 • Tx 689421 • Fax +49 (0)9352/40-4885

Dept. ESM (WN)

Contents

1 Introduction	1-1
1.1 General	1-1
1.2 Definition of Terms	1-1
2 System Requirements	2-1
2.1 Hardware.....	2-1
Operating Terminal and Remote-PC	2-1
Modem	2-1
Cable Connections	2-2
2.2 Software	2-2
3 Operation	3-1
3.1 Initiating the Host Mode	3-1
3.2 Starting the Remote Software	3-1
4 Appendix: Technical Explanation	4-1
4.1 Host Mode.....	4-1
Select Current Configuration	4-1
Host Settings	4-1
4.2 Configuring (Host- and Remote Mode)	4-3
System Hardware	4-3
System Setup	4-3
Telephone Number Prefix / Suffix	4-3
5 Appendix: Troubleshooting	5-1
6 Index	6-1

1 Introduction

1.1 General

Optimized, complex production lines, expensive production plants, moving production abroad, economizing spare part storing and high costs for service management require high machine availability, efficient service and a quick response.

Teleservice enables enterprises and their branch offices to access data of machines located remote in order to carry out diagnostics and maintenance.

Using Teleservice enables the office on duty (usually the customer service department) to look at and to modify user data (NC-/SPS programs, production data) of machines located remote and if necessary intervene operation.

When using Teleservice contractual agreement between service provider and service recipient is recommended which clearly states the possibilities and responsibilities between the two parties.

Typical Teleservice functions are:

- File transfer including soft- and firmware updates
- Observe operations
- Remote operation of a machine control

The following components are required

a) at the machine:

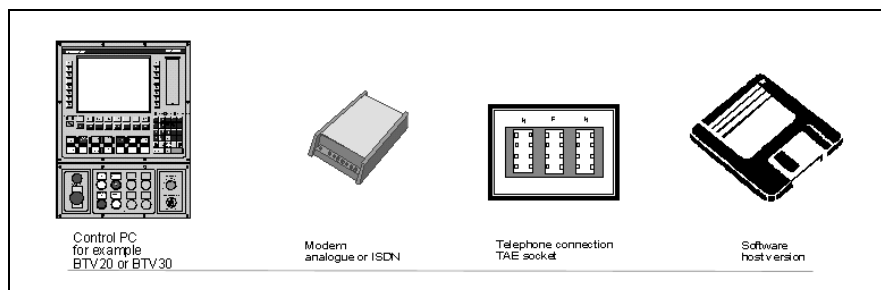


Fig. 1-1: Components required at the machine

b) at the service provider:

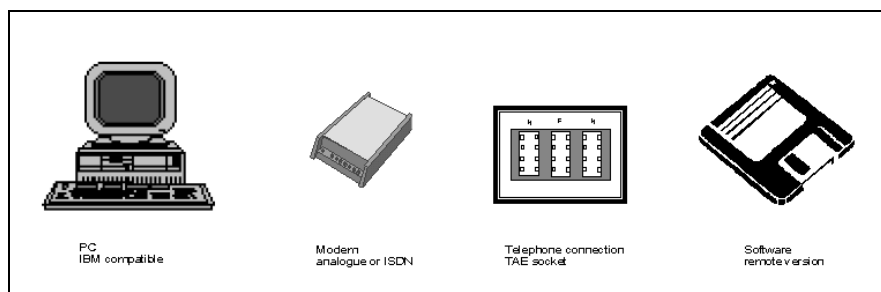


Fig. 1-2: Components of the remote station

1.2 Definition of Terms

Host-PC Within the Remote Diagnostics, the PC-based operating terminal at the machine represents the so-called Host-PC. In order to facilitate a Teleservice session, the host software needs to be installed and called up on the operating terminal. The link to a host-PC can be established at various locations. In this way, a Teleservice request can be handed over from internal maintenance via machine tool builder to the control manufacturer.

Remote-PC The PC, from which the link to the observing control system is established, is called Remote-PC. A Remote-PC can call any Host-PC. Selection is carried out via telephone number, meaning that the remote software needs to be installed on the Remote-PC only once. Host and remote software are two components of a software package that have to match.

During a Teleservice session, the Host-PC's screen contents are simultaneously displayed on the Remote-PC's screen. The Remote-PC's key inputs can instantly be directed to the Host-PC for operation.

2 System Requirements

2.1 Hardware

Operating Terminal and Remote-PC

The PCs in use must fulfill the following requirements (machine operating terminal and Remote-PC at customer service):

- IBM PC/AT or compatible system; ≥ 80486DX2/66 recommended.
- Work memory 8 MB min.
- available harddisk space 3 MB min. (MS-DOS), 16MB min. (Windows95 / WindowsNT)
- Floppy disk drive HD 3,5"
- V24/RS232 (COM) interface to connect an external modem

Note: Due to the fact that the COM2 interface is an optional feature in various controls, it must be checked, whether a vacant V24/RS232 interface is available at the machine operating terminal.

Modem

A modem facilitates Host- to Remote-PC communication via telephone lines.

Remote diagnostics require one modem for each participant. The modem must be supported by the remote- and host-software. A list of supported modems is provided with the documentation of the software used .

A so-called '**Hayes compatible**' modem featuring a transmission rate of 28.8 kBaud min. is recommended. Such a modem is capable of the 'Hayes command set' representing today's communication standard. Nowadays, the market provides analogue modems capable of data transfer rates between 33.6 and 56 kBaud.

ISDN (Integrated Services Digital Network)

Almost all over the world, the conventional telephone network is based on analogue data transmission. However, in many European countries the so-called ISDN standard has been available in the telephone network for several years. ISDN is based on a digital data transmission and facilitates, besides various special services, a higher transmission rate of 64 kBaud.

Introducing ISDN resulted in an additional classification for modems, namely the distinction between analogue and digital modem. Digital modems are also called terminal adapter.

Up to now, INDRAMAT has had good experience using the modem models listed below:

externally:	1&1/ Creatix Modem Skyconnect 33.6 kBaud analogue
externally:	Elsa MikroLink ISDN /TL V.34 automatic detection of analogue- (33,6 kBaud) or ISDN-operation (64 kBaud)
internally ISA bus:	USRobotics Sportster Voice 33.6 - 56 kBaud analogue (currently testing)

Fig. 2-3: Modem models

The decision about which modem type to be used depends on the final destination of the production line or machine. Not only the supply voltage and the telephone system may vary depending on the country, but also not every standard, like ISDN for example, is supported world wide. Checking the local conditions is absolutely necessary.

Cable Connections

PC → Modem

A so-called V24/RS232 standard nullmodem cable is required for a connection between a PC and an external modem. The connection length must not exceed 15 meter according to V24/RS232 standards.

If an internal modem is used instead of an external one, the above mentioned link is not applied. The modem is directly plugged into an empty PC ISA-bus slot and also communicates in this way.

Note: See modem documentation for further details

Modem → Telephone system

A telephone cable is required for the connection to the telephone network (in Germany for example a TAE6 telephone socket featuring coding 'N' in the case of a branch). A direct exchange line should be available at the machine side to enable direct access initiated by the Host-PC.

Due to connection technique variations of the telephone systems depending on the country, these facts need to be checked in advance or the required components should be provided at the final location of installation.

Note: See modem documentation for further details

2.2 Software

A special software is required to establish a link between Remote- and Host-PC and to carry out data transmission. Up to now, Indramat has successfully used the following software for Teleservice operation:

SYMANTEC™ NORTON pcANYWHERE for MS-DOS, Ver.5.0

SYMANTEC™ NORTON pcANYWHERE32 for Windows95/NT, Ver.7.5

All parts of the software are licensed and must exclusively be used on one PC in accordance with the license agreement.

According to the user functions - host and remote - this DOS software consists of two parts, the so-called host software and the remote software. Although both parts can be purchased in a single package, merely the host software must be installed on the Host-PC and the remote software on the Remote-PC.

Because the host software is required for each operating terminal which is to be equipped with Teleservice, but the remote software only once in the area of customer service, both parts can be purchased separately (for example a **NORTON pcANYWHERE 'Host only'** package).

The various **SYMANTEC™ NORTON pcANYWHERE** platforms (DOS- and Windows versions) are capable of communicating with each other, i.e. using a remote software running under Windows95/WindowsNT a host version running under DOS can be accessed.

For installation and configuration follow the notes of the documentation supplied with the relevant software.

3 Operation

A graphic program running on the Host-PC during remote diagnostics, for example, the Indramat user interface GUI (**G**raphical **U**ser **I**nterface) of the MTC200/MT-CNC causes a very slow screen synthesis at the Remote-PC due to an extensive amount of data required for image transmission.

To achieve remote diagnostic sessions at acceptable data transmission rates and in this way also reasonable screen refreshment rates, the use of the standard ASCII mode of the MTC200/MT-CNC user interface, the so-called MUI (**M**achine **U**ser **I**nterface), on the Host-PC is recommended.

3.1 Initiating the Host Mode

The software (DOS host software) installed on the operating terminal must be initiated prior to starting the CNC-MUI. After terminating all programs initiated hereafter, the memory residing program can be removed from memory using a certain key combination (a so-called 'hotkey').

A batch file containing the following commands can be created to start the host software:

```
@cls
@echo.
c:\<path>\aw_host /m:a
```

Replace <path> by the actual path where the host software was installed.

Usually the CNC user interface is called during AUTOEXEC.BAT execution. For this reason, the remote diagnostics call should be implemented in the AUTOEXEC.BAT as well.

3.2 Starting the Remote Software

To establish a communication to the host operating terminal, for example at the customer, the service technician has to start the remote program.

As with host operation, correct COM port configuration of the COM port where the modem is connected to is a requirement for a proper communication. For further details see *SYMANTEC™* documentation (see also '**Appendix**' of the documentation in hand, item 'software' and 'setting examples').

Change directory to the **NORTON pcANYWHERE** DOS installation directory and call up program:

```
c:\<path>\aw
```

Within the **pcANYWHERE** main menu the following menu items are selected subsequently in order to call a Host-PC:

```
pcANYWHERE Call host ...
Quick connection...           or if predefined entries exist,
                               'Connect via host list' ...
Call                           by this, the
                               'Remote quick connection parameter' settings
                               entered via
                               'Modify connection parameter' are used.
```

If no quick connection telephone number exists, then it is now prompted for the host telephone number.

After entering the host telephone number, the modem is trying to establish a connection to the operating terminal. Assuming correct installation and settings for host and remote, the entire screen of the operating terminal (host) is now displayed on the Remote-PC.

Remote diagnostics can now be started.

To terminate the remote diagnostic session, the key combination predefined in 'Settings' (for example <Ctrl>+<Alt>) must be entered (see also 'Appendix').

Further special functions like 'Return call', 'Session protocol', etc. are described in the *SYMANTEC™*-documentation.

Safety settings (host)

Parameter	Setting
Initialize system at end of session	No
Use calling device list	No (Standard calling device setup)
Standard calling device entry	<view/modify> see. Fig. 4-8
Random password for reconnection	No
Distinguish upper/lower case	No
Max. number of retries for password entry	3 (0 for unlimited)
Downtime for password entry	3 minutes
Record failure in logbook	Yes
Active keyboard during session	host only
Non-active cut off time	0 minutes (0 for none)
Turn off host screen	No
Lock host in waiting mode	No
Request among connection	No
Waiting time of request	5 seconds (5 - 120)
Use data encoding	No

Fig. 4-7: Safety settings

Calling device settings: Standard calling device entry

Parameter	Setting
Password	
Cut off host screen	No
calling device host initializes system	No
Usage of <Ctrl-Break>	<Ctrl-C> and <Ctrl-Break>
Use special key matrix	Yes
Modify host mode by calling device	Yes
Calling device non-active cut off time	No
Calling device logbook entry	Yes
Online time max.	0 min (0 = unlimited)
execute command among link	
Drive protection	inactive
Return call to remote	No
Return call telephone number Prefix Suffix	

Fig. 4-8: Calling device settings

4.2 Configuring (Host and Remote Modes)

System Hardware

Modem

Parameter	Setting
Interface	serial - COM2
Modem type	Hayes compatible
Baudrate	19200
Parity	<none>
Flow control	RTS/CTS
Connection start via	Modem response
End of connection via	Carrier detect (DCD)
Number of rings	1
Dialing method	Tone
Number of retries	0
Additional modem initializing string	
Break length	0.05 0.1/sec
DTR status	always ON
RTS status	always ON
Waiting time after dialing (sec.)	60
Permanent line	No
Sec. until radiating	10
Adapt DTE/DCE baudrate	Yes

Fig. 4-9: Modem parameter

System Set-Up

Parameter	Setting
Your computer name	RAH
Remove 'snow'	No
Master password	RAH
Program colors	Standard

Fig. 4-10: System parameter

Telephone Number Prefix / Suffix

Parameter	Setting
Outside line	0,
No call waiting time	*70,
Credit card	,,,0000 0000 0000

Fig. 4-11: Telephone number parameter

5 Appendix: Troubleshooting

Listed below are several indications on possible errors and their relevant counter measures, especially when operating under MS-DOS:

Error description	Possible counter measure
During initialization or operation error message: 'Not enough memory', 'Cannot load EMM386' or similar occurs.	Compare file CONFIG.SYS: <pre>Switches=/f DEVICE=C:\DOS\HIMEM.SYS DEVICE=C:\DOS\EMM386.EXE NOEMS BUFFERS=30,0 FILES=30 DOS=HIGH DOS=UMB FCBS=4,0 SHELL=C:\DOS\COMMAND.COM /e:768 /p COUNTRY=049,437,C:\DOS\COUNTRY.SYS</pre> and file AUTOEXEC.BAT : <pre>LH C:\DOS\SMARTDRV.EXE PROMPT \$p\$g path c:\dos LH KEYB GR,,C:\DOS\KEYBOARD.SYS LH doskey</pre>
No connection is established:	Check configuration, the modem must be connected to the relevant COM port, ...
After a successful initialization by the remote user the connection gets lost.	In 'Calling device settings' a 'Return call to remote' is selected, although the telephone/modem line does not have international rights.
Dialing interruption:	Determine whether your telephone / modem is using tone or pulse dialing and set the correct mode in item 'System hardware'- 'Dialing mode'.
Modem initialization error:	Some COM ports use an older, slower chip set. Reduce the baudrate prior to making the next attempt.
	The second COM port is not equipped within the operating PC, BTV-PC option.
Modem error:	Modem 'switches' should be default settings.
	Communication-, current- and telephone line of the modem must be connected correctly, for example connected to an external line.
	Carry out modem Power Reset
After calling the host mode, the initialization/dialing window is not displayed, the screen only flashes once.	Select and save again modem type, for example 'Hayes Compatible' in item 'Host configuration-System hardware-Modem-Modem type'.
The CNC User interface MUI is initiated, hotkey operation should remove the memory residential remote diagnostics software. Message 'System resources cannot be released'.	The remote diagnostic's memory residential host mode can only be terminated after terminating the CNC-MUI. TSR programs are removed from DOS-RAM according to the FILO principle (First In Last Out)!

Fig. 5-12: Troubleshooting

6 Index

A

AUTOEXEC.BAT: 3-1

C

Call: 3-1, 3-2

COM2 interface: 2-1

CONFIG.SYS: 4-1

Creatix: 2-1

D

data transmission: 2-1, 2-2

digital modems: 2-1

direct exchange line: 2-2

E

Elsa: 2-2

EMM386: 4-1

F

File transfer: 1-1

Floppy disk drive: 2-1

G

graphic program: 3-1

H

harddisk space: 2-1

Hayes: 2-1, 4-3, 5-1

host software: 1-2, 2-3, 3-1

Host-PC: 1-2, 2-3, 3-1

host-software: 2-1

I

Installation: 2-3, 3-2

ISA bus: 2-2

ISA-bus: 2-2

ISDN: 2-1, 2-2

K

key input: 1-2

L

license contract: 2-2

M

memory management: 4-1

Modem: 2-1, 2-2, 3-1, 3-2, 4-1, 4-3, 5-1

MS-DOS: 2-1, 2-2

N

nullmodem cable: 2-2

O

operating terminal: 1-2, 2-1, 2-3, 3-1, 3-2

Outside line: 4-3

P

pcANYWHERE: 2-2, 2-3, 3-1

Q

QEMM: 4-1

Quick connection: 3-1

R

Remote operation: 1-1

remote software: 2-3, 3-1

Remote-PC: 1-2, 2-1, 2-3, 3-1, 3-2, 4-1

Return call: 4-2, 5-1

RS232: 2-1, 2-2

,

'Session protocol': 3-2

S

settings: 3-1, 3-2, 4-1, 4-2

supply voltage: 2-2

T

TAE6 telephone socket: 2-2

Telephone line: 2-1

telephone system: 2-2

U

USRobotics: 2-2

W

Windows95: 2-1, 2-2

WindowsNT: 2-1

Work memory: 2-1

List of Customer Service Points

Germany

Sales area Center INDRAMAT GmbH D-97816 Lohr am Main Bgm.-Dr.-Nebel-Str. 2 Phone: 09352/40-0 Fax: 09352/40-4885	Sales area East INDRAMAT GmbH D-09120 Chemnitz Beckerstraße 31 Phone: 0371/3555-0 Fax: 0371/3555-230	Sales area West INDRAMAT GmbH D-40849 Ratingen Hansastraße 25 Phone: 02102/4318-0 Fax: 02102/41315	Sales area North INDRAMAT GmbH D-22085 Hamburg Fährhausstraße 11 Phone: 040/227126-16 Fax: 040/227126-15
Sales area South INDRAMAT GmbH D-80339 München Ridlerstraße 75 Phone: 089/540138-30 Fax: 089/540138-10	Sales area Southwest INDRAMAT GmbH D-71229 Leonberg Böblinger Straße 25 Phone: 07152/972-6 Fax: 07152/972-727		INDRAMAT Service Hotline INDRAMAT GmbH Phone: D-0172/660 040 6 -or- Phone: D-0171/333 882 6

Customer service points in Germany

Europe

Austria G.L.Rexroth Ges.m.b.H. Geschäftsbereich INDRAMAT A-1140 Wien Hägelingasse 3 Phone: 1/9852540-400 Fax: 1/9852540-93	Austria G.L.Rexroth Ges.m.b.H. Geschäftsbereich INDRAMAT A-4061 Pasching Randlestraße 14 Phone: 07229/64401-36 Fax: 07229/64401-80	Belgium Mannesmann Rexroth N.V.-S.A. Geschäftsbereich INDRAMAT B-1740 Ternat Randlaan 8 Phone: 02/5823180 Fax: 02/5824310	Denmark BEC Elektronik AS DK-8900 Randers Zinkvej 6 Phone: 086/447866 Fax: 086/447160
England Mannesmann Rexroth Ltd. INDRAMAT Division Cirencester, Glos GL7 1YG 4 Esland Place, Love Lane Phone: 01285/658671 Fax: 01285/654991	Finnland Rexroth Mecman OY SF-01720 Vantaa Riihimiehentie 3 Phone: 0/848511 Fax: 0/846387	France Rexroth - Sigma S.A. Division INDRAMAT F-92632 Gennevilliers Cedex Parc des Barbanniers 4, Place du Village Phone: 1/41475430 Fax: 1/47946941	France Rexroth - Sigma S.A. Division INDRAMAT F-69634 Venissieux - Cx 91, Bd 1 Joliot Curie Phone: 78785256 Fax: 78785231
France Rexroth - Sigma S.A. Division INDRAMAT F-31100 Toulouse 270, Avenue de l'ardenne Phone: 61499519 Fax: 61310041	Italy Rexroth S.p.A. Divisione INDRAMAT I-20063 Cernusco S/N.MI Via G. Di Vittoria, 1 Phone: 02/92365-270 Fax: 02/92108069	Italy Rexroth S.p.A. Divisione INDRAMAT Via Borgomanero, 11 I-10145 Torino Phone: 011/7712230 Fax: 011/7710190	Netherlands Hydraudyne Hydrauliek B.V. Kruisbroeksestraat 1a P.O. Box 32 NL-5280 AA Boxtel Phone: 04116/51951 Fax: 04116/51483
Spain Rexroth S.A. Centro Industrial Santiago Obradors s/n E-08130 Santa Perpetua de Mogoda (Barcelona) Phone: 03/718 68 51 Telex: 591 81 Fax: 03/718 98 62	Spain Goimendi S.A. División Indramat Jolastokieta (Herrera) Apartado 11 37 San Sebastian, 20017 Phone: 043/40 01 63 Telex: 361 72 Fax: 043/39 93 95	Sweden AB Rexroth Mecman INDRAMAT Division Varuvägen 7 S-125 81 Stockholm Phone: 08/727 92 00 Fax: 08/64 73 277	Switzerland Rexroth SA Département INDRAMAT Chemin de l'Ecole 6 CH-1036 Sullens Phone: 021/731 43 77 Fax: 021/731 46 78
Switzerland Rexroth AG Geschäftsbereich INDRAMAT Gewerbestraße 3 CH-8500 Frauenfeld Phone: 052/720 21 00 Fax: 052/720 21 11	Russia Tschudnenko E.B. Arsenia 22 153000 Ivanovo Rußland Phone: 093/22 39 633		

European customer service points without Germany

Outside of Europe

<p>Argentina</p> <p>Mannesmann Rexroth S.A.I.C. Division INDRAMAT Acassusso 48 41/7 1605 Munro (Buenos Aires) Argentina</p> <p>Phone: 01/756 01 40 01/756 02 40 Telex: 262 66 rexro ar Fax: 01/756 01 36</p>	<p>Argentina</p> <p>Nakase Asesoramiento Tecnico Diaz Velez 2929 1636 Olivos (Provincia de Buenos Aires) Argentina Argentina</p> <p>Phone 01/790 52 30</p>	<p>Australia</p> <p>Australian Industrial Machinery Services Pty. Ltd. Unit 3/45 Horne ST Campbellfield VIC 2061 Australia</p> <p>Phone: 03/93 59 0228 Fax: 03/93 59 02886</p>	<p>Brazil</p> <p>Mannesmann Rexroth Automação Ltda. Divisão INDRAMAT Rua Georg Rexroth, 609 Vila Padre Anchieta BR-09.951-250 Diadema-SP Caixa Postal 377 BR-09.901-970 Diadema-SP</p> <p>Phone: 011/745 90 65 011/745 90 70 Fax: 011/745 90 50</p>
<p>Canada</p> <p>Basic Technologies Corporation Burlington Division 3426 Mainway Drive Burlington, Ontario Canada L7M 1A8</p> <p>Phone: 905/335-55 11 Fax: 905/335-41 84</p>	<p>China</p> <p>Rexroth (China) Ltd. Shanghai Office Room 206 Shanghai Intern. Trade Centre 2200 Yanan Xi Lu Shanghai 200335 P.R. China</p> <p>Phone: 021/627 55 333 Fax: 021/627 55 666</p>	<p>China</p> <p>Rexroth (China) Ltd. Shanghai Parts & Service Centre 199 Wu Cao Road, Hua Cao Minhang District Shanghai 201 103 P.R. China</p> <p>Phone: 021/622 00 058 Fax: 021/622 00 068</p>	<p>China</p> <p>Rexroth (China) Ltd. 1430 China World Trade Centre 1, Jianguomenwai Avenue Beijing 100004 P.R. China</p> <p>Phone: 010/50 50 380 Fax: 010/50 50 379</p>
<p>China</p> <p>Rexroth (China) Ltd. A-5F., 123 Lian Shan Street Sha He Kou District Dalian 116 023 P.R. China</p> <p>Phone: 0411/46 78 930 Fax: 0411/46 78 932</p>	<p>Honkong</p> <p>Rexroth (China) Ltd. 19 Cheung Shun Street 1st Floor, Cheung Sha Wan, Kowloon, Honkong</p> <p>Phone: 741 13 51/-54 und 741 14 30 Telex: 3346 17 GL REX HX Fax: 786 40 19 786 07 33</p>	<p>India</p> <p>Mannesmann Rexroth (India) Ltd. INDRAMAT Division Plot. 96, Phase III Peenya Industrial Area Bangalore - 560058</p> <p>Phone: 80/839 21 01 80/839 73 74 Telex: 845 5028 RexB Fax: 80/839 43 45</p>	<p>Japan</p> <p>Rexroth Co., Ltd. INDRAMAT Division I.R. Building Nakamachidai 4-26-44 Tsuzuki-ku, Yokohama 226 Japan</p> <p>Phone: 045/942-72 10 Fax: 045/942-03 41</p>
<p>Korea</p> <p>Rexroth-Seki Co Ltd. 1500-12 Da-Dae-Dong Saha-Gu, Pusan, 604-050</p> <p>Phone: 051/264 90 01 Fax: 051/264 90 10</p>	<p>Korea</p> <p>Seo Chang Corporation Ltd. Room 903, Jeail Building 44-35 Yoido-Dong Youngdeungpo-Ku Seoul, Korea</p> <p>Phone: 02/780-82 07 ~9 Fax: 02/784-54 08</p>	<p>Mexico</p> <p>Motorización y Diseño de Controles, S.A. de C.V. Av. Dr. Gustavo Baz No. 288 Col. Parque Industrial la loma Apartado Postal No. 318 54060 Tlalnepantla Estado de Mexico</p> <p>Phone: 5/397 86 44 Fax: 5/398 98 88</p>	
<p>USA</p> <p>Rexroth Corporation INDRAMAT Division 5150 Prairie Stone Parkway Hoffman Estates, Illinois 60192</p> <p>Phone: 847/645-36 00 Fax: 857/645-62 01</p>	<p>USA</p> <p>Rexroth Corporation INDRAMAT Division 2110 Austin Avenue Rochester Hills, Michigan 48309</p> <p>Phone: 810/853-82 90 Fax: 810/853-82 90</p>		

Customer service points outside of Europe

Notes

