BECKHOFF New Automation Technology

PC-based Control for Water Management



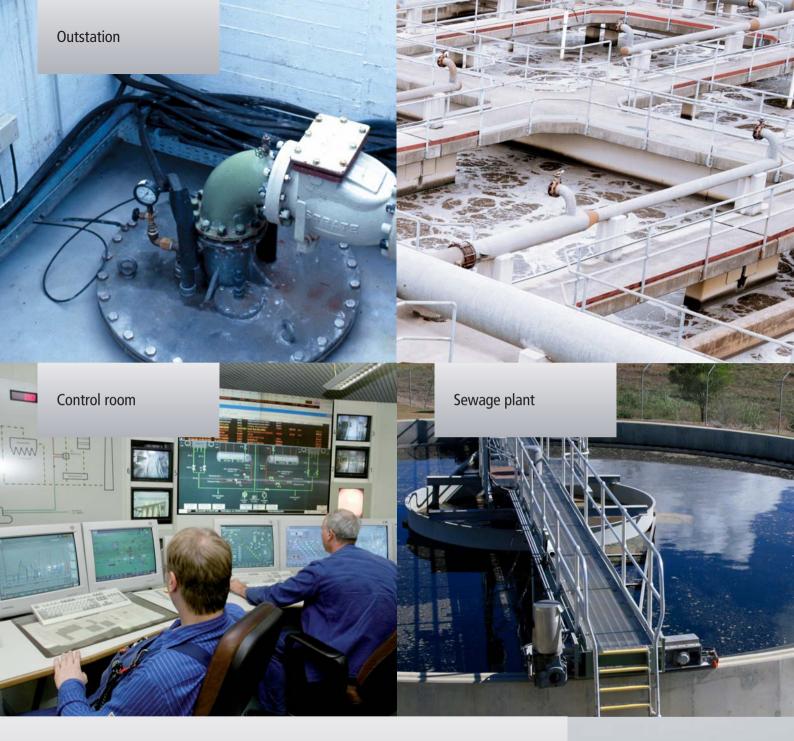


PC-based Control from Beckhoff ...

For over 30 years Beckhoff has been realising automation solutions on the basis of PC-based control technology, which have proven themselves in the most diverse industries and applications on account of their openness and high performance. The globally operative company, whose headquarters and production site are in Verl, Germany, is represented by 30* subsidiaries and distributors in over 60 countries and employs around 2100* people worldwide. Beckhoff achieved a total turnover of 465 million Euros in 2011.

The constant technological development, economic growth, high production depth and production capacities of Beckhoff guarantee robustness, long-term availability and delivery reliability of PC-based control technology.

*March 2012



... trims water and wastewater management to efficiency and sustainability.

Planners and engineers in the field of water management are faced today not only with the challenge of guaranteeing the supply of clean potable water and reliable wastewater disposal. In view of the demographic change and the increasing world population, sustainability in dealing with water as a resource and energy efficiency in the cleaning of wastewater are becoming increasingly important. At the same time the costs of building new plants or modernising existing ones are playing an ever increasing role in the municipalities. The PC-based control system from Beckhoff offers the solution: Through the use of the latest processors, PC-based Control makes a powerful automation platform available for the acquisition and processing of all process data. Due to the open interfaces and the support of communication standards, the PC-based controller is suitable both for the central control of a wastewater treatment plant and for the decentralised control of the outstations.

Industrial PC



Embedded PC



Embedded controller





Automation and engineering software

Scalable automation technology as a universal control platform ...

In addition to the I/O components for the acquisition of all data points and TwinCAT automation software, the Beckhoff product range offers a universal, scalable and modular control system that provides a suitable solution for every task with regard to computing performance, complexity and costs. With their wide performance range, the DIN rail-mountable Beckhoff embedded controllers with direct I/O interface cover all control tasks from the mid to the highest segment. The devices are compact; they save space and costs and on top of that they are modular and flexible. The even more powerful Beckhoff Industrial PCs can be used as the central controller of a large plant. The modular I/O system consists of electronic terminal blocks for direct sensor/actuator wiring and a Bus Coupler for connection to the respective bus system. With over 400 types of signals, all sensors and actuators can be coupled.



... for the entire water treatment process.

Efficient water management requires fast and precise access to and processing of an abundance of process data. The Beckhoff Embedded PC series is optimally suited to this: The connected Bus Terminals support the connection of all common sensors and actuators for the precise acquisition of the different process parameters, such as levels, temperatures, flow rate, pH value, oxygen or nitrogen content, etc., at the various water treatment stations. The compact embedded controllers have sufficient performance to control the decentral outstations of a wastewater treatment plant. Apart from control technology they also take care of data storage and processing as well as local visualisation. The scalability and modularity of the PC-based controller provides the operating company with the possibility to adapt its plant to the many different or changing requirements without having to accept high implementation costs and expenditure of time on each occasion.

Control room



Open interfaces simplify communication ...

Due to the variety of open software and hardware interfaces, the PC-based controller serves all common communication media and standards into the higher process level, for example via OPC and the IEC 60870-5-10x telecontrol protocols, as well as at field level via Ethernet, PROFINET, PROFIBUS, EtherNet/IP etc. Communication over long distances takes place via analog modem, radio, PC networks or mobile telephone networks. The communication standards required for this, such as GPRS, UMTS or also LTE, are supported by the PC-based platforms.

Outstation/sewage plant

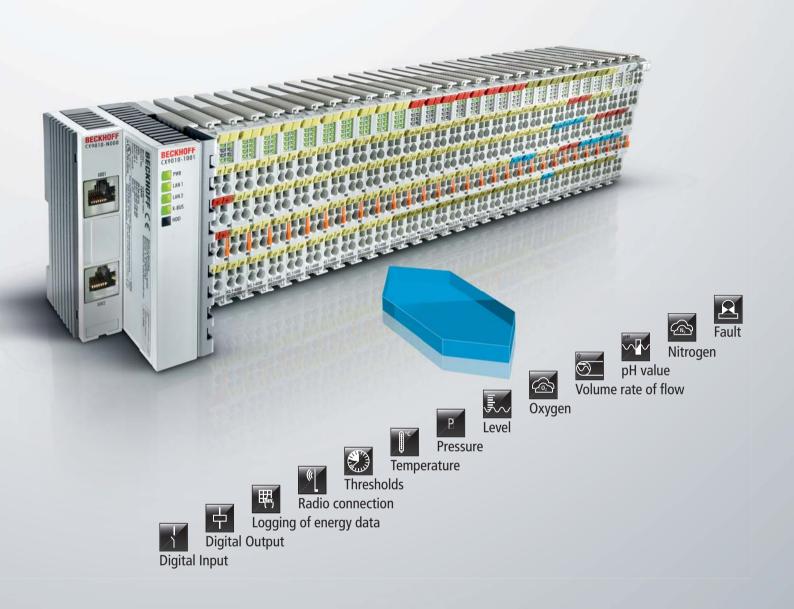
- wells
- pump stations
- storm water basins
- water towers
- grid/sand catcher/mechanical purification
- primary clarification
- biological cleaning
- sludge treatment
- final clarification

GPRS/UMTS/LTE IEC 60870-5-10x IEC 61850 OPC UA DeviceNet EtherCAT EtherNet/IP EthernetTCP/IP Modbus TCP, RTU PROFIBUS PROFINET RS232/RS422/RS485



... at the process level and the outstations.

Due to its open interfaces, PC-based control is suitable as a universal control platform both for the central control of a wastewater treatment plant and for the decentral control of outstations. Support for all common communication standards produces a highly efficient, available and powerful network for the transmission, storage and processing of the data, based on standard technologies. The energy sector has already created a term for this: Smart Grid. The openness of PC-based automation also enables adaptation to existing systems, so that a plant retrofit for improving the energy efficiency can be realised without problem.



www.beckhoff.com/BusTerminal

The modular Beckhoff I/O system offers ...

The modular Beckhoff I/O system consists of the electronic terminal blocks for the direct sensor/actuator wiring and a Bus Coupler, Bus Terminal Controller or Embedded PC for connecting to the bus systems commonly used in water management, such as EtherCAT, EtherNet/IP, Ethernet TCP/IP, Modbus TCP, RTU, PROFIBUS, PROFINET and RS232/RS422/RS485. With over 400 types of signals, all common sensors and actuators can be seamlessly integrated into the controller. All ranges of application are covered, from the drive controller to measuring and safety technology. The fine-grained implementation of 1 to 16 channels per terminal allows the user to tailor his automation solution precisely to the required inputs and outputs. In addition, the modular structure offers high flexibility in the configuration of the controllers for the individual systems of a wastewater treatment plant. The use of standard components ensures economical complete solutions as well as integration into existing systems.



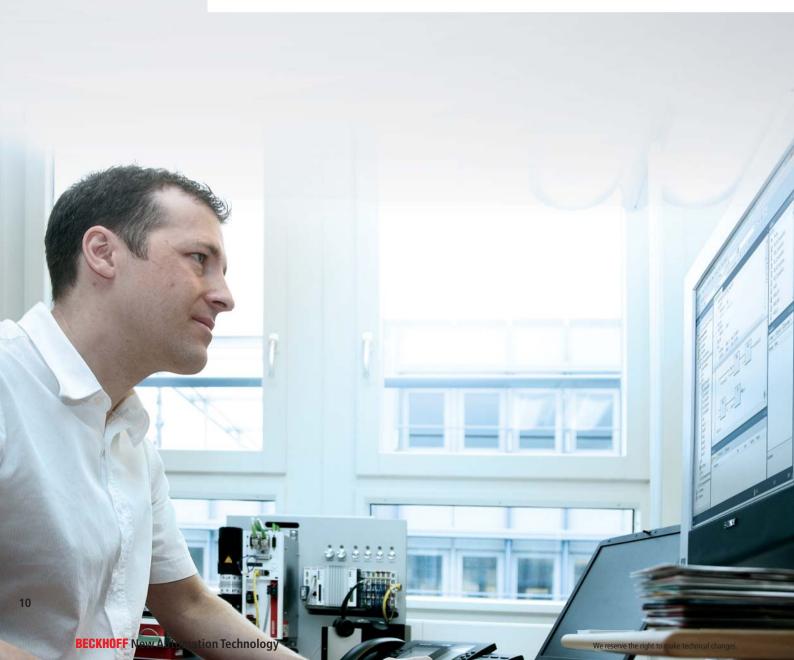
... tailor-made solutions for water management.

PC-based automation technology integrates extensive measuring, control and regulating technology on one platform and, together with the local and decentralised acquisition and storage of a large number of process parameters, offers the necessary conditions for the precise control of all processes in the cleaning of wastewater as well as the outstations, such as wells, pumps and storm water tanks. Process parameters such as levels, temperatures, flow rate, pH value, oxygen or nitrogen content are recorded by the Bus Terminals and processed further in the intelligent Bus Terminal Controllers or Embedded PCs. The integrated Beckhoff control solution not only has the advantage of a compact design; it also impresses through lower system costs, simplified engineering and flexibility. Substations or outstations of wastewater treatment plants can be connected via Ethernet, fieldbus, analog modem, ISDN, network radio, GSM and UMTS and allow remote access.

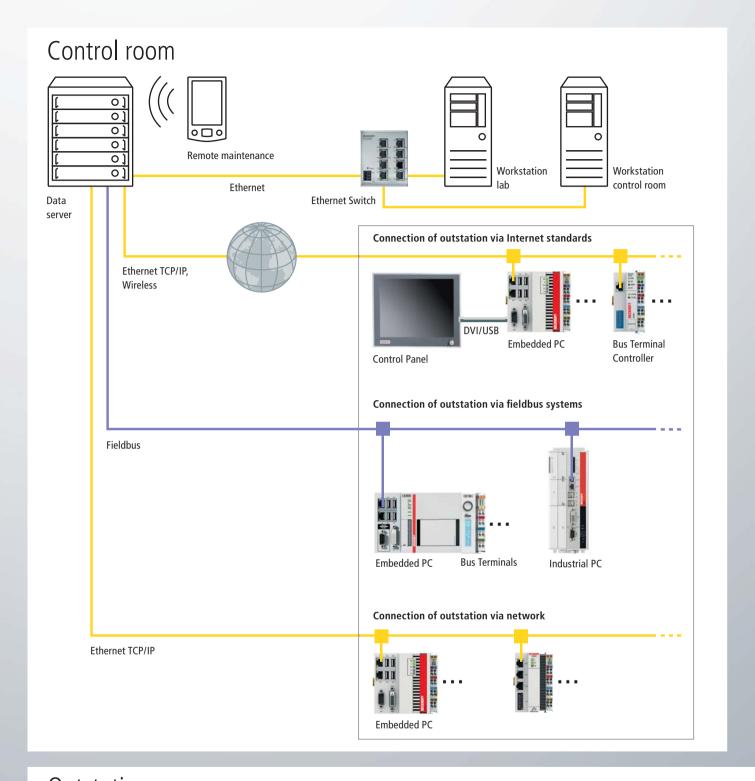
TwinCAT as a universal control platform ...

TwinCAT, the open, scalable Beckhoff automation software on the basis of Windows operating systems, forms the heart of the PC-based controller. It transforms a PC-compatible platform into a real-time controller with multi-PLC system, programming environment and operator station. TwinCAT is universally usable, from the controller of the wastewater treatment plant to the decentral outstations, and allows simple programming and commissioning. Numerous PLC libraries with function blocks compliant with the PLCopen standard facilitate programming and allow the use of standards. Connectivity to all popular fieldbuses and PC interfaces is supported. TwinCAT version 3 includes — alongside IEC 61131-3 — C/C++ and Matlab®/Simulink® as programming languages for real-time applications.

► www.beckhoff.com/TwinCAT







Outstation Ethernet TCP/IP DVI/USB Bus Terminals, EtherCAT Terminals Wireless Modem GPRS UMTS



In the water system outstations, such as wells, pumping stations or storm water tanks, process data must be acquired, processed, stored and transmitted via a communication network to a control station. Small controllers or DIN rail-mountable Embedded PCs are often used here, depending on the field of application. These controllers can optionally be equipped with larger storage media. This way, large amounts of data can be buffered if transmission to the control

station is not possible for an extended period of time. A large range of different Bus Terminals for the acquisition of the various signals allows precise and efficient control of the processes. The only requirements for this are one of the above-mentioned PC-based controllers with TwinCAT automation software and — according to the existing infrastructure and the location — an interface to the respective data transmission system.

Beckhoff — New Automation Technology

Beckhoff implements open automation systems based on PC Control technology. The product range covers Industrial PCs, I/O and Fieldbus Components, Drive Technology and automation software. Products that can be used as separate components or integrated into a complete and seamless control system are available for all industries. The Beckhoff "New Automation Technology" philosophy represents universal and open control and automation solutions that are used worldwide in a wide variety of different applications, ranging from CNC-controlled machine tools to intelligent building automation.

▶ www.beckhoff.com

Beckhoff at a glance

- Headquarters Verl, Germany
- Sales 2011: 465 million €
- Staff worldwide: over 2,100
- Branch Offices Germany: 11
- Subsidiaries/Branch Offices worldwide: 30
- Distributors worldwide: in more than 60 countries (as of 03/2012)



Worldwide presence on all continents

The central divisions of Beckhoff, such as development, production, administration, distribution, marketing, support and service are located at the Beckhoff Automation GmbH headquarters in Verl, Germany. Rapidly growing presence in the international market is taking place through 30 subsidiaries. Through worldwide co-operation with partners, Beckhoff is represented in more than 60 countries.

Further information

The web pages "PC-based Control for Water Management" offer further information, e. g. application reports or industry-specific solutions.

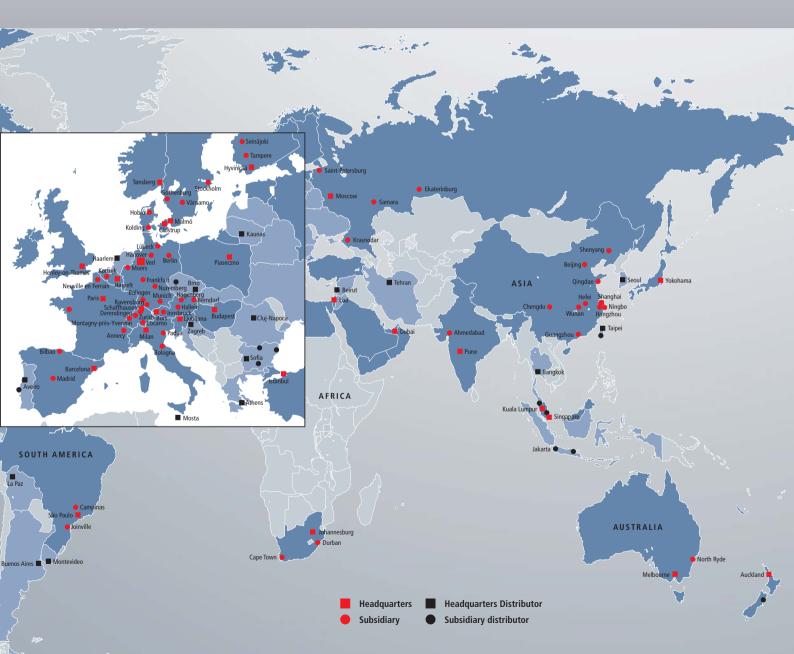
| www.beckhoff.com/water |

The Beckhoff catalogs and flyers are available for download on the Internet.

▶ www.beckhoff.com/media

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Headquarters

Beckhoff Automation GmbH Germany Phone: +49 (0) 52 46 / 9 63 - 0 info@beckhoff.com www.beckhoff.com

Europe Germany Office Balingen Beckhoff Automation GmbH Karlstraße 19 72336 Balingen Phone: +49 (0) 7433/26024-0 balingen@beckhoff.de

Office Berlin Beckhoff Automation GmbH Fasanenstraße 81 10623 Berlin Phone: +49(0)30/887116-0 berlin@beckhoff.de

Office Frankfurt Beckhoff Automation GmbH Torhaus Westhafen Speicherstraße 59 60327 Frankfurt am Main Phone: +49(0)69/680988-0 frankfurt@beckhoff.de

Beckhoff Automation GmbH Podbielskistraße 342 30655 Hanover Phone: +49(0)511/875758-0 hannover@beckhoff.de

Office Lübeck Beckhoff Automation GmbH Wahmstraße 56 23552 Lübeck Phone: +49 (0) 451/20 3988-0 luebeck@beckhoff.de

Office Munich
Beckhoff Automation GmbH
Oppelner Straße 5
82194 Gröbenzell/Munich
Phone: +49(0)81 42/41059-0
muenchen@beckhoff.de

Office Nuremberg
Beckhoff Automation GmbH
Ostendstraße 196
90482 Nuremberg
Phone: +49 (0) 911/54056-0
nuemberg@beckhoff.de

Sales Office Ravensburg Beckhoff Automation GmbH Parkstraße 48 88212 Ravensburg Phone: +49 (0) 751/3541550 ravensburg@beckhoff.de

Office Rhein/Ruhr
Beckhoff Automation GmbH
Eurotec-Ring 7
47445 Moers
Phone: +49 (0) 28 41/9 08 16-6
rhein-ruhr@beckhoff.de

Headquarters
Beckhoff Automation GmbH
Hauptstraße 4
6706 Bürs
Phone: +43 (0) 55 52 / 68813 -0
info@beckhoff.at
www.beckhoff.at

Sales Office Oberösterreich Beckhoff Automation GmbH Softwarepark 35 4232 Hagenberg Phone: +43 (0) 72 36/2 09 25 -0

Sales Office Niederösterreich Beckhoff Automation GmbH Schloss 2B/Top 3 scnioss 2B/Top 3 2542 Kottingbrunn Phone: +43 (0) 22 52/25 17 23 niederoesterreich@heckhoff.et

Sales Office Salzburg
Beckhoff Automation GmbH
Europastraße 32
5400 Hallein
Phone: +43(0)62 45/700 96 11
salzburg@beckhoff.at

Sales Office Tirol Beckhoff Automation GmbH Soho 2.0 Soho 2.0 Grabenweg 68 6020 Innsbruck Phone: +43 (0) 512/236 043 tirol@beckhoff.at

Belgium, Luxembourg

Headquarters
Beckhoff Automation byba
Kempische Steenweg 305 bus 202
3500 Hasselt Belgium Phone: +32(0)11/240800 info@beckhoff.be www.beckhoff.be

Sales Office West Beckhoff Automation byba President Kennedy park 6 bus 24 8500 Kortrijk Belgium Phone: +32 (0) 56/202037 info@beckhoff.be

Bulgaria Kastiva GmbH 68-72 Ami Bue Str., 4. Floor 1612 Sofia Phone: +359 (2) 950 4431 office@kastiva.com www.kastiva.com

Krovel d.o.o.
Barutanski jarak 114
10000 Zagreb
Phone: +385/12305788
beckhoff@krovel.hr
www.krovel.hr

Czech Republic, Slovac Republic Dyger s.r.o. Vystaviste 1 648 59 Brno Phone: +4205/41321004 info@dyger.cz www.dyger.cz

Denmark Headquarters Beckhoff Automation ApS Naverland 2 2600 Glostrup Phone: +4543/467620 info@beckhoff.dk ப்பு peckhoff.dk www.beckhoff.dk

Beckhoff Automation ApS Majsmarken 1 9500 Hobro Phone: +45 76/363831 info@beckhoff.dk

Office Kolding
Beckhoff Automation ApS
Birkemose allé 25
6000 Kolding
Phone: +4576/312072
info@beckhoff.dk

Finland, Estonia Beckhoff Automation Oy P.O. Box 23 Kankurinkatu 4-6 05801 Hvvinkää Phone: +358(0)20/7423800 info@beckhoff.fi www.beckhoff.fi

Sales Office Seinäjoki Beckhoff Automation Oy Tiedekatu 2 60320 Seinäjoki Finland Phone: +358(0)20/7423850 info@beckhoff.fi

Beckhoff Automation Oy Hermiankatu 1 B 33720 Tampere Finland rınıand Phone: +358(0)20/7423870 info@beckhoff.fi

Headquarters Beckhoff Automation Sarl Immeuble "Le Montréal" ZA de Courtaboeuf ZA de Courtaboeuf 19 bis, avenue du Québec 91951 Courtaboeuf Cedex Phone: +33 (0) 169 2983 70 info@beckhoff.fr www.beckhoff.fr

Sales Office North Beckhoff Automation Sarl 28, Rue de Tourcoing 59960 Neuville en Ferrain Phone: +33 (0) 3 20 11 00 08 info@beckhoff.fr

Sales Office South-East Beckhoff Automation Sarl PAE La Bouvarde – Park Nord 23 A, Immeuble Les Pléiades 74370 Metz-Tessy Phone: +33 (0) 450 23 22 75 info@beckhoff.fr

Greece, CyprusL. J. Skourgialos
Industrial Automation Systems
241 EL. Venizelou
176 73 Kallithea/Athens Greece Phone: +30/2109510260 ias@otenet.gr

Hungary Beckhoff Automation Kft. Gubacsi út 6. H-1097 Budapest info@beckhoff.hu www.beckhoff.hu

Italy Headquarters
Beckhoff Automation S.r.l.
Via E. Majorana, 1
20834 Nova Milanese (MB)
Phone: +39 0362/365164
info@beckhoff.it
www.beckhoff.it

Office Bologna Beckhoff Automation S.r.l. Via Zanini, 7 40011 Anzola dell'Emilia (BO) Phone: +39051/731509 bologna@beckhoff.it

Office Padua Beckhoff Automation S.r.l. Via Alsazia, 3/B 35127 Padua (PD) Phone: +39049/8704838 padova@beckhoff.it

Lithuania, Latvia, Belarus UAB "Santavilte" Europos pr. 121 LT-46339 Kaunas Lithuania Phone: +37037211360 info@santavilte.lt www.santavilte.lt

Malta
JMartans Automau
Ivy, Flat 1,
Salvu Barbara Street,
Mosta, MST 2433
Phone: +356 2142 0655
info@imartans.com
www.jmartans.com Malta

omation Link Industrial Automation Link Küppersweg 71 2031 EB Haarlem Phone: +3123/5185140 sales@ial.nl www.ial.nl Norway Beckhoff Automation AS Stensarmen 16 3112 Tønsberg Phone: +47 33 50 46 90 info@beckhoff.no w.becknoff.no w.beckhoff.no

Poland Beckhoff Automation Sp. z o.o. Zabieniec, ul. Ruczajowa 15 05-500 Piaseczno Phone: +4822/7504700 info@beckhoff.pl www.beckhoff.pl

Portugal Bresimar Automação, S.A. Bresimar Automação, S.A. Quinta do Simão — EN109 — Esqueira Apartado 3080 3801-101 Aveiro Phone: +351234/303320 bresimar@bresimar.pt www.bresimar.pt

Romania Kreatron Automation S.R.L. Str. Octavian Fodor nr. 113, ap. 13 400434, Cluj-Napoca jud. Cluj Phone: +40 364 40 16 12 office@kreatron.ro www.kreatron.ro

Russia Russia Headquarters Beckhoff Automation OOO Staraya Basmannaya 14/2 str. 2 105064 Moscow Phone: +7495/9816454 russia@beckhoff.com www.beckhoff.ru

Representation North-West Federal District Beckhoff Automation GmbH Vasilyevsky Island, 7-ya Liniya St. 76, Office 620 199178 Saint-Petersburg Phone: + 7812/332 6205 north-westfo@beckhoff.ru

Representation Southern Federal District Beckhoff Automation GmbH Dalnyaya St. 43, Office 202 350051 Krasnodar Phone: +7861/2796723 south@beckhoff.ru

Representation Ural Federal District Beckhoff Automation GmbH Komsomolskaya St. 37, Office 402/4 620049 Ekaterinburg Phone: +7343/3799873 uralfo@beckhoff.ru

Representation Volga Federal District Beckhoff Automation GmbH Krasnoarmeyskaya St.1, Office 312 443010 Samara Phone: +7846/2698067 volgafo@beckhoff.ru

Slovenia Beckhoff Avtomatizacija d.o.o. Zbiljska cesta 4 1215 Medvode Phone: +386/13613080 info@beckhoff.si www.beckhoff.si

Spain Headquarters
Beckhoff Automation S.A.
Edifficio Testa Sant Cugat
Avda. Alcalde Barnils, 64-68
08174 Sant Cugat (Barcelona)
Phone: +3493/5844997
info@beckhoff.es
www.beckhoff.es

Sales Office Bilbao Beckhoff Automation S.A. Edificio Udondo C. Ribera de Axpe, no 50 4a planta, Oficina 4-5 48950 Erandio (Bilbao) Phone: +34 941/431 40 75 info@beckhoff.es

Sales Office Madrid Beckhoff Automation S.A. Beckhoff Automation S.A. Edificio Cimaga Sierra de Cazorla, 1 Planta Baja, Oficina E 28290 Las Matas (Madrid) Phone: +3491/6364357 madrid@beckhoff.es

Sweden Headquarters
Beckhoff Automation AB
Stenåldersgatan 2A
21376 Malmö
Phone: +46 (0) 40 / 680 81 60
info@beckhoff.se
www.beckhoff.se

Sales Office Gothenburg Beckhoff Automation AB Tillfällavägen 15 43363 Sävedalen Phone: +46 (0) 40 / 680 81 41 info@beckhoff.se

Sales Office Stockholm Beckhoff Automation AB Frösundaviks Allé 15 16970 Solna Phone: +46 (0) 40/6808160 info@beckhoff.se

Sales Office Värnamo Beckhoff Automation AB Västbovägen 53 33153 Värnamo Phone: +46 (0) 40 / 680 81 60 info@beckhoff.se

Switzerland

Headquarters Beckhoff Automation AG Rheinweg 9 8200 Schaffhausen Phone: +41 (0) 52 / 6 33 40 40 info@beckhoff.ch www.beckhoff.ch

Beckhoff Automation AG Felsenrainstrasse 1 8052 Zurich Phone: +41 (0) 52 /633 40 40 info@beckhoff.ch

Beckhoff Automation AG
Application/Software Development Hauptstrasse 39 4552 Derendingen Phone: +41 (0) 32 / 566 16 50 info@beckhoff.ch

Sales + Support Center Suisse Romande Beckhoff Automation AG En Chamard 35 1442 Montagny-près-Yverdon Phone: +41 (0) 24/44727-00 yverdon@beckhoff.ch

Support Center Ticino
p.project sagl
Via Pianella 19
6596 Gordola
Phone: +41 (0) 91 / 745 01 11
ticino@beckhoff.ch

Turkey Beckhoff Otomasyon Itd. şti. Gardenya-3 Plaza No: 18-19 34758 Ataşehir Istanbul Phone: +902165809830 info@beckhoff.com.tr www.beckhoff.com.tr

UK, Ireland Beckhoff Automation Ltd. The Boathouse Station Road Henley on Thames Oxon RG9 1AZ Great Britain Great Britain Phone: +441491/410539 info@beckhoff.co.uk www.beckhoff.co.uk

North America USA

dauarters Headquarters and Training Center Beckhoff Automation LLC 12150 Nicollet Avenue South Burnsville, MN 55337 Phone: +1952 /890 0000 beckhoff.usa@beckhoff.com www.beckhoffautomation.com

East Region Headquarters and Training Center
Beckhoff Automation LLC
Charlotte, NC
Phone: +1704/9104367
east.usa@beckhoff.com

East Region Sales Beckhoff Automation LLC Beckhoff Automation LEC Coplay, PA Phone: +1952/2126226 newengland@beckhoff.com

Beckhoff Automation LLC Hanover, PA Phone: +1717/6345536 northeast.sales@beckhoff.com

Beckhoff Automation LLC Rochester Hills, MI Phone: +1248/8285310 michigan@beckhoff.com

Beckhoff Automation LLC Indianapolis, IN Phone: +1317/7039115 mideast.usa@beckhoff.com

Beckhoff Automation LLC Lake Wylie, SC Phone: +1803/7465491 east.usa@beckhoff.com

Beckhoff Automation LLC Apex, NC Phone: +1919/3670349 southeast.usa@beckhoff.com

Beckhoff Automation LLC Atlanta, GA Phone: +1770/4038868 georgia@beckhoff.com

Central Region Sales and Training Center Beckhoff Automation LLC Fond du Lac, WI Phone: +1920/2512777 wisconsin@beckhoff.com

Beckhoff Automation LLC Burnsville, MN 55337 Phone: +1952/8900000 north.usa@beckhoff.com

Beckhoff Automation LLC Lemont, IL Phone: +1630/6318467 midwest.usa@beckhoff.com

Beckhoff Automation LLC Rogers, AR Phone: +1479/9252951 south.usa@beckhoff.com

Beckhoff Automation LLC Cedar Park, TX Phone: +1512/2509809 southwest.sales@beckhoff.com Beckhoff Automation LLC Justin, TX Phone: +1817/4285314 southwest.sales@beckhoff.com

West Region Sales Beckhoff Automation LLC San Diego, CA Phone: +1858/5461111 west.sales@beckhoff.com Beckhoff Automation LLC La Crescenta, CA Phone: +1818/2249065 losangeles@beckhoff.com

Reckhoff Automation LLC San Francisco Bay Area, C. Phone: +1408/4251025 norcal@beckhoff.com

Beckhoff Automation LLC Phoenix, AZ Phone: +1602/3540506 arizona@beckhoff.com

Beckhoff Automation LLC Arvada, CO Phone: +1303/4290758 mountain.sales@beckhoff.com

Beckhoff Automation LLC Mill Creek, WA Phone: +1425/4514444 northwest.sales@beckhoff.com

West Region Technical Center Beckhoff Automation LLC San Diego, CA
Phone: +1858/5461111
west.application@beckhoff.com

Canada
Headquarters
Sales, Training Center and
Application Development
Beckhoff Automation Canada Ltd.
2900 Argentia Road, Suite 7
Mississauga, ON LISN 7X9
Phone: + 1289/6271900
canada@beckhoff.com

Canada Sales Beckhoff Automation Canada Ltd. Toronto, ON Phone: +1 905/466 4371 canada@beckhoff.com

Beckhoff Automation Canada Ltd. London, ON Phone: +1519/4518572 canada@beckhoff.com

Application Deve Application Development Integra Automation, SA de CV Av. Industrias 325-A 78399 Fracc. Talleres San Luis Potosi, S.L.P. Phone: +52 444/8222615 al 17 mexico@beckhoff.com

Argentina Argentina eFALCOM Alcorta 2411 CPA B1744HFM Moreno / Buenos Aires Phone: +54237/4631151 info@efalcom.com www.efalcom.com

BAVARIA S.R.I.
P.O. Box: 4923
C. Mario Diez de Medina, N° 32
Zona Morocollo
La Paz
Phone: +591 2 277 13 78
alvarobaptista@bavaria.bo
www.bavaria.bo

Brazil Brazil
Headquarters
Beckhoff Automação Industrial Ltda.
Rua Continental, 146
São Bernardo do Campo
São Paulo 99750-060
Phone: +55 (11) 4126-3232 info@beckhoff.com.br
www.beckhoff.com.br

Office Campinas Beckhoff Automação Industrial Ltda. Edificio Empresarial Torre do Castelo Rua Francisco Otaviano, 60 Sala 94 — Bairro Chapadão Campinas 13070-056 – SP Phone: +55 (19) 3368-7288 info@beckhoff.com.br

Office Joinville Beckhoff Automação Industrial Ltda. Rua Dona Francisca, 1113 – Salas 904/905 Bairro Saguaçu Joinville 89221-006 – SC Phone: +55473439-0908 info@beckhoff.com.br

Colombia SENTRONIC LTDA Calle 112 70-B-18 Bogotá Phone: +5715334323 sensores@sentronic.com www.sentronic.com.co

CONTROLTECH Ltda Cra 21 159-12 of 103 C.P: 110131 Bogotá Phone: +571 471 4890 controltech@controltech.co

Uruguay Comando Ltda. Dr. J. de Salterain 1142 Montevideo 11200 Phone: +598 (2) /400-7923 comando@comandonet.com www.comandonet.com

Africa South Africa

Headquarters
Beckhoff Automation (Pty) Ltd
6 Ateljee Street
Randpark Ridge
Randburg
Gauteng
2194 Phone: +27(0)117952898 info@beckhoff.co.za www.beckhoff.co.za

Office Cape Town Beckhoff Automation (Pty) Ltd Giuliwa House, 47 Blaauwherg Road Table View, 7441 Phone: +27 (0) 79 493 2288 info@beckhoff.co.za

Office Durban
Beckhoff Automation (Pty) Ltd
Suite 7A, 58A Beechgate Crescent
Southgate Business Park
KwaZulu-Natal
Phone: +27 (0) 861 2325 4633
info@beckhoff.co.za

China
Headquarters
Beckhoff Automation
(Shanghai) Co., Ltd.
5th Floor
No. 153 JiangChang San Road
Shanghai Shibei Industrial Zone
Shanghai, 200436
Phone: +8621/66312666
info@beckhoff.com.cn
www.beckhoff.com.cn

Office Beijing
Beckhoff Automation
(Shanghai) Co., Ltd.
Room 1801-1803, Tower T3,
Xihuan Plaza,
No.1, Xizhimenwai Avenue
Xicheng District
Beijing, 100044
Phone: +8610/58301236
beijing@beckhoff.com.cn

Office Guangzhou Beckhoff Automation (Shanghai) Co., Ltd. Room 4118-4119 Yaozhong Plaza 9 West Linhe Road Tianhe District Guangzhou, 510620 Phone: +8620/38010300 guangzhou@beckhoff.com.cn

(Shanghai) Co., Ltd. 8F, G of The City Tower, No. 86, Section one, South Peoples Road Chengdu, Sichuan, 610016 Phone: +8628/86202581 chengdu@beckhoff.com.cn

Office Wuhan Beckhoff Automation Beckhoff Automation (Shanghai) Co., Ltd. Room 1803, 18/F., Wuhan Zhongshang Plaza, NO.7, Zhongnan Road, Wuhan, Hubei Phone: +86 27/87 71 1992 wuhan@beckhoff.com.cn

Office Shenyang Beckhoff Automation (Shanghai) Co. Ltd. Room1803, L'Anenue No.10 Hui Gong Street No.10 Hur Gong Shen he district Shenyang City, 11013, Liaoning Phone: +8624/22788896 shenyang@beckhoff.com.cn

Office Qingdao
Beckhoff Automation
(Shanghai) Co. Ltd.
Room 812-813, Building B
Wanda Plaza Business Buildin
Qingdao, Shandong Province
Phone: +86532/55663857
qingdao@beckhoff.com.cn

Office Hefei
Beckhoff Automation
(Shanghai) Co. Ltd.
Room 1311, Furong mansion
No. 3 Suixi Road
Hefei, Anhui Province
Phone: + 86 551 / 55 43 513
hefei@beckhoff.com.cn

Office Hangzhou Beckhoff Automation (Shanghai) Co. Ltd. Room 816, Jiahua International Business Center, No. 15 Hangda Road Hangzhou, Zhejiang Province Phone: +86 571/87 65 27 86 hangzhou@beckhoff.com.cn

Office Ningbo
Beckhoff Automation
(Shanghai) Co. Ltd.
Room 2001, Tianyuan Building,
No. 9 South Jiefang Road
Ningbo, Zhejiang Province
Phone: + 86574/87203335
ningbo@beckhoff.com.cn

India Headquarters Beckhoff Automation Pvt. Ltd. Suite 4, Level 6, Muttha Towers Don Bosco Marg Pune – 411 006 Phone: +91 20 40 00 48 00 info@beckhoff.co.in www.beckhoff.co.in

Sales Office Ahmedabad Beckhoff Automation Pvt. Ltd. 10th Floor, 1005, Venus Atlantis Corporate Park, Anandnagar Road, Ahmedabad – 380015 Phone: +91 79 40 08 48 00 info@beckhoff.co.in

Israel
Beckhoff Automation Ltd.
Beit Golan
Golan St. (corner of Tavor St.)
Airport City
Lod 70151
Phone: 97237764445
info@beckhoff.co.il
www.beckhoff.co.il

Japan Beckhoff Automation K.K. Nisseki Yokohama Building 18th Floor 1-1-8 Sakuragicho, Naka-ku Vokohama-shi Kanagawa-ker Yokohama-shi Kanagawa 231-0062 Phone: +81 45 650 1612 info@beckhoff.co.jp www.beckhoff.co.jp

K.MECS Co., Ltd. Yusen Iwamotocho Blg. 3F 2-3-3 Iwamotocho, Chiyoda-City, Tokyo 101-0032 Phone: +81358255333 info@kmecs.co.jp www.kmecs.com

Lebanon, Jordan, Syria Industrial Technologies (ftec) S.A.L. Afrah Plaza Center, Blvd Fouad Chehab Sin El Fil, Beirut Phone: +961 (1) 4911 61 info@iteclb.com

Malaysia Beckhoff Automation Sdn. Bhd. (889044-H) Unit 2-1, 2nd Floor, Surian Tower No. 1 Jalan Pill 7/3 Mutiara Damansara 47810 Petaling Jaya Phone: +60(3) 7731 8388 info@beckhoff.com.my www.beckhoff.com.my

TDS Technology (KL) Sdn. Bhd. 5-1, Jalan Anggerik Vanilla T Section 31/T, Kota Kemuning 40460 Shah Alam Phone: +60 (3) 5122 4220 marketing. kl@tdstech.com www.tdstech.com

Singapore, Philippines, Vietnam, Indonesia Beckhoff Automation Pte. Ltd. 3 International Business Park #07-08 Nordic European Centre Singapore 609927 Phone: +65/66355000 info@beckhoff.com.sg www.beckhoff.com.sg

TDS Technology (S) Pte Ltd 64 Sungei Kadut Loop (Hocen Building) Singapore 729493 Phone: +65/63661661 sales_sg@tdstech.com www.tdstech.com

TDS Technology (Thailand) Co., Ltd. 50/962 Moo 2
Bengyeetos Thanyaburi Pratumthanee 12130 Bangkok Phone: +66 (0) 2569 5511 sales_th@tdstech.com www.tdstech.com

T&R Electronic (Thailand) Co., Ltd. 120/62 Moo 8 Bang Sare Sattahip Chonburi 20250 Phone: +66 (0) 3873 7487 trthailand@trelectronic.co.th www.trelectronic.co.th

South Korea South Korea Tri-TEK Corp. 717 DaeRyung TechnoTown III 448 KasanDong Kumcheongu Seoul 153-803 Phone: +822/2107-3242 tritek@tritek.co.kr www.tritek.co.kr

Taiwan JI-DIEN Co., Ltd. 9F., No. 22, Sec. 1, Zhongshan Rd. Xingzhuang City Taipei County 242 Phone: +886 (2) 8522 3237 jidien@chgroup.com.tw www.chgroup.com.tw

United Arab Emirates, Oman, Qatar, Bahrain, Kuwait, Saudi Arabia, Egypt Beckhoff Automation FZE C# 608, Dubai Silicon Oasis P.O. Box No. 341007 Dubai United Arab Emirates Phone: +971 45015480 info@beckhoff.ae www.beckhoff.ae

Headquarters
Beckhoff Automation Pty. Ltd.
Level 16, 10 Queens Road
Melbourne, Victoria, 3004
Phone: +61 (3) 9912 5430
info@beckhoff.com.au
www.beckhoff.com.au

Sales Office North Ryde Beckhoff Automation Pty. Ltd. Suite 508, 32 Delhi Road North Ryde, NSW, 2113 Phone: +61(2)8069-2333 info@beckhoff.com.au

New Zealand Beckhoff Automation Limited Unit C2, 59 Apollo Drive Albany, Auckland 0632 Phone: +64 (9) 281 12736 info@beckhoff.co.nz www.beckhoff.co.nz

CSE-W. Arthur Fisher Ltd P.O. Box 58955 Manukau 2163 Phone: +64(9) 271 3810 sales@cse-waf.co.nz www.cse-waf.co.nz