

ctrlX AUTOMATION

XC20 Servo Drive System



ctrlX
AUTOMATION

rexroth
A Bosch Company

Product at a glance

ctrlX AUTOMATION family expands with a powerful new member

Delivering on both **technical** and **cost** expectations for the local market

Your ultimate
“SMART” choice!

The system includes **XC20 servo drive**, **MC20 servo motor**, and **cables and accessories**.

The power range is from 0.2 kW to 7.5 kW and is equipped with the STO safety function. A variety of communication options are available, such as EtherCAT, Profinet, designed to meet various standard applications.



Highlights and advantages

“SMART” selection

High cost-performance

- ▶ Comprehensive localization from R&D and production to service, offering ultra-high cost-effectiveness and fast delivery
- ▶ Supports CE, UL, and STO certifications, meeting global standards¹⁾
- ▶ Optional servo compensation function, optional real-time temperature sensor monitoring, and optional PLC functionality integrated into the drive²⁾

“SMART” performance

Enhanced efficiency

- ▶ Inherits the powerful DNA of Rexroth's ctrlX AUTOMATION, integrating superior performance with an open ecosystem
- ▶ 3.5 times overload capacity, 125 μ s current loop, and EtherCAT scan cycle³⁾ for high dynamics and fast response
- ▶ Optional low and medium inertia, 23-bit mechanical multi-turn encoder for high-precision applications
- ▶ 30 m cable length, suitable for 5 million drag chain cycles, expanding application scenarios

“SMART” operation

Flexible and user-friendly

- ▶ Compact book-size design with side-by-side mounting to minimize space requirements
- ▶ Compatible with all major communication protocols³⁾
- ▶ Supports Web server connection and commissioning for quick startup and parameter optimization without engineering software²⁾
- ▶ Open interfaces, support for major high-level languages, and SDK for easy integration with other IT systems⁴⁾



¹⁾ STO certification is in preparation. Only XC20 has a UL certificate

²⁾ Web server commissioning and integrated PLC function are in preparation

³⁾ Including EtherCAT (fastest 250 μ s, 125 μ s in preparation), Profinet, Analog, TCP/IP*, Modbus TCP*

* Requires drive with integrated PLC functionality

⁴⁾ .NET, Java, C, LabVIEW, Android system

System topology

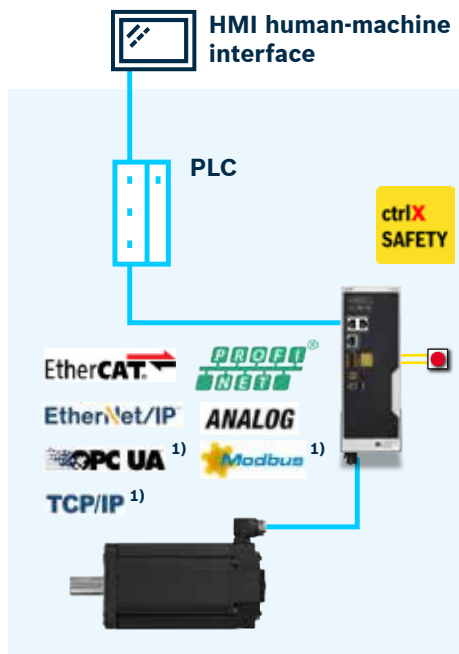


Safety function STO



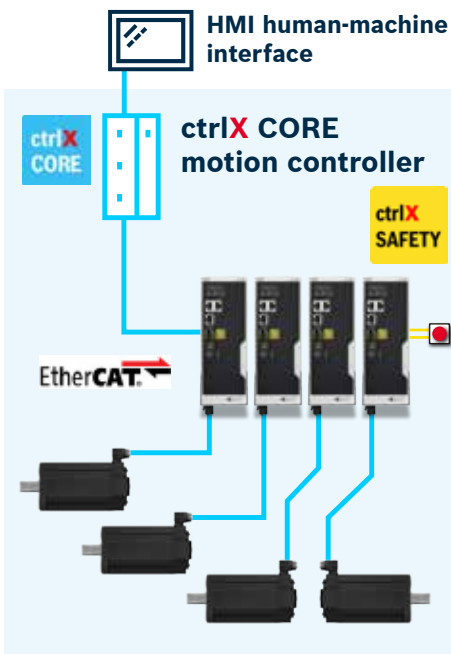
Rexroth Motion Control

Single-axis solution



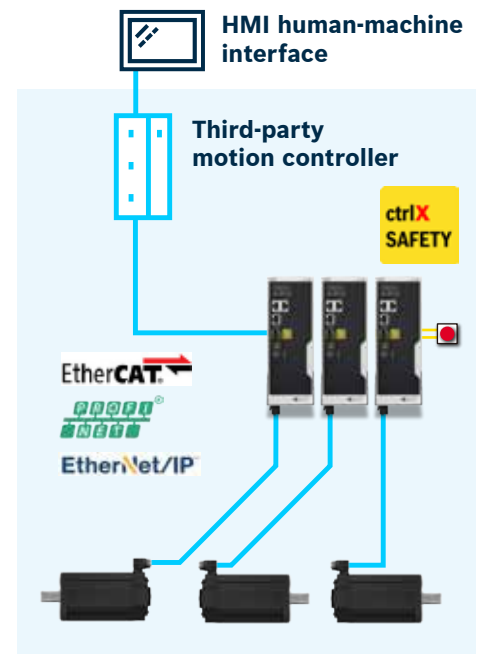
- ▶ Bus control or analog control
- ▶ Spindle function
- ▶ Position, speed, and torque modes

ctrlX CORE motion controller + XC20 drive system complete solution



- ▶ Motion control for up to 100 axes
- ▶ Fastest bus cycle time of 125 μ s²⁾

Third-party controller + XC20 drive system solution



- ▶ Bus control
- ▶ Fastest bus cycle time of 125 μ s²⁾

¹⁾ Requires drive with integrated PLC functionality; ²⁾ EtherCAT fastest 250 μ s, 125 μ s in preparation

Application scenarios

Automotive and auto parts



- Automated production lines
- Automated testing equipment

Laser, machine tool, metal forming equipment



- Laser tube/sheet cutting machines
- Punch presses
- Pipe bending machines
- Tool grinding machines
- Punching and shearing machines
- Spring machines

Fast-moving consumer goods (FMCG) packaging



- Vertical/horizontal packaging machines
- Bag making machines
- Ice cream cone machines
- Slitting machines
- Pharmaceutical packaging

Warehousing and logistics



- Loading/unloading/gantry robots
- Logistics conveyor lines/turntables
- Automated warehouse

Photovoltaic/semiconductor



- Handling/sorting/cleaning equipment
- Raw material cutting/edge grinding/squaring equipment
- Tungsten filament making machines
- Wire drawing machines

Lithium battery/new energy

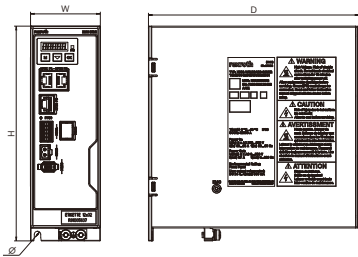


- Battery cell production equipment (coating/stacking/winding)
- Battery module handling
- Presses

XC20 Servo Drive Technical Parameters

Product model	W0005	W0007	W00012	W00023	W00033	W00050
Dimensions	XD			XE		XF
Maximum current (duration 400 ms) in A rms	5	7	12	23	33	50
Continuous current (at 8 kHz carrier frequency) In A rms	1.5	2	4	6.3	10	16
Overload capacity	3.3	3.5	3	3.7	3.3	3.1
Supported PWM carrier frequencies kHz ¹⁾	4,8,12,16					
Rated PWM carrier frequency kHz	8					
Integrated fan	Yes					
Internal braking resistance (ω)	160			70		35
Continuous braking power (w)	40			80		80
Maximum braking power (w)	1430	2610	3430	6900	9600	17180

Dimensions



Dimensions (mm)	Width W	Height H	Depth D
XD	50	178	196
XE	65	188	196
XF	80	218	196

¹⁾ After switching the carrier frequency, all rated and maximum current data need to be re-evaluated.

XC20 servo drive function overview

Function description	
Basic Functions	Probe port (diff, dead_time, accept)
	Easy start up simple debugging (including command instruction generator)
	Fault response setting (f alarm or e warning)
	Oscilloscope function
	Positioning block function
	Automatic pwm switching to increase stall current
Axis Control	Three-loop automatic optimization
	Spindle positioning
Compensation/Correction	Axis position correction
	Backlash compensation
	Friction correction
	Weight load compensation
	Automatic weight load compensation

Function description	
Compensation/Correction	Temperature error compensation
	Torque constant compensation
	Quadrant error compensation
	Cogging compensation
	Adaptive speed loop gain control
	External torque feedforward
	Reference model speed control
	Speed loop filtering
	Oscillation suppression filtering
Error Reaction	Sensorless stop
	Position block return when error
Open Interface	Support for major high-level languages, and sdk for easy integration with other it systems



► Additional servo packages can be selected to achieve full functionality

► Mechanical offset compensation, cogging compensation, etc.

► Spindle function, parameter switching

► Failure behavior is controllable

► Net, Java, C, Labview, Android Integration

MC20 servo motor product highlights



- ▶ 5 flange sizes
- ▶ 27 different power and inertia combinations
- ▶ A total of 200+ product options

High precision

- ▶ 23-bit high-resolution multi-turn absolute encoder
- ▶ Optional mechanical multi-turn absolute encoder
- ▶ Repeatability up to 120"

Green and energy-saving

- ▶ The motor meets CEL Grade 1
- ▶ Energy saving and emission reduction

Low or medium inertia options available

- ▶ Meets the inertia matching requirements of various industry applications

Reliability

Ensures stable operation in harsh field environments

- ▶ Class F insulation winding
- ▶ IP65 protection grade
- ▶ Shaft seal as standard

Intelligence

- ▶ Standard electronic nameplate function
- ▶ Automatic matching with XC20 servo drives

- ▶ Rated speed from 1500 rpm to 3000 rpm
- ▶ Maximum speed up to 6000 rpm
- ▶ Maximum speed up to 4500 rpm for medium inertia models

MC20 Servo Motor Product Specifications



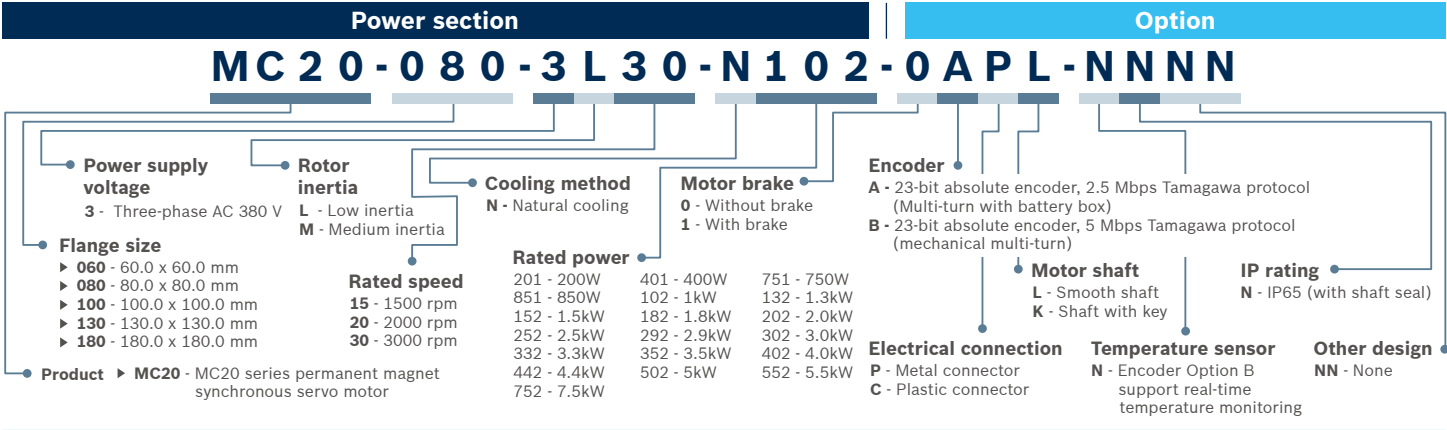
Flange size	60	80	100	130			180	
Inertia	Low inertia	Low inertia	Low inertia	Low inertia	Medium inertia		Medium inertia	
Rated speed	3000 rpm	3000 rpm	3000 rpm	3000 rpm	2000 rpm	1500 rpm	2000 rpm	1500 rpm
Operating voltage: Three-phase AC 380 V	0.2 kW	0.75 kW	1.5 kW	3.0 kW	1.0 kW	0.85 kW	3.5 kW	2.9 kW
	0.4 kW	1 kW	2.0 kW	4.0 kW	1.5 Kw	1.3 kW	4.0 kW	3.3 kW
			2.5 kW	5.0 kW	2.0 kW	1.8 kW	5.0 kW	4.4 kW
					2.5 kW		7.5 kW	5.5 kW
					3.0 kW			7.5 kW

¹⁾ For detailed technical parameters, please refer to the MC20 motor catalog. Rexroth reserves the right of final interpretation.

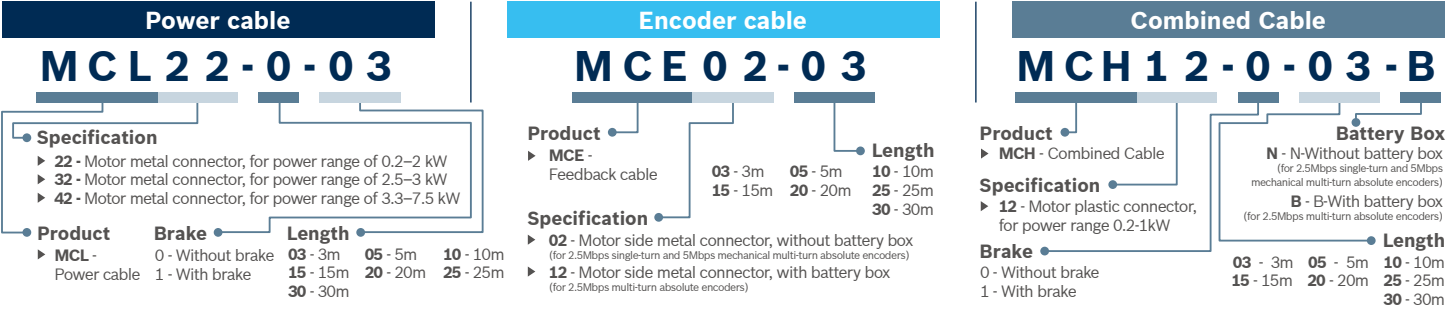
Technical data

Motor model	Inertia	Rated power (kW)	Rated speed (rpm) nN	Rated torque (Nm) MN	Maximum torque (Nm) Mmax	Maximum speed (rpm) nmax	Rated current (A) IN	Maximum current (A) lmax	Rotor inertia – without brake Jrot (kg·cm ²)	Rotor inertia – with brake Jrot (kg·cm ²)	Mass – without brake (kg) m	Mass – with brake (kg) m	Flange (mm) A	Frame length – without brake (mm) L	Frame length – with brake (mm) L	Shaft length (mm) C	Shaft diameter (mm) D
MC20-060-3L30-N201-_-_-_-NNNN	Low	0.2	3000	0.64	2	6000	0.92	3.1	0.2	0.21	1.1	1.4	60	91	119	30	14
MC20-060-3L30-N401-_-_-_-NNNN	Low	0.4	3000	1.28	4	6000	1.43	4.8	0.37	0.38	1.4	1.8	60	109	137	30	14
MC20-080-3L30-N751-_-_-_-NNNN	Low	0.75	3000	2.39	8	6000	2	6.7	1.44	1.5	2.6	3	80	127	157	35	19
MC20-080-3L30-N102-_-_-_-NNNN	Low	1	3000	3.18	9.8	6000	3.86	12	1.9	1.95	3.2	3.6	80	139	169	35	19
MC20-130-3M15-N851-_-_-P_-NNNN	Medium	0.85	1500	5.4	16.6	4500	3.8	12	10.5	11.5	6.7	8.2	130	147	172	58	24
MC20-130-3M20-N102-_-_-P_-NNNN	Medium	1	2000	4.8	14.3	4500	4	12	10.5	11.5	6.7	8.2	130	147	172	58	24
MC20-130-3M15-N132-_-_-P_-NNNN	Medium	1.3	1500	8.3	24	4500	5.8	17	13.3	14.2	7.5	9	130	157	182	58	24
MC20-100-3L30-N152-_-_-P_-NNNN	Low	1.5	3000	4.8	14.85	6000	5.6	17.7	2.19	2.56	4.4	5.6	100	152	195	45	24
MC20-130-3M20-N152-_-_-P_-NNNN	Medium	1.5	2000	7.2	24	4500	6.3	21.5	13.3	14.2	7.5	9.1	130	157	182	58	24
MC20-130-3M15-N182-_-_-P_-NNNN	Medium	1.8	1500	11.5	36	4500	6.3	20.6	18.3	19.3	9.3	10.8	130	177	202	58	24
MC20-100-3L30-N202-_-_-P_-NNNN	Low	2	3000	6.38	19.8	5000	6.3	20.4	2.79	3.16	5.1	6.4	100	177	220	45	24
MC20-130-3M20-N202-_-_-P_-NNNN	Medium	2	2000	9.6	33.5	4500	6.3	23	18.3	19.3	9.3	10.8	130	177	202	58	24
MC20-100-3L30-N252-_-_-P_-NNNN	Low	2.5	3000	7.96	26.4	5000	8	26.8	3.65	4.02	6.1	7.4	100	207	250	45	24
MC20-130-3M20-N252-_-_-P_-NNNN	Medium	2.5	2000	12	40	4500	9.9	33	23.6	24.6	11	12.6	130	197	222	58	24
MC20-180-3M15-N292-_-_-P_-NNNN	Medium	2.9	1500	18.5	57.6	4500	9.9	31.5	48.3	54.7	17.1	21.8	180	182.5	212.5	79	35
MC20-130-3L30-N302-_-_-P_-NNNN	Low	3	3000	9.6	29	5000	10	33	10.2	12.2	10.1	11.9	130	202	232	58	24
MC20-130-3M20-N302-_-_-P_-NNNN	Medium	3	2000	14.3	47	4500	9.7	33	28.8	29.7	12.9	14.4	130	217	242	58	24
MC20-180-3M15-N332-_-_-P_-NNNN	Medium	3.3	1500	21	67.2	4500	14.7	47.6	54.5	60.9	18.5	23.3	180	190.5	220.5	79	35
MC20-180-3M20-N352-_-_-P_-NNNN	Medium	3.5	2000	16.7	54	4500	15.1	50	48.3	54.7	17	21.8	180	182.5	212.5	79	35
MC20-130-3L30-N402-_-_-P_-NNNN	Low	4	3000	12.7	45	5000	12.6	49	12.8	14.8	11.7	13.5	130	212	242	58	24
MC20-180-3M20-N402-_-_-P_-NNNN	Medium	4	2000	19.1	60	4500	15.6	50	54.5	60.9	18.6	23.3	180	190.5	220.5	79	35
MC20-180-3M15-N442-_-_-P_-NNNN	Medium	4.4	1500	28	86	4500	15.9	50	70	76.4	21.5	26.7	180	210.5	240.5	79	35
MC20-130-3L30-N502-_-_-P_-NNNN	Low	5	3000	16	48	5000	16	50	16.8	18.8	13.3	16	130	242	272	58	24
MC20-180-3M20-N502-_-_-P_-NNNN	Medium	5	2000	24	76	4500	15.6	50	70	76.4	21.8	26.7	180	210.5	240.5	79	35
MC20-180-3M15-N552-_-_-P_-NNNN	Medium	5.5	1500	35	112	4500	15.4	50	91.7	98.2	27	31.8	180	238.5	268.5	110	42
MC20-180-3M20-N752-_-_-P_-NNNN	Medium	7.5	2000	36	116	4500	15.3	50	113.4	120	31.9	36.8	180	266.5	296.5	110	42
MC20-180-3M15-N752-_-_-P_-NNNN	Medium	7.5	1500	48	150	3000	15.7	50	113.4	120	32.1	36.6	180	266.5	296.5	110	42

MC20 servo motor model overview



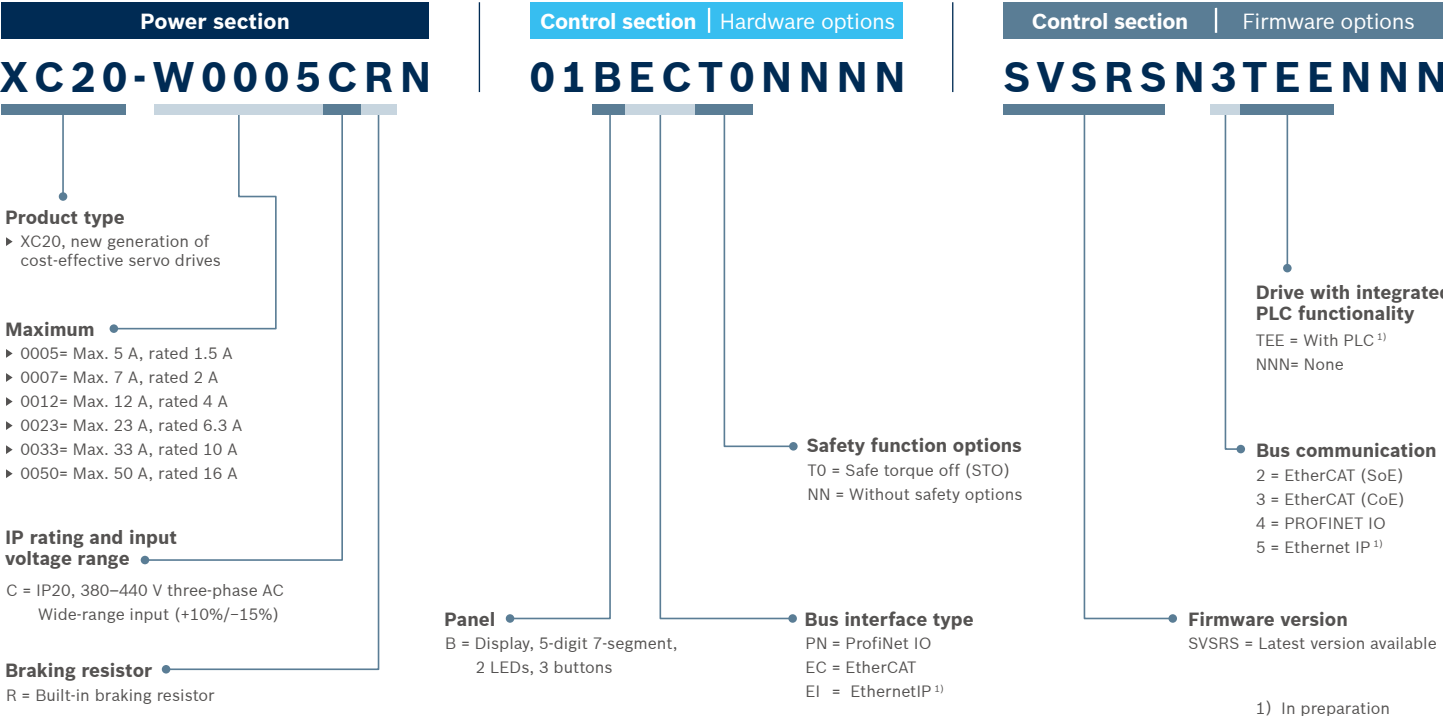
MC20 cable and encoder model overview



Drive, motor, and cable selection and matching

	MC20 servo motor model	Matching XC20 servo drive model	Matching power cable model	Matching feedback cable model				
				Mechanical multi-turn encoder	Battery-backed multi-turn encoder			
	MC20-060-3L30-N201-_-_-_-NNNN	XC20-W0005CRN-01B_ _ _ _NNNN-SVSRSN_NNNNNNN	MCL22-_-_-_- /MCH12-_-_-_-	MCE02_ _ /MCH12-_-_-_-N	MCE12_ _ /MCH12-_-_-_-B			
	MC20-060-3L30-N401-_-_-_-NNNN							
	MC20-080-3L30-N751-_-_-_-NNNN							
	MC20-080-3L30-N102-_-_-_-NNNN	XC20-W0007CRN-01B_ _ _ _NNNN-SVSRSN_NNNNNNN						
	MC20-080-3L30-N102-_-_-_-NNNN	XC20-W0012CRN-01B_ _ _ _NNNN-SVSRSN_NNNNNNN						
	MC20-130-3M15-N851- _ _P_-NNNN	XC20-W0012CRN-01B_ _ _ _NNNN-SVSRSN_NNNNNNN	MCL22-_- _ _	MCE02_ _ /MCH12-_-_-_-N	MCE12_ _ /MCH12-_-_-_-B			
	MC20-130-3M20-N102- _ _P_-NNNN							
	MC20-130-3M15-N132- _ _P_-NNNN							
	MC20-100-3L30-N152- _ _P_-NNNN	XC20-W0023CRN-01B_ _ _ _NNNN-SVSRSN_NNNNNNN						
	MC20-130-3M20-N152- _ _P_-NNNN							
	MC20-130-3M15-N182- _ _P_-NNNN							
	MC20-100-3L30-N202- _ _P_-NNNN							
	MC20-130-3M20-N202- _ _P_-NNNN							
	MC20-100-3L30-N252- _ _P_-NNNN	XC20-W0033CRN-01B_ _ _ _NNNN-SVSRSN_NNNNNNN				MCL32-_- _ _	MCE02_ _ /MCH12-_-_-_-N	MCE12_ _ /MCH12-_-_-_-B
	MC20-130-3M20-N252- _ _P_-NNNN							
	MC20-180-3M15-N292- _ _P_-NNNN							
	MC20-130-3L30-N302- _ _P_-NNNN							
	MC20-130-3M20-N302- _ _P_-NNNN							
	MC20-180-3M15-N332- _ _P_-NNNN	XC20-W0050CRN-01B_ _ _ _NNNN-SVSRSN_NNNNNNN	MCL42-_- _ _	MCE02_ _ /MCH12-_-_-_-N	MCE12_ _ /MCH12-_-_-_-B			
	MC20-180-3M20-N352- _ _P_-NNNN							
	MC20-130-3L30-N402- _ _P_-NNNN							
	MC20-180-3M20-N402- _ _P_-NNNN							
	MC20-180-3M15-N442- _ _P_-NNNN							
	MC20-130-3L30-N502- _ _P_-NNNN							
	MC20-180-3M20-N502- _ _P_-NNNN							
	MC20-180-3M15-N552- _ _P_-NNNN							
	MC20-180-3M20-N752- _ _P_-NNNN							
	MC20-180-3M15-N752- _ _P_-NNNN							

XC20 servo drive model overview



Worldwide sales
and service network

80
countries

5

continents

Dedicated to research
and development

**Global
application
experience**

**Region-
specific
customized
solutions**

49
production sites

with customization
centers in 21
countries

**International
project
management**

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Documentation center:

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Online configurator:

<https://www.boschrexroth.com/ctrlx-configurator/>

XC20 official website: www.boschrexroth.com.cn/xc20

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