WINDER SOLUTIONS

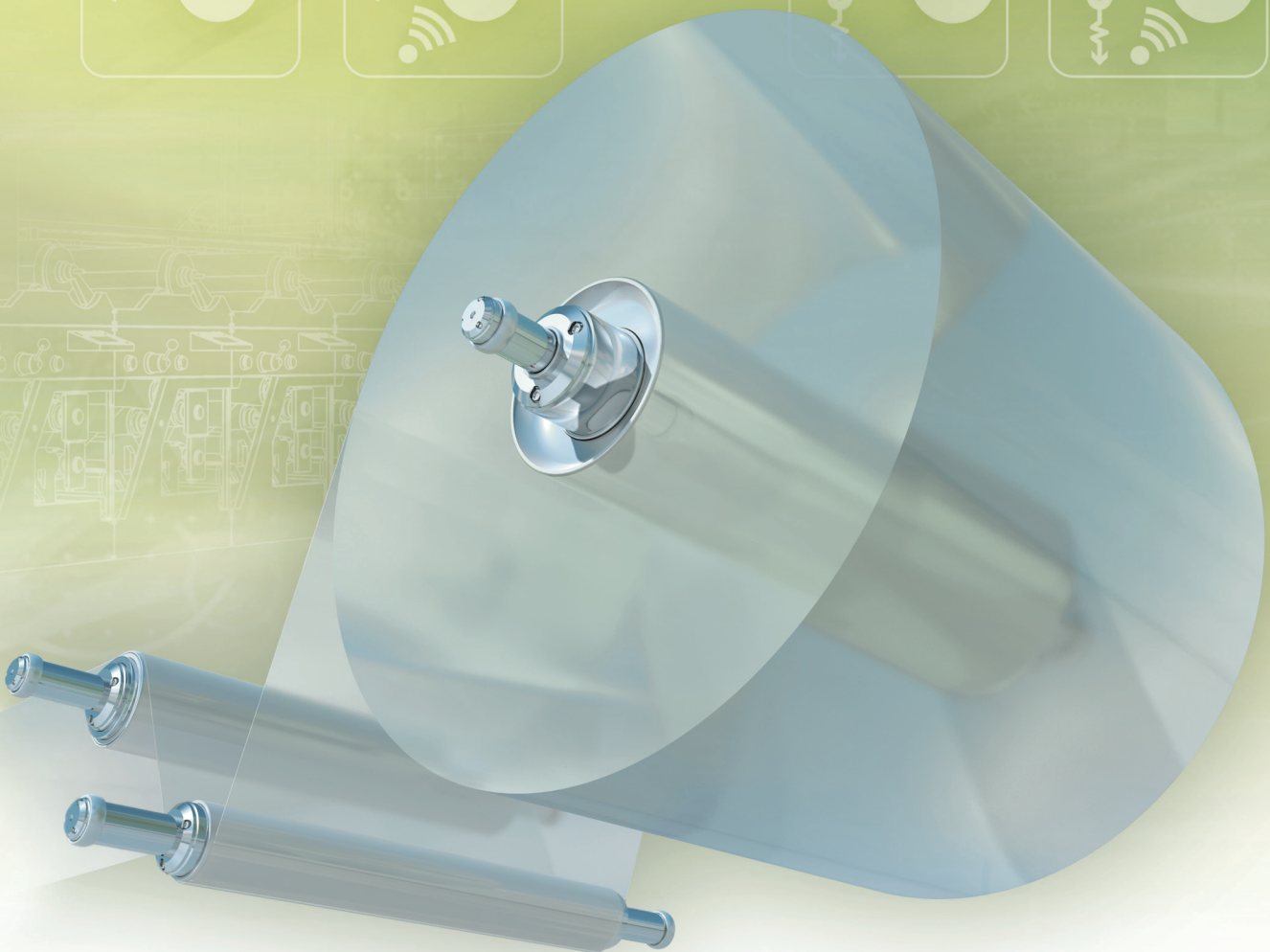## Inverter Application Software

realizing

Inverter Application Software...

Based on OMRON's experience in winder applications, the RX inverter offers four times faster torque control loop. In addition to this torque control loop improvement, the solution includes dedicated application functions such as diameter calculation without sensor, winder/unwinder bidirectional modes and tension control by either torque or PID. The built-in programming functionality also offers a set of software libraries for your winder application.

TENSION CONTROL BY TORQUE

• No load cell or dancer needed

• RX inverter series in closed loop vector control
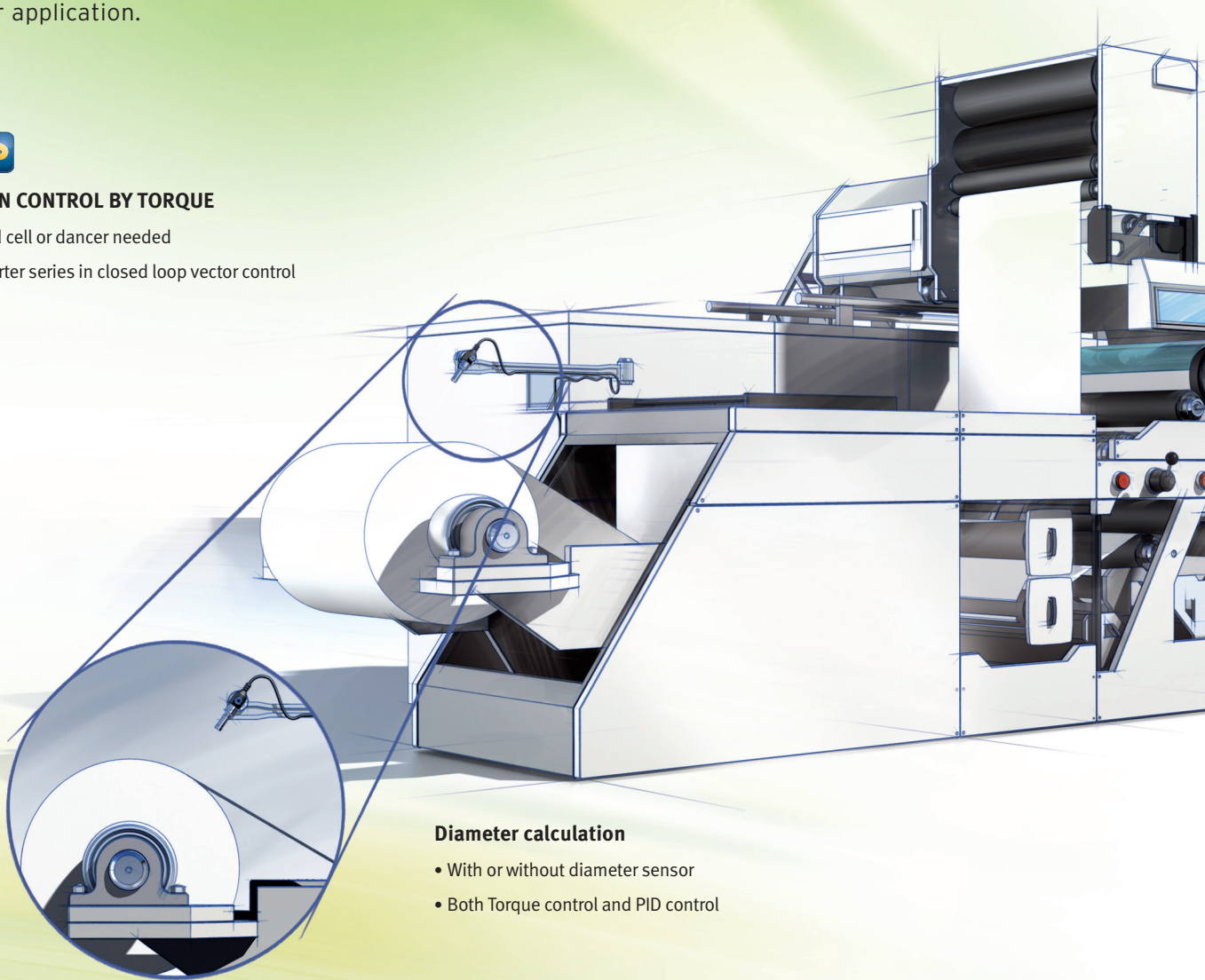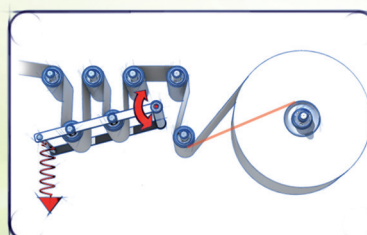
Diameter calculation

• With or without diameter sensor
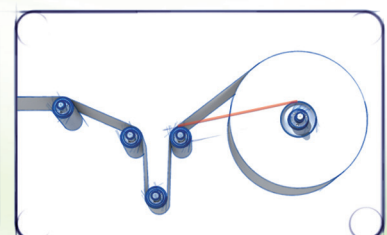
• Both Torque control and PID control

TENSION CONTROL BY PID

• Load cell or dancer is needed

• MX2 & RX inverter series can work in this mode

DANCER

LOAD CELL

Winder & Unwinder mode

- Both can work in forward or reverse
- Both are available in torque and PID tension control modes
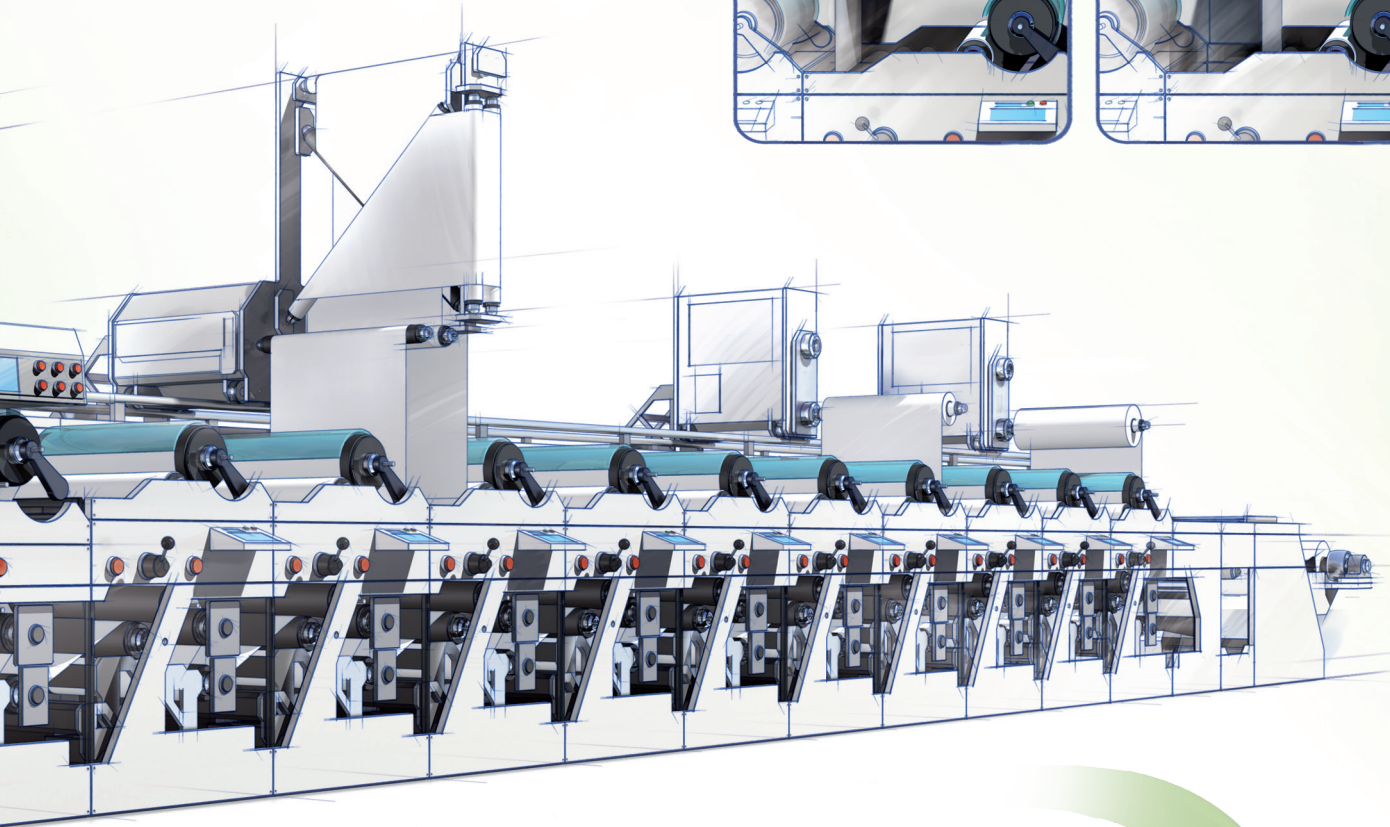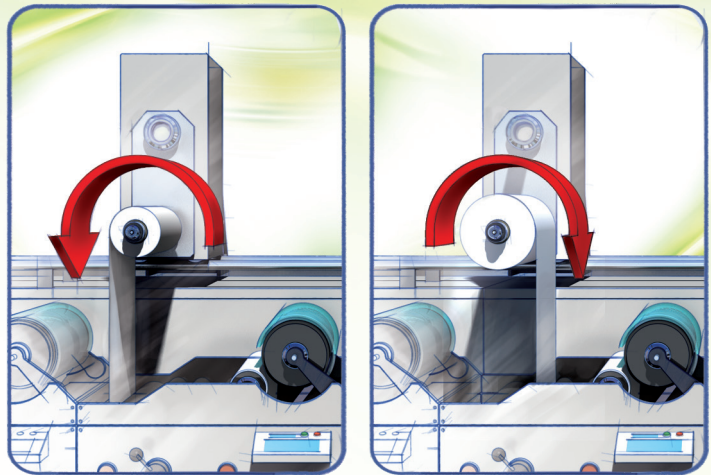
Machine loses compensation

- Static and dynamic friction compensation
- Effective tension control by Torque

Dedicated monitors

- Like diameter or final product torque reference are supported
- New monitors can be implemented based on application needs

Friction/Torque compensation

Dynamic Friction

Static Friction

Winder Speed

Max. Frequency

...for Winder Solutions

The Omron Winder Inverter Application Software Library has been developed using different functions for tension control by torque or PID regulation. Additionally, CX-Drive Progra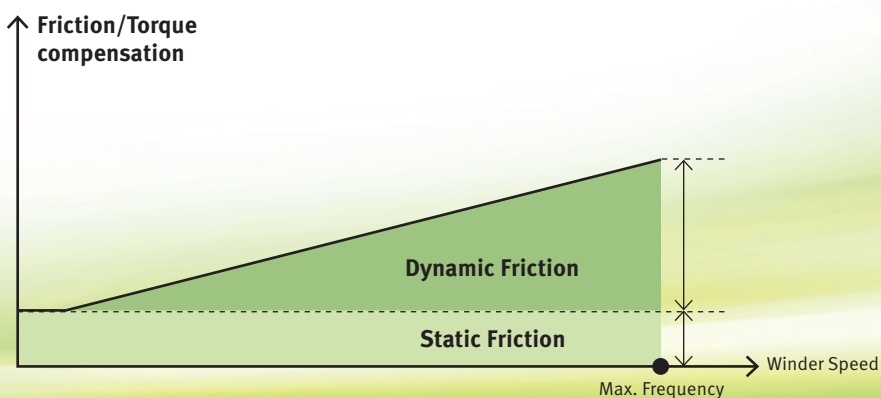mming enables existing functions to be adapted to customers' needs. New functions can also be created resulting in exclusive, tailor-made solutions. Customers may also develop their own application software with the CX-Drive Programming open tool.

Tension correction by diameter

The Taper function compensates for the non-linear effects of winding tension causing telescoping and excessive crushed rolls. These effects may appear even with the correct diameter, PID regulation and/ or correct torque set point calculation. Taper provides a tension compensation curve based on diameter
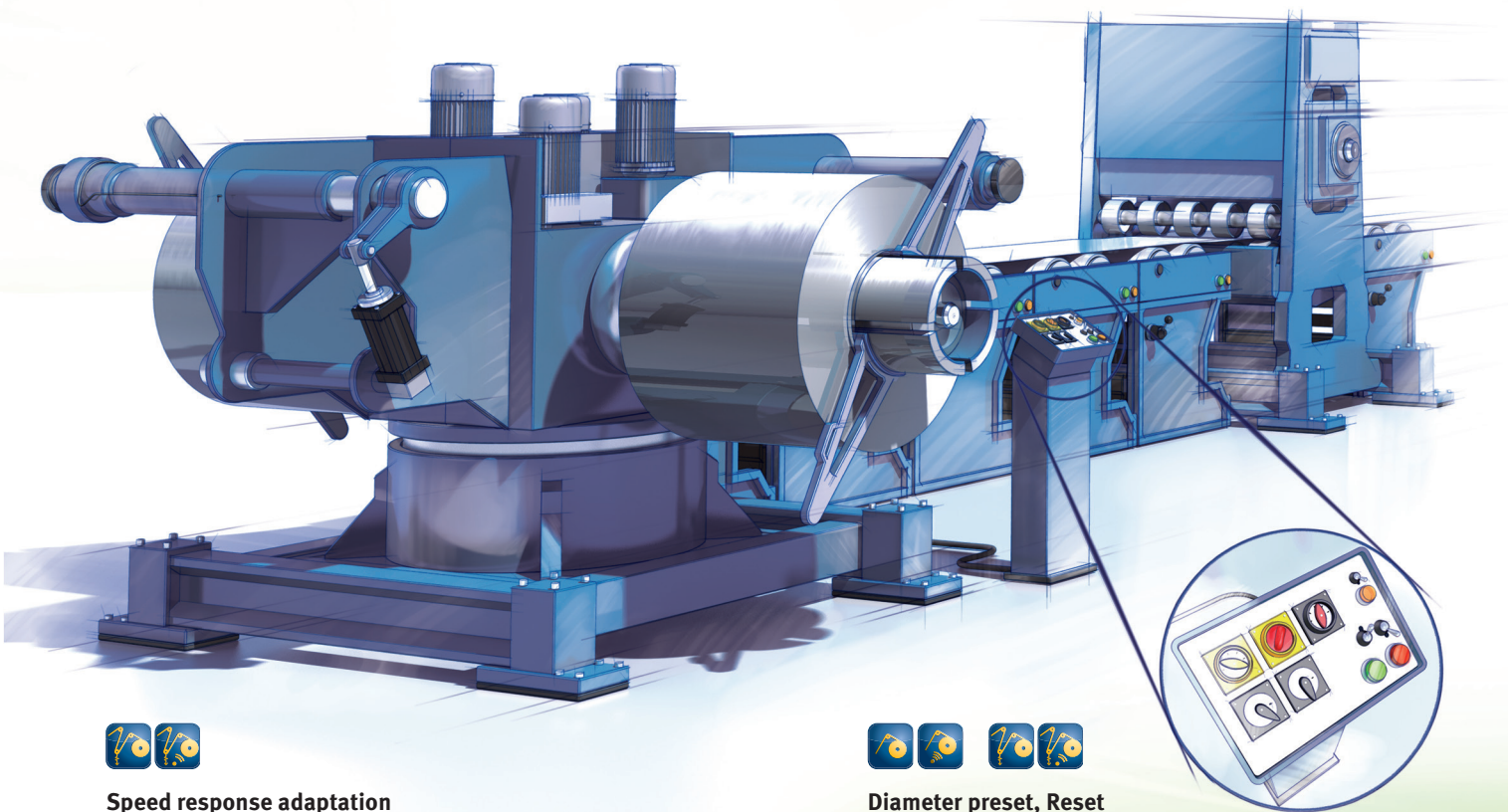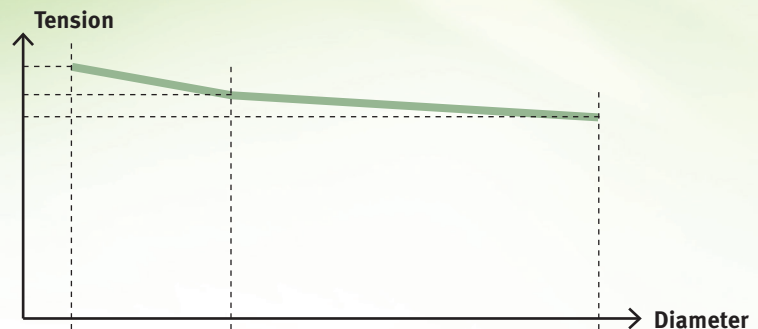
Speed response adaptation

- Dynamic rigidity is calculated depending on diameter

Diameter preset, Reset and Freeze functions

RX INVERTER

- Supports winder Tension control by:
  - Torque in closed loop vector control
  - PID in open loop & closed loop vector control

MX2 INVERTER

- Supports winder Tension control by:
  - PID in open loop vector control

APPLICATION SOFTWARE LIBRARIES

Benefit from using Omron's Inverter Application Software Library which provides solutions for cranes, winders, positioning, water and energy as well as other areas which will be launched in the future. Omron's inverter **application software can be customised to meet specific customer needs...**

Positioning

Water

Cranes

Winder

TORQUE CONTROL   PID CONTROL

...or just create your ones

by using the CX-Drive Programming tool included in the standard CX-Drive software, which features:

- Flow chart and text editor programming languages
- 5 tasks running simultaneously with up to 1000 lines per program
- Full access to parameters and inverter functions
- Access to an LCD real time clock

Cx → *Drive* PROGRAMMING
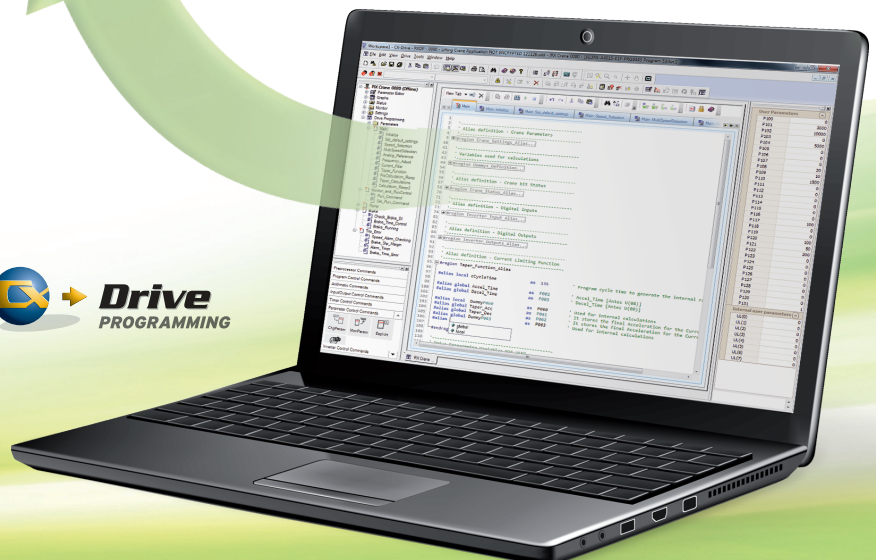
RX Inverter

- Power range up to 132 kW
- Sensor-less and closed-loop vector control
- High starting torque in open loop (200% at 0.3 Hz)
- Full torque at 0 Hz in closed-loop
- Double rating VT 120%/ 1 min and CT 150%/1 min
- Built-in application functionality: ELS (Electronic Line Shaft), brake control, load over speed control

200 V class

Three-phase: 3G3RX				A2004	A2007	A2015	A2022	A2037	A2055	A2075	A2110	A2150	A2185	A2220	A2300	A2370	A2450	A2550
Max. applicable motor 4P kW			at CT	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
			at VT	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Output characteristics	Inverter capacity KVA	200 V	at CT	1.0	1.7	2.5	3.6	5.7	8.3	11	15.9	22.1	26.3	32.9	41.9	50.2	63	76.2
			at VT	1.3	2.1	3.2	4.1	6.7	10.4	15.2	20	26.3	29.4	39.1	49.5	59.2	72.7	93.5
		240 V	at CT	1.2	2.0	3.1	4.3	6.8	9.9	13.3	19.1	26.6	31.5	39.4	50.2	60.2	75.6	91.4
			at VT	1.5	2.6	3.9	5.0	8.1	12.4	18.2	24.1	31.5	35.3	46.9	59.4	71	87.2	112.2
	Rated output current (A)		at CT	3.0	5.0	7.5	10.5	16.5	24	32	46	64	76	95	121	145	182	220
			at VT	3.7	6.3	9.4	12	19.6	30	44	58	73	85	113	140	169	210	270

400 V class

Three-phase: 3G3RX				A4004	A4007	A4015	A4022	A4040	A4055	A4075	A4110	A4150	A4185	A4220	A4300	A4370	A4450	A4550	B4750	B4900	B411K	B413K
Max. applicable motor 4P kW			at CT	0.4	0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132
			at VT	0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160
Output characteristics	Inverter capacity KVA	400 V	at CT	1.0	1.7	2.5	3.6	6.2	9.7	13.1	17.3	22.1	26.3	33.2	40.1	51.9	63	77.6	103.2	121.9	150.3	180.1
			at VT	1.3	2.1	3.3	4.6	7.7	11	15.2	20.9	25.6	30.4	39.4	48.4	58.8	72.7	93.5	110.8	135	159.3	200.9
		480 V	at CT	1.2	2.0	3.1	4.3	7.4	11.6	15.8	20.7	26.6	31.5	39.9	48.2	62.3	75.6	93.1	128.3	146.3	180.4	216.1
			at VT	1.5	2.5	4.0	5.5	9.2	13.3	18.2	24.1	30.7	36.5	47.3	58.1	70.6	87.2	112.2	133	162.1	191.2	241.1
	Rated output current (A)		at CT	1.5	2.5	3.8	5.3	9.0	14	19	25	32	38	48	58	75	91	112	149	176	217	260
			at VT	1.9	3.1	4.8	6.7	11.1	16	22	29	37	43	57	70	85	105	135	160	195	230	290

Selection guide: KPP_RX_EN_INT

SOFTWARE TOOL

- CX-Drive with Drive Programming functionality

APPLICATION LIBRARIES

Crane				Winder		Water	Positioning
TOWER	LUFFING	GRAB	GANTRY	TORQUE CONTROL	PID CONTROL	PUMP SEQ	EXTRA POSITIONING

*Note: Please contact your OMRON representative for detailed specifications and ordering information.

MX2 Inverter

- Power range up to 15 kW
- Torque control in open loop
- 200% starting torque (at 0.5 Hz)
- Double rating VT 120%/1 min and CT 150%/1 min
- Models with IP54 housing protection
- 24 VDC backup supply for control board and communication
- Built-in application functionality (i.e. Brake control)

200 V class

Single-phase: 3G3MX2		B001	B002	B004	B007	B015	B022	-	-	-	-	-
Three-phase: 3G3MX2		2001	2002	2004	2007	2015	2022	2037	2055	2075	2110	2150
Motor kW	For VT setting	0.2	0.4	0.55	1.1	2.2	3.0	5.5	7.5	11	15	18.5
	For CT setting	0.1	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15
Output characteristics	Inverter capacity kVA 200 VT	0.4	0.6	1.2	2.0	3.3	4.1	6.7	10.3	13.8	19.3	23.9
	200 CT	0.2	0.5	1.0	1.7	2.7	3.8	6.0	8.6	11.4	16.2	20.7
	240 VT	0.4	0.7	1.4	2.4	3.9	4.9	8.1	12.4	16.6	23.2	28.6
	240 CT	0.3	0.6	1.2	2.0	3.3	4.5	7.2	10.3	13.7	19.5	24.9
	Rated output current (A) at VT	1.2	1.9	3.5	6.0	9.6	12.0	19.6	30.0	40.0	56.0	69.0
	Rated output current (A) at CT	1.0	1.6	3.0	5.0	8.0	11.0	17.5	25.0	33.0	47.0	60.0

400 V class

Three-phase: 3G3MX2		4004	4007	4015	4022	4030	4040	4055	4075	4110	4150
Motor kW	For VT setting	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15	18.5
	For CT setting	0.4	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15
Output characteristics	Inverter capacity kVA 380 VT	1.3	2.6	3.5	4.5	5.7	7.3	11.5	15.1	20.4	25.0
	380 CT	1.1	2.2	3.1	3.6	4.7	6.0	9.7	11.8	15.7	20.4
	480 VT	1.7	3.4	4.4	5.7	7.3	9.2	14.5	19.1	25.7	31.5
	480 CT	1.4	2.8	3.9	4.5	5.9	7.6	12.3	14.9	19.9	25.7
	Rated output current (A) at VT	2.1	4.1	5.4	6.9	8.8	11.1	17.5	23.0	31.0	38.0
	Rated output current (A) at CT	1.8	3.4	4.8	5.5	7.2	9.2	14.8	18.0	24.0	31.0

Selection guide: KPP_MX2_EN_INT

SOFTWARE TOOL

- CX-Drive with Drive Programming functionality

APPLICATION LIBRARIES

Winder	Water	Hoist & Lift	Textile	Energy
PID CONTROL	x3 PUMP SEQ	LIFT	TRAVERSE	SOLAR TRAK

*Note: Please contact your OMRON representative for detailed specifications and ordering information.

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