



Technical Data

PowerFlex 700L Liquid-cooled AC Drives

Catalog Number 20L

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Summary of Changes

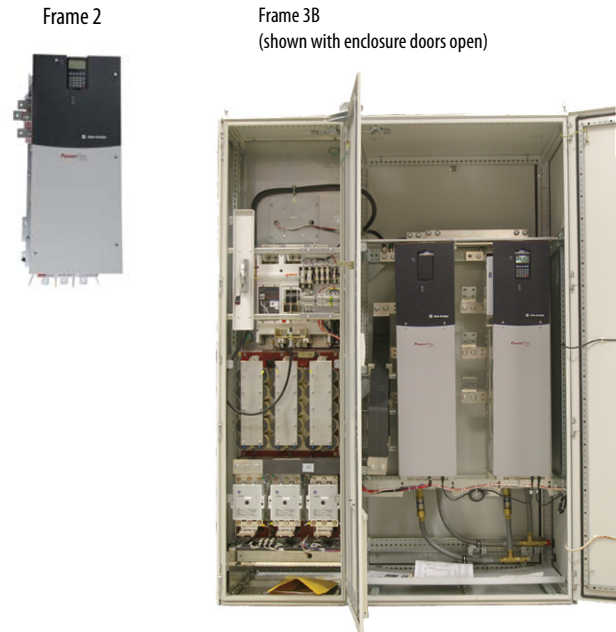
This publication contains updated information as indicated in the following table.

Topic	Page
Added notes that the PowerFlex 700L drives with Safe Torque Off manufactured before 09/25/2020 are TUV certified.	3, 7, 9, 11, 35
Updated Agency Certifications, removed years, removed certification images.	35

Product Overview

PowerFlex® 700L Liquid-cooled AC drives are responsive, high performance, regenerative industrial drives for installations requiring a compact footprint. The PowerFlex 700L drive offers two versions of control: either the PowerFlex 700 Vector Control or the PowerFlex 700S Phase II Control. This provides the PowerFlex 700L drive with exceptional and proven performance as well as the same interface, communications capabilities and programming tools of the air-cooled drives. The many features allow you to easily configure the drive for most application needs. Ratings presently available include:

- 268...960 Hp (200...715 kW) at 400V AC
- 300...1150 Hp (224...860 kW) at 480V AC
- 465...870 Hp (345...650 kW) at 600V AC
- 475...881 Hp (355...657 kW) at 690V AC



Key Features/Benefits

Space Saving Features

The PowerFlex 700L AC drive features a patented liquid-cooled heatsink design to transfer over 80% of the drive heat loss to the liquid coolant, resulting in the best drive power-to-size ratio in the market. The integral active converter and line filter translate to a fully regenerative drive that's over 60% smaller than typical air-cooled drives.

Integrated Line Regenerative Braking For Precise Control and Energy Savings

- The Liquid-cooled AC drive features regenerative braking which is ideal for precise, high-response speed and position control, continuous holdback, rapid deceleration and stopping of high inertia loads. Instead of wasting energy with resistor braking technology, regenerative braking actually puts the energy back into the system to be used by other equipment.
- Regenerative braking eliminates the need for large resistor banks. These resistor banks can create a lot of heat and must frequently be cleaned.

Improved Power Quality with Regenerative Rectifier

- Compact and cost-effective means to achieve compliance with CE and IEEE 519 harmonic limits.
- Actively controls power factor regardless of motor speed which reduces input line currents and minimizes the size of upstream devices.
- Input Voltage Boost
- Integrated active converter and line-side filter allow 'input voltage boost' to protect your system from power disturbances.
- Maintains consistent system performance in the event of power dips or other power quality issues.
- Provides full 480V AC to the motor even when operating on 380V AC power lines.

Flexible Control Platforms

- Designed for applications with requirements ranging from the simplest speed control to the most demanding torque control, the PowerFlex 700L drive is available with either PowerFlex 700 Vector Control or PowerFlex 700S Control.
- Outstanding open or closed loop speed regulation for applications ranging from fans and pumps to precise winder control.
- Excellent torque production and tight torque regulation for demanding applications like extruders, web process, and test stands.
- Fast update times of torque inputs are suitable for high performance applications.
- All of this flexibility is possible through multiple control modes: V/Hz control, Sensorless Vector, Vector Control with FORCE™ Technology, and Permanent Magnet Control (700S control only).
- Safe Torque Off Option (available with the PowerFlex 700S Control option), the first offering available within the DriveGuard™ series of safety solutions, prevents a drive from delivering rotational energy to motors by integrating a safety circuit with the drive's power switching signals. This solution meets EN13849-1, Category 3.

TIP PowerFlex 700L drives with Safe Torque Off manufactured before 09/25/2020 are TUV certified.

Packaging Options

- The PowerFlex 700L frame 2 is an IP00 (Open Style) panel mount drive that can be mounted in a variety of enclosures.
- The PowerFlex 700L frame 3A and 3B are available in a IP20 (NEMA 1) Rittal enclosure that includes the input circuit breaker.
- The majority of heat lost from the drive is transferred to the liquid coolant. Therefore, other enclosure options such as IP54 (NEMA/UL Type 12) or IP66 (NEMA/UL Type 4X) can be used and placed directly into dusty, dirty, and outdoor environments. Contact your local Rockwell Automation drive center for these packaging options.

Cooling Loop Options

A liquid-to-liquid or liquid-to-air heat exchanger, or a chiller can be used with the PowerFlex 700L drive. See [page 40](#) for more information.

Communication and Human Interface Options

Premier Integration with PowerFlex Drives and RSLogix 5000 Software

For simplified AC drive start-up and reduced development time, we've integrated Allen-Bradley PowerFlex drive configuration with RSLogix™ 5000 software. This single-software approach simplifies parameter and tag programming while still allowing stand-alone drive software tool use on the factory floor.

Communication Modules

DPI communication modules provide fast and efficient control and/or data exchange over:

- DeviceNet™ interface
- ControlNet™ interface
- EtherNet/IP™ interface
- Serial communications
- Other open control and communication networks

Unsurpassed Capability in Network Communications

PowerFlex drives are fully compatible with the wide variety of Allen-Bradley DPI™ communication adapters, offering the following benefits.

DeviceNet	ControlNet	EtherNet/IP	RS485 DF1	PROFIBUS DP	CANopen	Modbus RTU	Modbus TCP	Metasys N2	Siemens PT FLN	Description
x	x	x								Unconnected Messaging permits other network devices (for example, PanelView™ terminal) to communicate directly to a drive without routing the communication through the network scanner.
x	x	x	x			x				Adapter Routing – Plug PC into one drive and talk to all other Allen-Bradley drives on same network, without being routed through the network scanner.
x	x	x	x	x	x	x	x	x	x	Access to 100% of all parameters over the network.
x		x		x						AutoBaud capability makes initial connections less problematic.
x										Change of State significantly reduces network traffic by configuring control messages to be sent only upon customer defined states. Very flexible configuration for each node (Example: 'reference must change by more than 5%').
x		x								Peer Control provides master-slave type control between drives, where one or more slave drives (consumers) can run based on the status of a master drive (producer), which can also significantly reduce network traffic.
x										Automatic Device Replacement (ADR) saves significant time and effort when replacing a drive, by allowing the scanner to be configured to automatically detect a new drive and download the required parameter settings.
x	x	x	x	x	x	x	x	x	x	Flexible Fault Configuration – Adapters can be programmed to take fault based actions such as ramp to stop, coast-to-stop, and hold last state, as well as send user configurable logic control and speed reference values. In addition, different actions can be taken based on whether the network experienced a serious problem (broken cable, and so forth) versus a network idle condition (PLC set to 'Program').

PowerFlex Architecture-Class LCD Human Interface Modules

- An LCD Human Interface Module (also used with the PowerFlex 70, PowerFlex 700, and PowerFlex 700S) provides multilingual text for startup, metering, programming, and troubleshooting.
- Large and easy to read 7 line x 21 character backlit display
- Alternate function keys for shortcuts to common tasks
- ‘Calculator-like’ number pad for fast and easy data entry (Full Numeric version only)
- Control keys for local start, stop, speed, and direction
- Remote versions for panel mount applications

PC-based Configuration Tools

Connected Components Workbench

Connected Components Workbench™ (CCW) design and device configuration software, offers device configuration, controller programming, and integration with HMI editor. Connected Components Workbench software is developed based on proven Rockwell Automation® and Microsoft® Visual Studio technology. CCW has software compatibility with:

- RSLinx® Classic Lite version 2.59.02 or greater
- ControlFLASH™ version 11.00 or greater

DriveTools™ SP Software

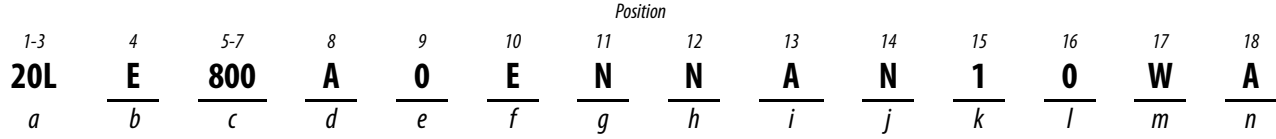
A powerful personal computer-based software suite, for programming, configuration, and troubleshooting.

- DriveExecutive™ - for online and offline configuration and management of drives and drive peripherals
- DriveObserver™ - for real time trending of drive information

See the PowerFlex Low Voltage AC Drives Selection Guide, publication [PFLEX-SG002](#), for information on other software configuration tools.

TIP DriveTools SP Software has been upgraded to Connected Components Workbench. DriveTools support can be found at the Product Compatibility Download Center <https://compatibility.rockwellautomation.com/Pages/home.aspx>, but is no longer available for sale.

Catalog Number Explanation



a

Drive	
Code	Type
20L	PowerFlex 700L

b

Voltage Rating		
Code	Voltage	Ph.
C	400V AC	3
D	480V AC	3
E	600V AC	3
F	690V AC	3

c1

ND Rating			
400V, 60 Hz Input			
Code	Amps	Hp (KW)	Frame
360	360	268 (200)	2
650	650	500 (370)	3A
1K2	1250	960 (715)	3B

c2

ND Rating			
480V, 60 Hz Input			
Code	Amps	Hp (KW)	Frame
360	360	300 (224)	2
650	650	600 (445)	3A
1K2	1250	1150 (860)	3B

c3

ND Rating			
600V, 60 Hz Input			
Code	Amps	Hp (KW)	Frame
425	425	465 (345)	3A
800	800	870 (650)	3B
1K1	1175	1275 (950)	3B ♣

♣ Must operate at 2 kHz PWM only, and only as a stand-alone inverter module ("K" in position 13).

c4

ND Rating			
690V, 60 Hz Input			
Code	Amps	Hp (KW)	Frame
380	380	475 (355)	3A
705	705	881 (657)	3B
1K0	1050	1310 (980)	3B ♣

♣ Must operate at 2 kHz PWM only, and only as a stand-alone inverter module ("K" in position 13).

d

Enclosure		
Code	Type	Conformal Coating
A	NEMA/UL Type 1, IP20 †	Yes
N	Open-Chassis Style/IP00 ❖	Yes

† Frame 3 complete drive.
❖ Frame 2 drive and frame 3 input filter and power modules.

e

HIM	
Code	Operator Interface
0	No HIM/Blank Cover
3	Full Numeric LCD ♣
C	Door-Mounted Full Numeric LCD †

♣ Frame 2 and frame 3 power modules.
† Frame 3 complete drive only.

f

Documentation		
Code	Documents	Ship Carton
E	English Doc Set	Yes
N	No Documentation	Yes
Q	No Documentation	No

g

Brake	
Code	w/Brake IGBT
N	No

h

Brake Resistor	
Code	w/Resistor
N	No

i

Equipment Type		
Code	Description	Frame
A	Complete Regenerative Drive - Std. Interrupt Rating	2, 3A, and 3B
C	Input Filter	3A and 3B
E	Combined Active Converter/ Inverter Power Module	3A only
G	Active Converter Power Module	3B only
J	Inverter Power Module - Coupled Version	3B only
K	Inverter Power Module - Common DC Bus Version	3B only
L	Dual Inverter Power Module	3A only
P	Active Converter Power Module - Stand Alone Version	3B only
X	Spare Power Module ❖	3A and 3B

❖ No control cassettes.

j

Comm Slot		
Code	Communication Option	DPI User-Installed Kit Cat. No.
N	None	N
C	ControlNet (Coax) - DPI	20-COMM-C
D	DeviceNet - DPI	20-COMM-D
E	EtherNet/IP - DPI	20-COMM-E

Position

1-3	4	5-7	8	9	10	11	12	13	14	15	16	17	18
20L	E	800	A	0	E	N	N	A	N	1	0	W	A
<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>

k

Control Option				
Code	Control	Cassette	Logic Expansion	Synch Link
1	700VC 24V I/O	Base	N/A	N/A
2	700VC 115V I/O	Base	N/A	N/A
A	700S Ph. II	Expanded	No	No
B	700S Ph. II	Expanded	No	Yes
C	700S Ph. II	Expanded	Yes	No ▲
D	700S Ph. II	Expanded	Yes	Yes ▲
W	None ❖	N/A	N/A	N/A

❖ Frame 3 input filter, Active Converter Power Modules, and spare power modules.
 ▲ Requires DriveLogix5730.

l

Feedback		
Code	Control Option	Type
0	All	None
1	700VC	Encoder 5V/12V
E	700S Ph. II	2nd Encoder ♥
S	700S Ph. II ▲	Safe Torque Off (w/2nd Encoder) ♥

▲ PowerFlex 700L drives with Safe Torque Off manufactured before 09/25/2020 are TUV certified.
 ♥ Requires expanded cassette.

n

Coolant Type		
Code	Coolant	Frame
N	None	3 Input Filter only
A	Water	All

m

Additional 700S Configuration		
Code	Logix Option	Embedded Comm.
W	None	—
E	Phase II Control	No
K	Phase II Control with DriveLogix 5730	No

Standard Drive Product Selection

400V AC Three-phase Drives

Output Amps (with 400V AC Induction Motor) ⁽¹⁾						Nominal Power Ratings				IP20, NEMA/UL Type 1 ⁽²⁾	Frame Size	PWM Freq. (kHz)
Normal Duty			Heavy Duty			Normal Duty		Heavy Duty		Cat. No.		
Cont.	110% 1 min	150% 3 s	Cont.	150% 1 min	200% 3 s	kW	Hp	kW	Hp			
360	396	540	264	396	540	200	268	150	200	20LC360NOENNAN10WA	2	4
650	715	975	475	715	975	370	500	270	365	20LC650AOENNAN10WA	3A	4
1250	1375	1875	915	1375	1875	715	960	525	700	20LC1K2AOENNAN10WA	3B	4

(1) Frame 2 ratings are based on 50 °C ambient and 50 °C coolant. Frame 3A and 3B ratings are based on 40 °C ambient and 40 °C coolant.

(2) Frames 3A and 3B only. Frame 2 drives are IP00, NEMA/UL Type Open.

480V AC Three-phase Drives

Output Amps (with 480V AC Induction Motor) ⁽¹⁾						Nominal Power Ratings				IP20, NEMA/UL Type 1 ⁽²⁾	Frame Size	PWM Freq. (kHz)
Normal Duty			Heavy Duty			Normal Duty		Heavy Duty		Cat. No.		
Cont.	110% 1 min	150% 3 s	Cont.	150% 1 min	200% 3 s	kW	Hp	kW	Hp			
360	396	540	264	396	540	224	300	175	235	20LD360NOENNAN10WA	2	4
650	715	975	475	715	975	445	600	325	440	20LD650AOENNAN10WA	3A	4
1250	1375	1875	915	1375	1875	860	1150	630	845	20LD1K2AOENNAN10WA	3B	4

(1) Frame 2 ratings are based on 50 °C ambient and 50 °C coolant. Frame 3A and 3B ratings are based on 40 °C ambient and 40 °C coolant.

(2) Frames 3A and 3B only. Frame 2 drives are IP00, NEMA/UL Type Open.

600V AC Three-phase Drives

Output Amps (with 600V AC Induction Motor) ⁽¹⁾						Nominal Power Ratings				IP20, NEMA/UL Type 1	Frame Size	PWM Freq. (kHz)
Normal Duty			Heavy Duty			Normal Duty		Heavy Duty		Cat. No.		
Cont.	110% 1 min	150% 3 s	Cont.	150% 1 min	200% 3 s	kW	Hp	kW	Hp			
425	470	640	315	470	640	345	465	255	345	20LE425AOENNAN10WA	3A	4
800	885	1200	590	885	1200	650	870	480	640	20LE800AOENNAN10WA	3B	4
1175	1295	1765	860	1295	1765	955	1275	695	935	20LE1K1AOENNAN10WA	3B	2 ⁽²⁾

(1) Frame 3A and 3B ratings are based on 40 °C ambient and 40 °C coolant.

(2) Must operate at 2 kHz PWM only, and only as a stand-alone inverter module ('K' in catalog string position 13).

690V AC Three-phase Drives

Output Amps (with 690V AC Induction Motor) ⁽¹⁾						Nominal Power Ratings				IP20, NEMA/UL Type 1	Frame Size	PWM Freq. (kHz)
Normal Duty			Heavy Duty			Normal Duty		Heavy Duty		Cat. No.		
Cont.	110% 1 min	150% 3 s	Cont.	150% 1 min	200% 3 s	kW	Hp	kW	Hp			
380	420	570	280	420	570	355	475	260	350	20LF380AOENNAN10WA	3A	4
705	780	1060	520	780	1060	657	881	485	650	20LF705AOENNAN10WA	3B	4
1050	1155	1575	770	1155	1575	980	1315	720	965	20LF1K0AOENNAN10WA		2 ⁽²⁾

(1) Frame 3A and 3B ratings are based on 40 °C ambient and 40 °C coolant.

(2) Must operate at 2 kHz PWM only, and only as a stand-alone inverter module ('K' in catalog string position 13).

Factory Installed Options

Human Interface and Wireless Interface Modules IP20, NEMA/UL Type 1 (Position e)



Cat. Code: 0
No HIM (Blank Plate)



Cat. Code: 3
LCD Display, Full
Numeric Keypad



Cat. Code: C
Door Mounted Bezel
LCD Display, Full
Numeric Keypad
NEMA/UL Type 1

Documentation

Description	Cat. Code (Position f)
English Documentation Set	E
No Documentation	N

Internal Communication Adapters

Description	Cat. Code (Position j)
None	N
ControlNet Communication Adapter (Coax) ‡	C
DeviceNet Communication Adapter ‡	D
EtherNet/IP Communication Adapter ‡	E

‡ 700 Vector Control uses DPI comm. slot options only.

Control Options

Control Option	Description	Cat. Code (Position k)
700VC - 24V I/O	Base Cassette	1
700VC - 115V I/O	Base Cassette	2
Phase II Control	Expanded Cassette Only	A
	Expanded Cassette w/SynchLink	B
Phase II Control *	Expanded Cassette w/Logix Expansion Board	C
	Expanded Cassette w/Logix Expansion Board & SynchLink	D

* Requires DriveLogix5730.

Feedback Options

Control Type	Description	Cat. Code (Position l)
All	No Encoder	0
700VC	12V/5V Encoder	1
700S Phase II	2nd Encoder, 5V or 12V Configurable by the Drive	E
	DriveGuard Safe Torque Off (w/2nd Encoder) ‹	S

§ Requires Expanded Cassette.

‹‹ PowerFlex 700L drives with Safe Torque Off manufactured before 09/25/2020 are TUV certified.

Additional 700S Configurations

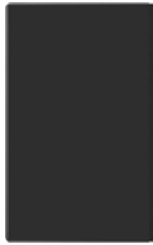
Description	Embedded Communication	Cat. Code (Position m)
None	–	W
Phase II Control	No	E
Phase II Control, with DriveLogix5730 Controller	No	K

Coolant Options

Description	Frame	Cat. Code (Position n)
Water	All	A

User Installed Options

Human Interface Modules



No HIM (Blank Plate)
20-HIM-A0



LCD Display, Full
Numeric Keypad
20-HIM-A3



LCD Display,
Programmer Only
20-HIM-A5



Remote (Panel Mount) LCD
Display, Full Numeric
Keypad
20-HIM-C3S ⁽¹⁾⁽²⁾



Remote (Panel Mount) LCD
Display, Programmer Only
20-HIM-C5S ⁽¹⁾⁽²⁾



LCD Display, Full Numeric
Keypad, Handheld/Local,
Drive Mounted, NEMA Type 1
20-HIM-A6 ⁽¹⁾

(1) For indoor use only.

(2) Includes a 1202-C30 interface cable (3 meters) for connection to drive.



LCD Display, Full Numeric
Keypad, IP66 NEMA Type
4X/12
20-HIM-C6S ⁽¹⁾⁽²⁾

(1) For indoor use only.

(2) Includes a 1202-C30 interface cable (3 meters) for connection to drive.

Human Interface Module Accessories

Description	Cat. No.
Bezel Kit for LCD HIMs, NEMA/UL Type 1 ⁽¹⁾	20-HIM-B1
PowerFlex HIM Interface Cable, 1 m (39 in) ⁽²⁾	20-HIM-H10
Cable Kit (Male-Female) ⁽³⁾	
0.33 Meters (1.1 Feet)	1202-H03
1 Meter (3.3 Feet)	1202-H10
3 Meter (9.8 Feet)	1202-H30
9 Meter (29.5 Feet)	1202-H90
DPI/SCANport™ One to Two Port Splitter Cable	1203-S03

(1) Includes an interface cable (1202-C30) for connection to drive.

(2) Required only when HIM is used as handheld or remote.

(3) Required in addition to 20-HIM-H10 for distances up to a total maximum of 10 Meters (32.8 Feet).