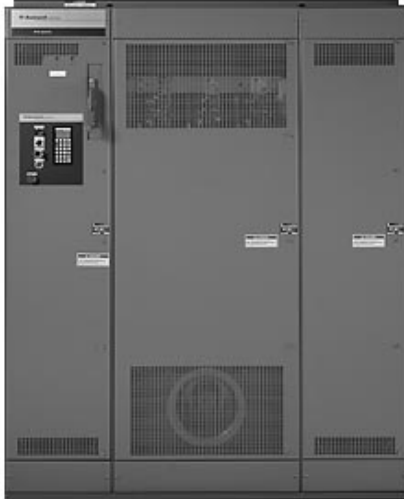




# 1395 Digital DC Drives Packaged Within CENTERLINE™ Motor Control Centers for Drive Systems



1250A DC Drive

Bulletin 2361 drive units include the high-performance, configurable 1395 Digital DC Drive and are available in armature ratings from 5 through 3000 A DC. Bulletin 2361 drive units combine the field-proven Bulletin 1395 Digital DC Drives with Bulletin 2100 MCC packaging to handle your most demanding DC application needs.

Bulletin 2361 units:

- Reduce your installation time and material costs because they utilize CENTERLINE thru-bus construction.
- Easily attach to your existing Bulletin 2100 motor control center sections

## Recent Bulletin 2361 Additions

Allen-Bradley's newest additions to Bulletin 2361:

- Direct-to-drive ControlNet (Network Version 1.5) connectivity for all frame sizes.
- High-horsepower 1395 drives for applications requiring 1250 - 3000A DC armatures with a choice of 43A or 90A field supplies.

## Contents of this Document

Applications . . . . . Page 2

Standard Features . . . . . Page 4

Standard Options . . . . . Page 5

About the Bulletin 1395 Digital DC Drive . . . . . Page 6

2361 Specifications . . . . . Page 8

## Applications

The Bulletin 2361 product line was designed for the tough, high-performance application needs of today's industries including: cement, converting, forest products, material handling, metals, printing, and transportation.

### Forest Products

- Winders
- Calendars
- Dryer Rolls
- Corrugating Machines
- Accumulators / Nips
- Pinch Rolls
- Web Tension



### Metals

- Rolling Mills
- Bar & Rod Mills
- Wire Drawing
- Levelers
- Slitters
- Continuous Casting
- Tube Mills
- Process Lines



### Material Handling

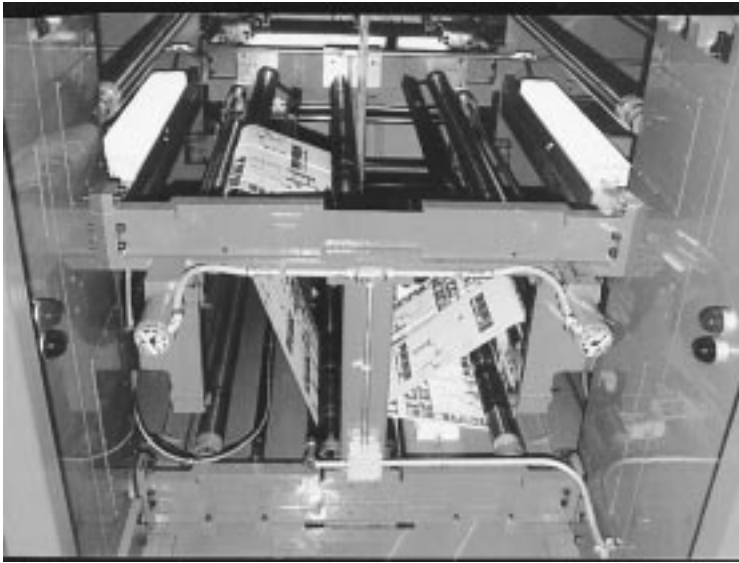
- Conveyors
- Pelletizers





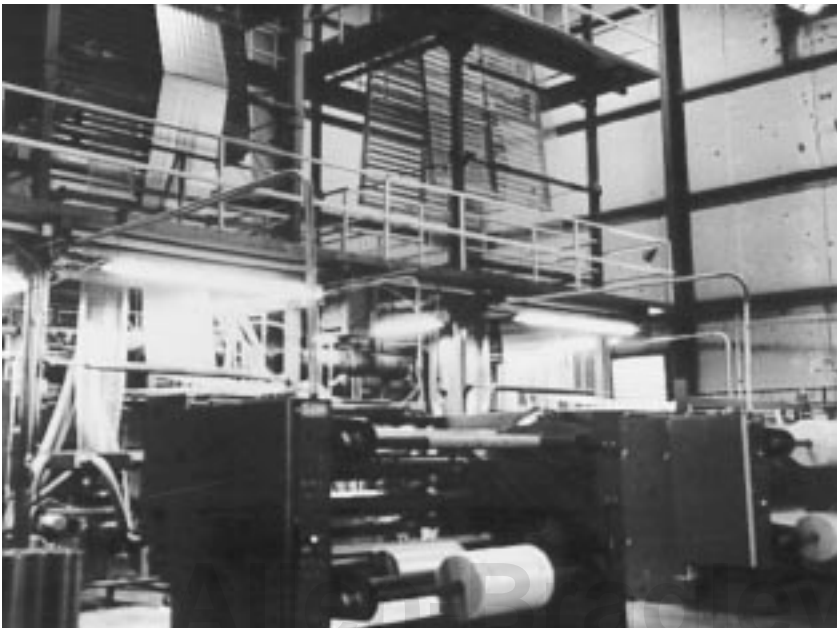
### Transportation

- Test Stands (engine, transmission)
- Extruders (rubber)
- Calendars (rubber)
- Mixers (rubber)
- Stamping Presses



### Printing

- Printing Presses
- Web Tension
- Binders



### Fibers / Converting

- Web Tension (fibers, carpet, films, fabric)
- Winders
- Cut-to-Length Machines
- Extruders
- Wire Drawing
- Bagging Machines

# Parts

## Standard Features



Circuit Breaker in a 3000A DC 1395 Drive

## Electrical

- Regenerative and non-regenerative Bulletin 1395 Digital DC Drives
- 43A DC field supply
- 3-phase AC line reacto
- Disconnect device:
  - 5 - 345 A DC drives may be selected with either motor circuit protectors or circuit breakers
  - 670 - 3000 A DC drives have circuit breakers
- Input line fusing for 5 - 980 A DC drives; armature cell fusing for 1250 - 3000 A DC drives
- Easy access to armature and field wiring terminations, tachometer/encoder feedback, hard-wired stop interface, blower motor starter, discrete and analog I/O, RIO, and programming terminals



**ATTENTION:** When activated – the hard-wired stop interface de-energizes the drive's DC contactor; thereby opening the armature circuit of the DC motor.



Two 110A DC 1395 Drives

## Mechanical

- NEMA Type 1 enclosures painted ASA49 gray
- 20"-deep MCC sections with appropriately-sized, tin-plated copper AC power thru bus that is braced for 65kAIC
- Tin-plated copper PE (equipment grounding) and TE (zero potential busses)
- All 2361 sections are designed and manufactured for installation next to existing Bulletin 2100 MCCs and 2362 MCC that have AC power thru bus
- All disconnect devices are padlockable
- Removable top plate facilitates ease of cutting for conduit-entry holes
- Side isolation sheets between vertical sections

## Standard Options



Door mounted operator devices on a 3000A DC 1395 Drive (Typical of all ratings)

## Electrical

- Adapter boards (See Page 6)
- Door-mounted programming terminal or a door-mounted D-shell connector for the external connection of a handheld programming terminal
- Door-mounted operator devices including:
  - Power-on pilot light
  - Drive stop, jog forward, jog reverse, and hard-wired E-stop pushbuttons
  - Start / running and clear faults / drive faulted illuminated pushbuttons
  - Speed 0-1-2 and single-turn speed pot switches
- 115V AC single-phase control power transformer with primary fusing mounted in 2361 drive unit
- Auxiliary contacts for circuit breakers
- NEMA or IEC blower starter assemblies with fusing
- Tachometer feedback scaling boards for interfacing with resolvers
- Control power factory-wired from 115V AC control bus to drive unit where control bus requires an external 115V AC supply



A 110A DC 1395 Drive mounted in an MCC

## Mechanical

- Door gaskets and door-fan filters
- Optional base channels for B through P-frame units

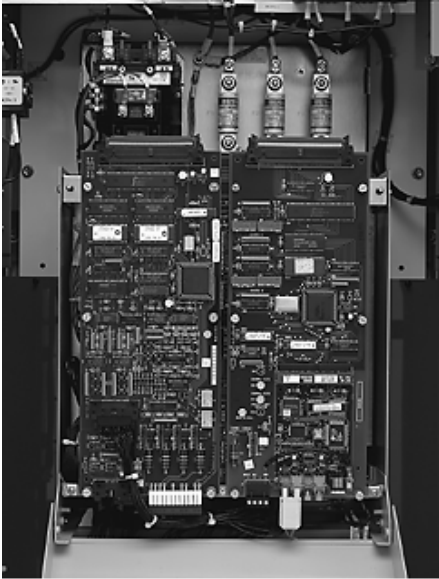
# Allen-Bradley Parts

## About the Bulletin 1395 Digital DC Drive

## Communications

The 1395 drive provides two internal ports (A and B) for the connection of optional adapter boards. These option boards allow you to customize the drive for your application without modifying the basic drive.

**Important:** All applications utilize the 4 - 10 digital inputs, 2 - 5 digital outputs, 2 - 4 analog inputs, and 2 - 4 analog outputs available via Port A option boards.



Port A (left): 115V AC Discrete Adapter

Port B (right): ControlNet Adapter

Available port A adapter boards:

- **Digital reference adapter board.** This option provides the drive with a digital reference for a “follower” application. This reference may be sourced from a dual-channel quadrature encoder, a signal channel isolator, or a frequency generator. The digital reference adapter also provides 19 additional digital and analog I/O options.
- **Discrete adapter board.** This board allows the drive to be controlled via discrete logic using four discrete inputs (stop, start, jog, and fault-reset), two discrete contact outputs (drive running, drive faulted), four configurable analog inputs, and four configurable analog outputs. Both 115V AC and 24V DC-versions of this board are available.

Available port B adapter boards:

- **ControlNet version 1.5 adapter board.** The ControlNet adapter board provides a direct connection from the drive to a ControlNet version 1.5 network using a fiber-optic cable.
- **Multi-communication adapter board.** The multi-communication adapter provides a direct interface to DataHighway Plus (DH+) and Remote I/O at baud rates of 57k, 115k, and 230k.
- **Node adapter board.** This board permits direct connection to the Allen-Bradley family of PLC controllers where the drive then communicates as either a full or half-rack of I/O with real-time data transferred via the drive’s I/O image table.

## Functionality



140 - 345A DC 1395 Drive (left),  
5 - 100A DC 1395 Drive (right), and  
Standard Handheld Terminal (DHT)

- **Fully-digital.** This digital drive makes setup easier, operation more precise, and maintenance simpler than either analog or mechanical drives. With modules ranging from 1 to 2500 HP in CENTERLINE MCC units, the Bulletin 1395 family can meet a wide range of motor and process control requirements.
- **Autotuning.** The 1395 drive has three separate autotuning routines to help speed startup. One routine calibrates the drive current loop to the motor characteristics while checking for shorted or open circuits in the armature bridge or motor circuit. A second routine calibrates the drive speed loop to the motor and machine. The third routine determines the motor flux characteristics and calibrates the drive field flux regulator.
- **Trending.** The 1395 has trend buffers to monitor selected parameters. These buffers are useful during the commissioning of the system. Motor status, logic command, and other important information can be monitored using a PLC controller or a personal computer.
- **Motor feedback methods.** Encoder feedback is a standard feature. The precision control offered by encoder feedback enhances speed regulation. Both DC tachometer feedback and armature voltage feedback are available as options within 2361 MCC units.

*When enabled, the unique “Tach Loss Recovery” feature allows the 1395 drive to switch from encoder or DC tachometer feedback to armature voltage control without causing a drive fault and without halting drive/motor operation. The drive will switch automatically and provide a warning fault. A reset to the primary feedback device can be made while the drive is operating.*



Standard Handheld Terminal (DHT)

- **Configuration and monitoring capabilities.** User interfaces include standard handheld terminal (DHT) connected via a door-mounted D-shell connector; a standard door-mounted terminal (DMT); an enhanced handheld terminal (EHT) connected via a door-mounted D-shell connector; and an enhanced door-mounted terminal (EMT).

All terminal styles act as monitor displays and feature a 4-line by 16-character display with a 24-key panel. The enhanced terminal provides the additional benefit of online programming. Three modes facilitate programming, monitoring, and diagnostic functions. The 1395 drive can also be programmed using Allen-Bradley DriveTools™ software.

- **Simplified troubleshooting.** Extensive diagnostics aid in troubleshooting and correcting many drive and system problems. Three distinct levels of diagnostics are reported via either the local programming terminal or DriveTools software.

# Allen-Bradley Parts

## 2361 Specifications

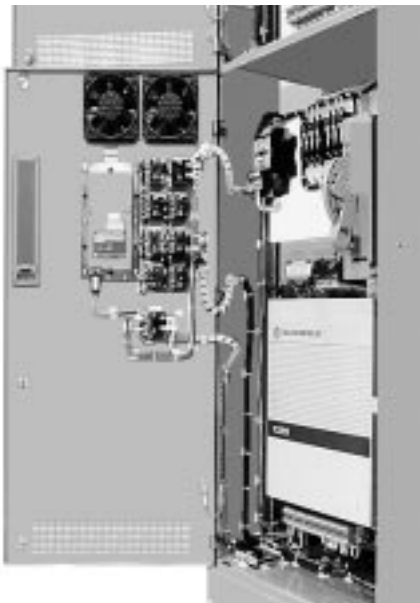
## Performance

<b>Speed regulation</b>	<u>Encoder</u> <ul style="list-style-type: none"> <li>• 0.01% of set speed (10:1 speed range)</li> <li>• 0.001% of top speed (100:1 speed range)</li> </ul> <u>DC tachometer</u> <ul style="list-style-type: none"> <li>• 0.5% of top speed with a 5PY tachometer</li> <li>• 0.1% of top speed with a BC42 tachometer</li> </ul> <u>Armature voltage</u> <ul style="list-style-type: none"> <li>• 2% of top speed</li> </ul>
<b>Accel / decel adjustment</b>	0.1 to 6653 seconds
<b>Preset speeds</b>	5 programmable
<b>Jog speeds</b>	2 programmable
<b>Autotuning</b>	Tunable current loop, velocity loop, and field loop
<b>S-ramp</b>	Programmable

## Unit Ratings

**Important:** Refer to *Special Rating Notes* on Page 9.

230V AC Input, 240V DC Armature



A 110A DC 1395 Digital DC Drive mounted in an MCC

Frame Size	Nominal Input Power (kVA)	Maximum Armature Current (A DC)	Nominal HP	Watt Dissipation at 100% Current
B	6.6	5	1	583
C	7.3	10	1.5 - 2	583
D	11.0	19	3 - 5	598
E	16.8	40	7.5 - 10	743
F	22.4	56	15	823
H	41	110	20 - 30	1038
J	63	140	40	1262
K	76	180	50	1262
L	102	260	60 - 75	1582
M	130	345	100	1952
N	253	670	125 - 200	3728
P	362	980	250 - 300	4642



## 460V AC Input, 500V DC Armature

Frame Size	Nominal Input Power (kVA)	Maximum Armature Current (A DC)	Nominal HP	Watt Dissipation at 100% Current
B	12.3	5	2	583
C	14.7	10	3 - 5	583
D	20.4	19	7.5 - 10	598
E	32	40	15 - 20	743
F	42	56	25 - 30	823
H	78	110	40 - 60	1038
J	125	140	75	1262
K	151	180	100	1262
L	203	260	125 - 150	1582
M	258	345	200	1952
N	504	670	250 - 400	3728
P	722	980	500 - 600	4642
R	922	1250	700 - 750	7417
S	1182	1650	800 - 1000	8739
T	2099	3000	1250 - 1750	12798

## 575V AC Input, 600V DC Armature

Frame Size	Nominal Input Power (kVA)	Maximum Armature Current (A DC)	Nominal HP	Watt Dissipation at 100% Current
R	1152	1250	750 - 900	7417
S	1477	1650	1000 - 1250	8739
T	2623	3000	1500 - 2250	12798

## 660V AC Input, 700V DC Armature

Frame Size	Nominal Input Power (kVA)	Maximum Armature Current (A DC)	Nominal HP	Watt Dissipation at 100% Current
R	1322	1250	750 - 1000	7417
S	1695	1650	1250	8739
T	3010	3000	1500 - 2500	12798

## Special Rating Notes

- B through H, and N through S-frame drives are available in regenerative (2361E) and non-regenerative (2361F) configurations.
- J, K, L, M, and T-frame drives are available in regenerative (2361E) configurations only.
- B through T-frame drives come standard with a 43A DC field supply and R through T-frame drives can be ordered with an optional 90A DC field supply. Both field supplies are rated for a maximum field voltage of 300V DC.

## Power Specifications



Heatpipe Assemblies in a 3000A DC 1395 Drive

<b>AC input voltages</b>	230V AC $\pm$ 10%, 3-phase 380 to 460V AC $\pm$ 10%, 3-phase 575V AC $\pm$ 10%, 3-phase 660V AC $\pm$ 10%, 3-phase
<b>AC input frequency</b>	50 / 60 Hz $\pm$ 3 Hz
<b>Overload rating</b>	Continuous: 100% 60 seconds: 150% 10 seconds: 200% 5 seconds: 260%
<b>Overload duty cycle</b>	1 minute out of 20 minutes at rated load and temperature

## Environmental Specifications

<b>Ambient operating temperature</b>	0° to 40° C (32° to 104° F)
<b>Storage temperature</b>	-40° to 70° C (-40° to 158° F)
<b>Relative humidity</b>	5 to 95%, non-condensing
<b>Altitude</b>	1000 meters (3000 feet) without derating

## Certification

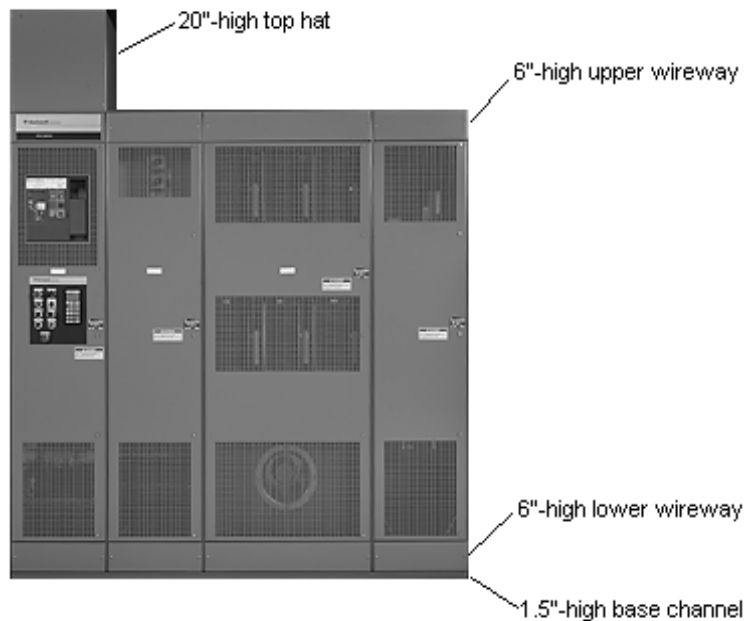
- Low-kVA 2361 units (drives with armatures rated from 5 to 345A DC) at 230 and 460V AC are UL/cUL845-listed as a 2361 packaged solution and UL/cUL508C-listed as a 1395 drive module.
- Medium-kVA 2361 units (drives with armatures rated from 670 to 980A DC) at 230 and 460V AC are UL/cUL508C and UL/cUL845-listed as a 2361 packaged solution.
- High-kVA 2361 units (drives with armatures rated from 1250 to 3000A DC) at 460 and 575V AC are designed to UL/cUL508C and UL/cUL845. UL/cUL listing pending at time of printing.
- High-kVA 2361 units (drives with armatures rated from 1250 to 3000A DC) at 660V AC units are designed to the 601 - 2000V specification of UL/cUL508C (not listed).

## Physical Dimensions

Frame Size	Height ①	Width	Depth	MCC Sections	Shipping Weight
B - H ②	90.0" (2286 mm)	20" (508 mm)	20" (508 mm)	1	600 lb (272 kg)
J - K	90.0" (2286 mm)	20" (508 mm)	20" (508 mm)	1	550 lb (249 kg)
L - M	90.0" (2286 mm)	25" (635 mm)	20" (508 mm)	1	700 lb (318 kg)
N - P	90.0" (2286 mm)	35" (889 mm)	20" (508 mm)	1	1165 lb (528 kg)
R	91.5" (2324 mm)	75" (1905 mm)	20" (508 mm)	3	2500 lbs (1134 kg)
S	91.5" (2324 mm)	75" (1905 mm)	20" (508 mm)	3	2500 lbs (1134 kg)
T	111.5" (2832 mm)	95" (2413 mm)	20" (508 mm)	4	3500 lbs (1588 kg)

① The height of R through S-frame drives includes a required 1.5"-high base channel; the height of the T-frame drive includes a required 1.5"-high base channel and a required 20"-high top hat.

② The shipping weight and dimensions of B through H-frame drives is based upon the MCC containing two drives of this size.



3000A DC Drive

---

**Reach us now at [www.rockwellautomation.com](http://www.rockwellautomation.com)**

Wherever you need us, Rockwell Automation brings together leading brands in industrial automation including Allen-Bradley controls, Reliance Electric power transmission products, Dodge mechanical power transmission components, and Rockwell Software. Rockwell Automation's unique, flexible approach to helping customers achieve a competitive advantage is supported by thousands of authorized partners, distributors and system integrators around the world.



**Americas Headquarters**, 1201 South Second Street, Milwaukee, WI 53204, USA, Tel: (1) 414 382-2000, Fax: (1) 414 382-4444

**European Headquarters SA/NV**, avenue Herrmann Debroux, 46, 1160 Brussels, Belgium, Tel: (32) 2 663 06 00, Fax: (32) 2 663 06 40

**Asia Pacific Headquarters**, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

**Rockwell  
Automation**

Publication 2361-2.0 June 1999

Supersedes Publication 2361-2.0 - July 1994

Copyright 1999 of Rockwell International Corporation. Printed in the USA