



February 16, 2020  
File: 224501051

**Attention: Gilbert Gamboa**  
Senior Civil Engineer  
3621 Bell Avenue  
Manhattan Beach, CA 90266

Dear Mr. Gamboa,

**Reference: Peck Reservoir Replacement Project - Sole Source Equipment Justification**

Throughout the course of the design and discussions with the City of Manhattan Beach Operation Staff, five pieces of equipment have been identified as requiring sole source procurement. These five items along with the reason that sole source procurement is justified, and the corresponding specification sections have been summarized below. Attached to this letter are product cut sheets that may provide additional information.

- **Motor Control Center** – The motor control center is a high value item, that needs to have specific dimensions. Selecting this piece of equipment through an open bid process could result in a product that will not fit in the area identified. This would have a negative impact on the project requiring changes to the electrical room size and layout. It is requested that this equipment and associated products be procured without substitution. Specification Section 26 29 00 identifies the requirements for this piece of equipment.
- **Control Valves** – the control valves are critical elements of the control strategy and need to function as specified without vendor supplied control panels. Selecting a product through an open bid procurement could result in a product that does not work with the control strategy that has been developed to date. This would result in a delay of the project. Specification Section 43 30 36 identifies the requirements for this piece of equipment.
- **Variable Frequency Drives** – the variable frequency drives will need to fit inside the cabinet space set aside for them, have features consistent with the operational strategy of the project, and fit inside the layout of the electrical room. It is requested that the variable frequency drives and associated products be procured without substitution. Specification Section 26 29 23 identifies the requirements for this piece of equipment.
- **Generator** – The Generator is a high value item that needs to fit in a specific dimension, meet SCAQMD requirements, and provide appropriate safety features. Selecting this piece of equipment through an open bid process could result in a product that will not fit in the area identified. This would have a negative impact on the project. It is requested that this equipment and associated products be procured without substitution. Specification Section 26 32 13 identifies the requirements for this piece of equipment.

**Reference:** Peck Reservoir Replacement Project - Sole Source Equipment Justification

- PLC – The City has an established SCADA system based on Allen Bradley PLCs. In order to be consistent with City established standards and create an efficient spare parts inventory, it is requested that this equipment and associated products be procured without substitution. Specification Section 40 95 10 identifies the requirements for this piece of equipment.

Thank you for your consideration in the manner and please feel free to contact me if you have any questions or comments.

Regards,



**Sarah Munger** PE

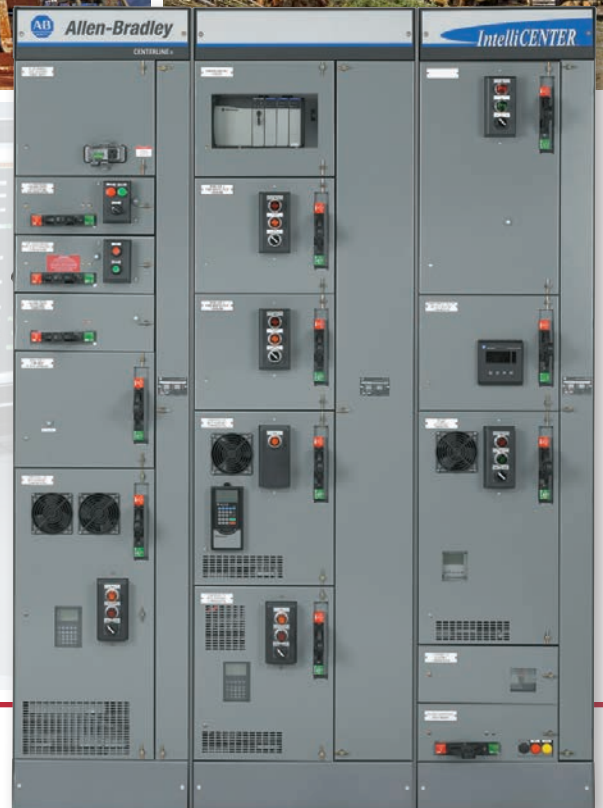
Phone: 626-568-6104  
sarah.munger@stantec.com

Attachment: Product Cut Sheets  
c. Chris Mote  
ms document2

# CENTERLINE 2100 Motor Control Centers Selection Guide



Industry-Leading Motor Control Centers Delivering  
Safety, Performance and Reliability

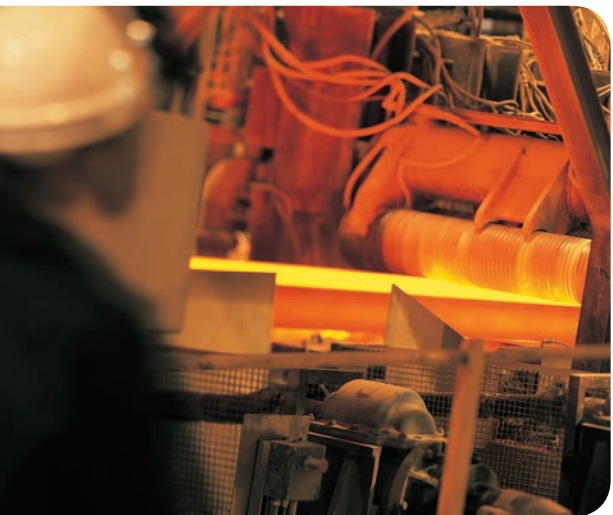


LISTEN.  
THINK.  
SOLVE.

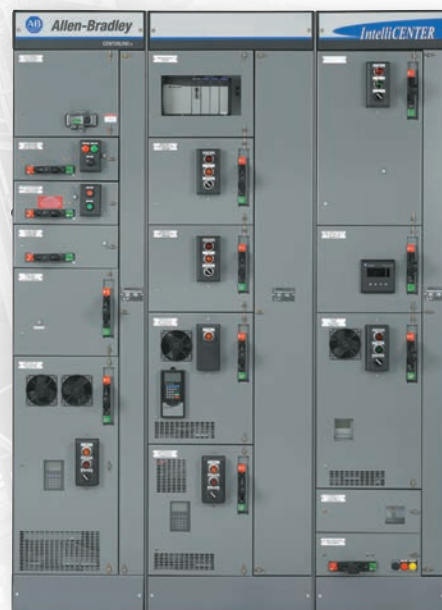


# CENTERLINE® 2100 Motor Control Centers

## Selection Guide



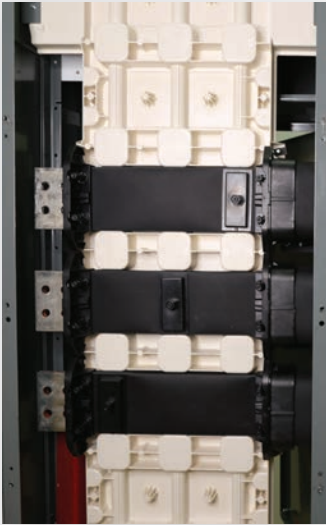
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# What's New

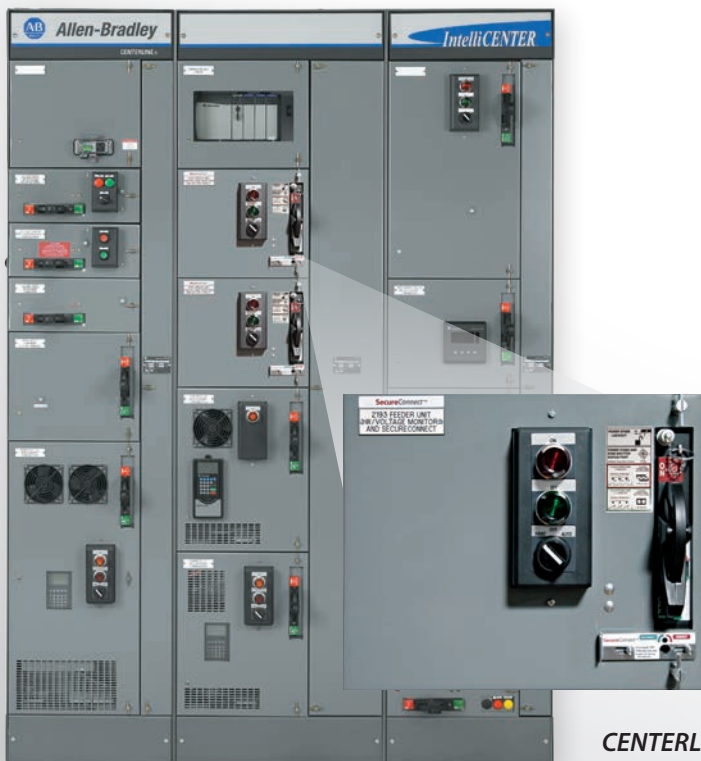
## Insulated Horizontal Bus



An insulated bus helps improve personnel safety by preventing arc propagation. The newly engineered option removes the need to tape splices, making installation easier. The bus is also corrosion resistant, which improves the equipment's longevity. The bus is an easy, ready-to-install insulating wrap that you can assemble quickly.

Features include:

- UL Rating available for 800...1600 A horizontal bus
- 65 kA withstand
- Plug-in sections
- Sections available in 20, 25, 30, and 35 in. width (including frame mount)
- Available mains: 2191M and 2193 N-frame (80% rated – top mounted)
- Front-mounted sections only
- 15 in. and 20 in. deep sections available



## SecureConnect™ Technology

SecureConnect units for CENTERLINE 2100 motor control centers (MCCs) can help streamline maintenance and reduce downtime while helping to reduce exposure to electrical shock and harmful voltages. This allows a unit to be disconnected from the vertical power bus with the enclosure door still closed. SecureConnect Technology electrically isolates the equipment that needs servicing without impact to other operating equipment. It helps reduce unintended downtime that is caused by troubleshooting electrical faults. SecureConnect technology is available as part of our standard delivery program for starters, drives, and SMC™ Smart Motor Controllers up to 125 Hp and for feeders up to 225 A.

**CENTERLINE 2100 MCC  
with SecureConnect Technology**

## E300™ Electronic Overload Relay

The E300 Electronic Overload Relay combines embedded communications, current and voltage protection and enhanced power monitoring and diagnostic capabilities, to help improve energy efficiency and safeguard critical electric motor loads.

The addition of voltage protection helps protect your motors against voltage issues such as under-voltage, voltage unbalance, phase loss and phase rotation. Gain the additional benefits of access to real time data with the Ethernet-enabled E300 Electronic Overload Relay. When installed in a CENTERLINE MCC with EtherNet/IP and IntelliCENTER software, operating information is easily accessed allowing you to monitor your operations and make data driven decisions based on operating conditions. A DeviceNet-enabled E300 Electronic Overload Relay is also available.



## PowerFlex® 520-Series AC Drives

PowerFlex 523 and PowerFlex 525 AC drives are now available in CENTERLINE 2100 MCCs. This next generation of compact PowerFlex drives is available in global voltages from 100V to 600V with ambient operating temperatures from -20 °C (-4 °F) up to 50 °C (122 °F). The PowerFlex 523 drive offers a power range of 0.2...22 kW/0.25...30 Hp. The PowerFlex 525 drive has a power range of 0.4...22 kW/0.5...30 Hp and features a built-in Ethernet port for simplified integration into an EtherNet/IP-enabled CENTERLINE MCC and IntelliCENTER software.

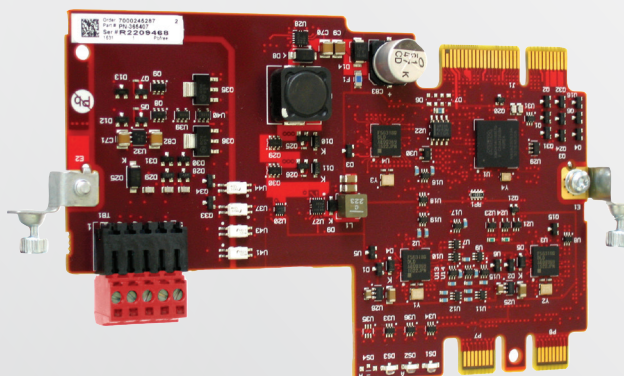


## Networked Safe Torque Off Option Module for PowerFlex® 755 Series AC Drives

The Networked Safe Torque Off safety option card provides Safe Torque Off functionality with the built-in EtherNet/IP port of the PowerFlex 755 family of drives.

Integrating safety functions over EtherNet/IP can improve productivity and help to reduce hardware and installation costs. Operators and maintenance personnel now have visibility to all machine events – including safety events – due to the combination of the safety and standard control systems. This visibility enables quicker responses that get your machine back to full production faster. For flexibility and simplified machine design changes, you can use the SIL 3, PLe, CAT 3 rated Safe Torque Off option module for both hardwired and networked Safe Torque Off applications. The Integrated Safety Functions card is now also available and provides safe speed monitoring functionality over EtherNet/IP.

The option module removes rotational power to the motor without loss of power to the drive. It integrates with GuardLogix® controllers and requires Studio 5000® version 30 and higher.





# CENTERLINE 2100 Motor Control Centers



*Industry-Leading Motor Control Centers Delivering Safety, Performance and Reliability*

The CENTERLINE 2100 MCC combines rugged durability and premium quality, meeting UL and NEMA standards. CENTERLINE 2100 MCCs integrate control and power in one package with a variety of motor control options.

This industry-leading motor control center has delivered the safety, performance and reliability you need for over 40 years.

- Designs are certified to UL 845 and meet NEMA standards
- Built-in Ethernet with IntelliCENTER® technology
- Helps reduce arc flash incidents with ArcShield
- Consistent design allows for backward compatibility
- Proven CENTERLINE bus design for improved heat dissipation
- Solid grounding system helps reduce shock hazards
- Fully isolated enclosure provides maximum fault containment
- Space saving designs maximize section use reducing your MCC footprint
- Offers a variety of intelligent motor control options such as:
  - Across-the-line starters with Electronic Overload Relays
  - Soft starters
  - Variable speed drives
- SecureConnect Technology helps provide a safer work environment with the ability to disconnect power from the vertical power bus in an individual unit with the door closed
- High short-circuit current ratings in type-tested enclosures
- Continuous bus bracing provides uniform support
- Durable NEMA components
- Factory tested for faster and more dependable start-up
- CENTERLINE 2100 MCCs with IntelliCENTER technology have built-in networking and preconfigured software to:
  - Enhance performance through system-wide communications
  - Share diagnostic information for predictive maintenance
  - Initiate warnings before potential faults occur







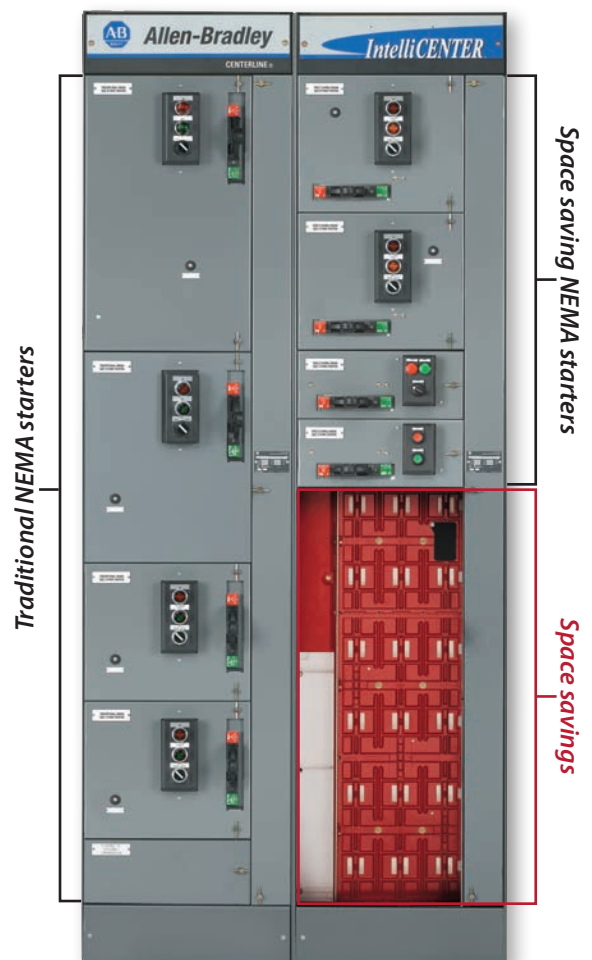
Our MCCs offer more intelligent components and options than other manufacturers. You can get a complete power, control and information solution packaged per your local specifications, which are built on a common platform.

With a CENTERLINE 2100 MCC you can use the same architecture, components, programming language and networking. Regardless of where you do business, you will receive unparalleled support from a single-source provider.

## Space-saving Units

With limited floor space in your facility for motor control equipment, space-saving units can help reduce your section count, which can help you save valuable floor space. Space-saving unit designs for CENTERLINE 2100 MCCs are available for Size 1-5 full-voltage non-reversing and Size 1-3 full-voltage reversing starter units, feeder units, drive units, and soft starter units. Space-saving designs provide an alternative to traditional units and can help reduce the overall footprint of your CENTERLINE 2100 MCCs while still meeting NEMA and UL standards.

You can use CENTERLINE 2100 MCC space-saving units for applications such as commercial, water/wastewater, offshore oil platforms or when you would like to minimize your MCC footprint.



*Space savings shown from when equivalent space-saving NEMA starters are used instead of traditional NEMA starters*

# IntelliCENTER® Technology

CENTERLINE MCCs with IntelliCENTER technology use intelligent motor controls, built-in networking and pre-configured and tested software. Predictive maintenance enhances performance through system-wide communications that share diagnostics. This initiates warnings before faults occur. Built-in networking captures information for predictive maintenance, process monitoring and advanced diagnostics enhancing the intelligence of a CENTERLINE 2100 MCC.

IntelliCENTER technology features factory-configured built-in Ethernet, intelligent motor controls and advanced monitoring software. CENTERLINE MCCs with IntelliCENTER technology are a cost effective solution to solve even your most complex motor control needs.

## Intelligent Motor Controls

MCCs with IntelliCENTER technology combine intelligent motor control and protection devices with advanced networking and diagnostic capabilities to give you an inside look at your motor control application.

## Built-in Network

Built-in Ethernet cabling helps you achieve faster startup. The preconfigured and validated Ethernet network reduces your need to make device connections, set baud rate or assign node addresses.

*"With its 'plug-and-play' setup, IntelliCENTER technology reduces installation time and minimizes facility downtime. It is able to quickly start delivering intelligent diagnostic and predictive failure information."*

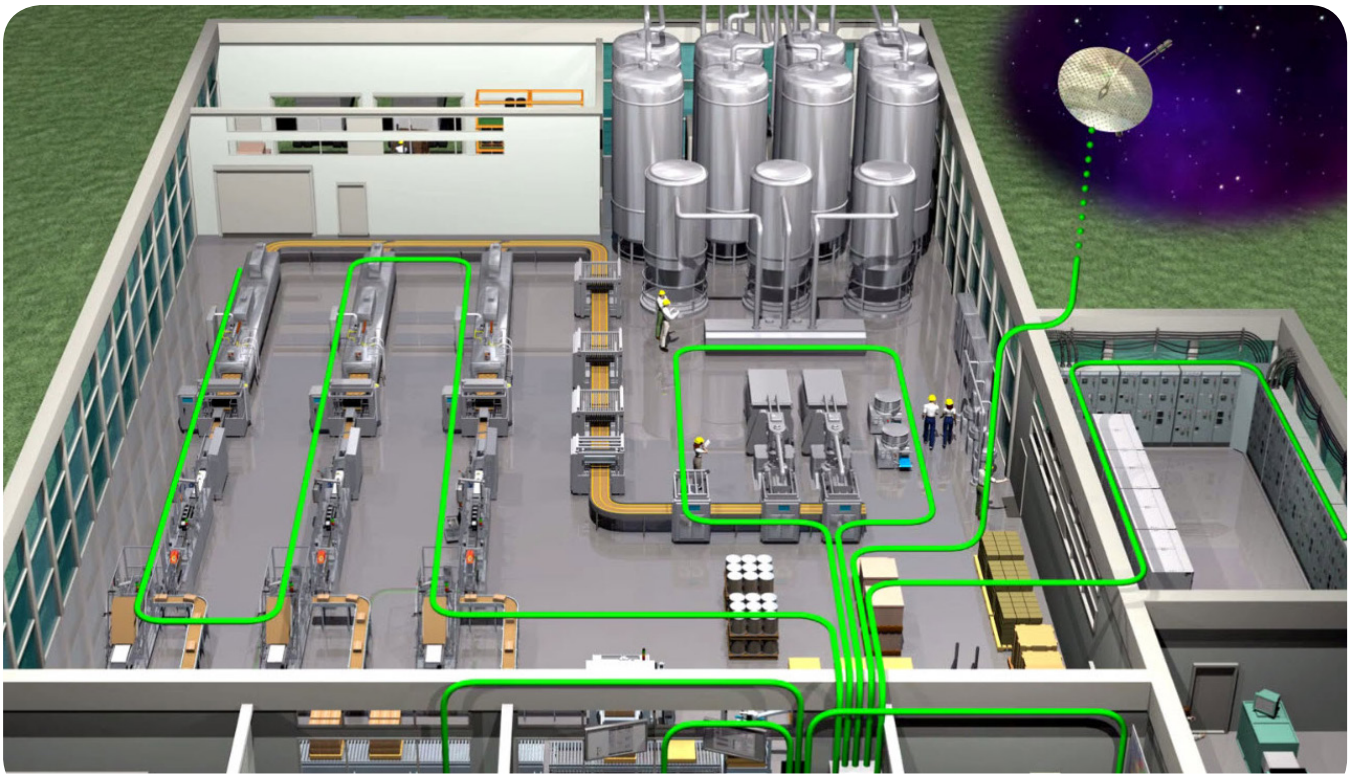
*Daewoo Shipbuilding Marine Engineering  
– South Korea*

## IntelliCENTER Software

The addition of IntelliCENTER software provides the ultimate window into your MCC. The software puts both real-time diagnostics and MCC documentation at your fingertips to maximize MCC and related equipment performance. Graphical views of individual MCC units display device data allowing you to quickly view critical status information.







*Explore the EtherNet/IP MCCs with IntelliCENTER Technology Virtual Brochure and learn how EtherNet/IP helps enhance integration, reduces your MCC setup time, increases the network speed and allows you to quickly monitor, troubleshoot and diagnose your MCC from anywhere.*  
[https://literature.rockwellautomation.com/idc/groups/multi\\_media/documents/multimedia/files/virtualbrochure/ethernet-intellicenter/index.html](https://literature.rockwellautomation.com/idc/groups/multi_media/documents/multimedia/files/virtualbrochure/ethernet-intellicenter/index.html).

## Increase Uptime with Advanced Maintenance Tools

The preconfigured software gives maintenance personnel easy access to critical IntelliCENTER MCC configuration information and process data for troubleshooting. The configurable system views give you system status at a glance and can help keep facilities running with electronic documentation, remote diagnostics and predictive maintenance. IntelliCENTER software allows you to significantly reduce HMI programming time and PLC development time with automatic tag generation and even complete network configuration before the MCC is powered up.

## Increased Safety & Control

Help enhance your personnel's safety with remote access to real time data.

- Keep personnel safe from hazardous areas with remote monitoring
- Set, reset, and configure devices without opening MCC doors
- Track all configuration changes through the event log
- Read /Write privileges assigned via user profiles



# Safety

With the growing need for a safer industrial environment, the CENTERLINE 2100 MCCs have continued to produce ways to mitigate safety risks.

CENTERLINE MCCs help deliver safety, performance and reliability while meeting various standards. We certify the CENTERLINE 2100 MCCs to UL 845 – while helping drive alignment with common standards, like NFPA70E and CSA-Z465. To ensure additional safety, we test our MCCs to meet the requirements of IEEE and Seismic specifications.

CENTERLINE MCCs offer safety features that allow you to design a CENTERLINE 2100 MCC to meet the needs of your electrical safety program. The following safety features can help protect employees and eliminate unplanned outages and downtime:

- High level of isolation from hazardous voltage
- Superior fault containment
- Solid grounding system
- Advanced diagnostics from IntelliCENTER software provide remote access to data and troubleshooting, minimizing your need to enter the arc flash boundary zone
- IntelliCENTER software allows you to troubleshoot your MCC remotely, without personal protective equipment (PPE)
- High degree of fault containment helps prevent a single fault from cascading throughout the enclosure, limiting equipment damage
- Isolation, grounding and remote monitoring help prevent accidental exposure to energized parts
- Automatic shutters isolate vertical bus when a

unit is removed

- Continuous bus bracing provides more uniform support than point bracing
- Infrared windows allow completion of thermal inspection without opening doors, maximizing personnel safety
- Plug-in replacement units allow maintenance to be performed away from energized controls
- Intelligent motor control devices help warn of an impending failure before it occurs
- NEMA components help deliver dependable operation
- Locking and Interlocking features allow for easier use of your company's lockout/tagout safety procedures
- Through-the-door DeviceNet and Ethernet ports give you access to the network without opening the unit door
- Through-the-door viewing window lets you inspect the disconnect without opening the unit door

*"The safety issue is one of the things that we are happiest with. The old system created hazardous troubleshooting conditions, with technicians having to test and probe and work around live wires within a confined panel space."*

Ronnie Sexton  
Acme Brick – USA



**CENTERLINE 2100 MCC with ArcShield**

## ArcShield

You can't predict when an arc blast will occur, which makes arc resistant designs important. The National Electrical Code (NEC), Standard for Electrical Safety in the Workplace NFPA 70E and the Institute of Electrical and Electronics Engineers (IEEE) C37.20.7 have acknowledged arc flash dangers.

ArcShield is an enhanced version of the CENTERLINE 2100 MCC and the first to offer arc-resistant features. The CENTERLINE 2100 MCC with ArcShield has been tested in accordance with the IEEE C37.20.7 standard for Type 2 accessibility. Type 2 accessibility allows your personnel to be protected on all sides of the enclosure in the event of an arcing fault.

CENTERLINE MCCs with ArcShield are built on the rugged structural design and inherent safety features of the CENTERLINE 2100 MCC. A recessed horizontal bus and labyrinth vertical bus helps to prevent arcs from spreading between phases. True unit and wireway isolation and special arc-containment door latches help deliver an extra level of protection against internal electrical arcing faults.

Patented arc resistant baffles for the CENTERLINE 2100 MCC with ArcShield lets you choose from the full range of MCC units, even those needing venting. The arc-resistant baffles maintain Type 2 accessibility.

## SecureConnect Technology

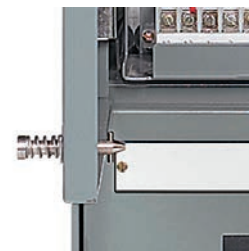
The SecureConnect Technology option for CENTERLINE 2100 MCCs helps reduce exposure to electrical hazards by allowing a unit to be disconnected from the vertical power bus with the enclosure door closed. Its "snap action" retract mechanism of the stabs helps to reduce exposure to electrical shock and arc-flash events by quickly disconnecting the stabs and isolating them behind two sets of shutters. SecureConnect Technology includes a multi-point validation system that is both electrical and mechanical. This can be used to validate that the stabs have been retracted completely into the housing and that the stab shutters have been closed. SecureConnect has been extended to high current applications for Size 4 units with currents up to 225 A and is part of our standard delivery program.

## Enhance Personnel Safety

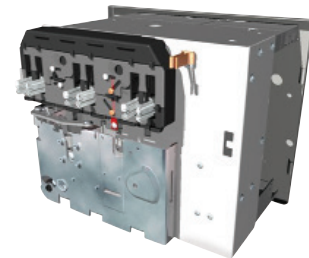
Help enhance your personnel's safety with remote access to real-time data for monitoring, configuration and troubleshooting of intelligent motor control devices. IntelliCENTER software harnesses the power of the Integrated Architecture® system so you can access critical MCC information from anywhere in your facility.



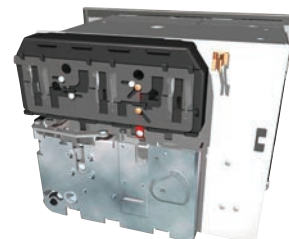
*Pressure relief vents allow hazardous gases to escape from the top of the MCC*



*Arc-containment door latches help deliver an extra level of protection against internal electrical arcing faults*



*SecureConnect unit with shutters open is "engaged" with the busbar position"*



*Shutters closed is "disengaged" so the bucket can be removed*



# MODEL 131 Series Electronic Control Valves



- Simple Proven Design
- Quality Solenoid Pilot Controls
- Ideal For SCADA Systems
- Multi-Function Capability; Hydraulic Backup
- Security System to Prevent Unauthorized Changes
- Easy to Maintain

The Cla-Val Series 131 Electronic Control Valves are designed specifically for applications where remote control of the valve is preferred. It is a hydraulically operated, pilot controlled, diaphragm valve. The solenoid pilot controls are actuated by electrical signals from the optional VC-22D Electronic Valve Controller. The solenoid pilots either add or relieve line pressure from the cover chamber of the valve, causing it to open or close as directed by the electronic controller.

Series 131 Electronic Control valves can be configured to perform a wide range of functions, such as; pressure reducing, pressure sustaining, flow control, or level control. The electric controls can also be combined with hydraulic controls to create dual function, or fail-safe capability.

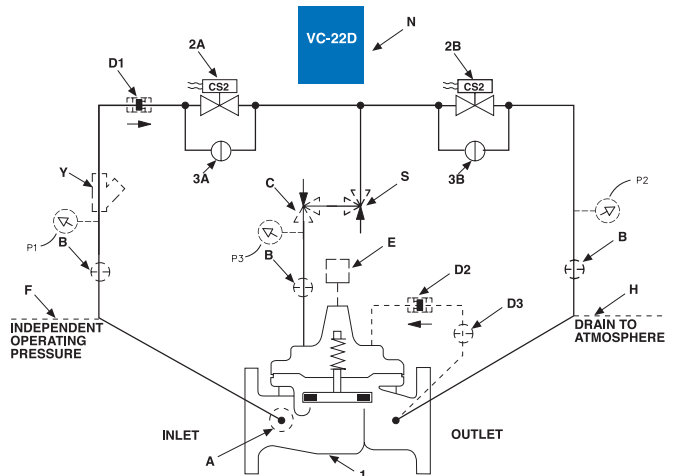
The basic 131-01 Electronic Control Valve (Schematic shown below) includes the main valve and solenoid pilot controls. Optional features include the VC-22D Electronic Valve Controller and the X117 Series Valve Position Transmitter. If the check feature option is added, and a pressure reversal occurs, the downstream pressure is admitted into the cover, closing the valve.

## Schematic Diagram

Item	Description
1	100-01 Hytrol Main Valve
2	CS2 Solenoid Control
3	CK2 Solenoid Bypass Valve

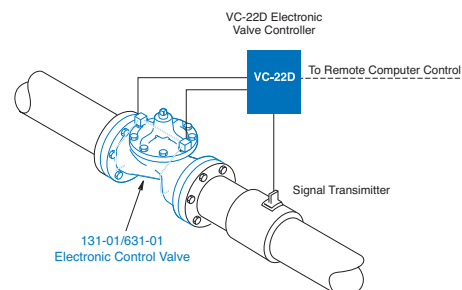
## Optional Features

Item	Description
A	X46A Flow Clean Strainer
B	CK2 Isolation Valve
C	CV Flow Control (Closing)
D	Check Valves With Isolation Valve
E	X117 Series Position Transmitter
F	Independent Operating Pressure
H	Atmospheric Drain
N	Electronic Controller
P	X141 Pressure Gauge
S	CV Flow Control (Opening)
Y	X43 "Y" Strainer



## Typical Applications

This data sheet contains typical applications that are modifications to the basic 131-01 Electronic Control Valve shown here. It is typically installed in a pipeline with a VC-22D Series Controller that receives a process variable signal that is compared to a set point and adjusts the main valve's capacity until the signals match. There are many different variations not shown in this brochure. Contact us with your specific application and we will provide a field proven solution.





## 131 Series (Uses 100-01 Hytrol Main Valve)

### Pressure Ratings (Recommended Maximum Pressure - psi)

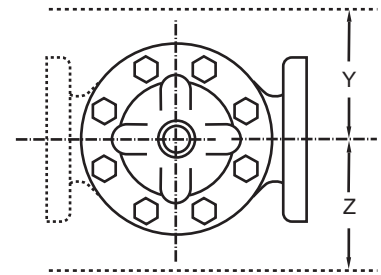
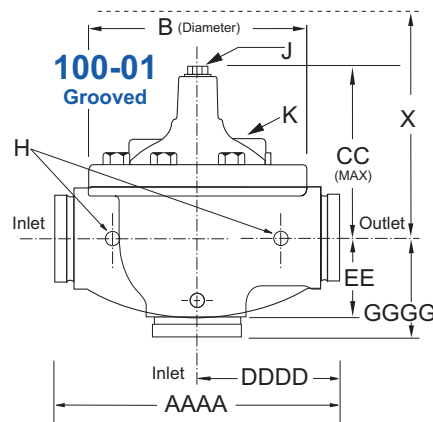
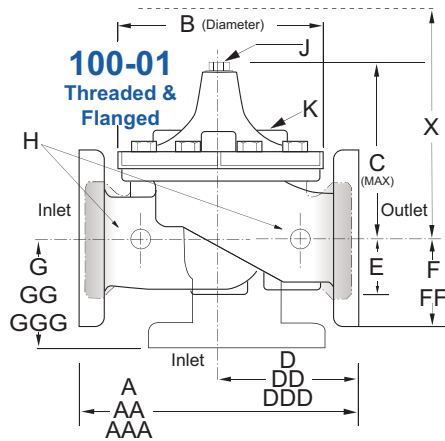
Valve Body & Cover		Pressure Class				
		Flanged			Grooved Threaded	
Grade	Material	ANSI Standards*	150 Class	300 Class	300 Class	End† Details
ASTM A536	Ductile Iron	B16.42	250	400	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400	400
UNS 87850	Bronze	B16.24	225	400	400	400

Note: \* ANSI standards are for flange dimensions only.  
 Flanged valves are available faced but not drilled.  
 † End Details machined to ANSI B2.1 specifications.  
**Valves for higher pressure are available; consult factory for details**

### Materials

Component	Standard Material Combinations		
Valve Body & Cover	Ductile Iron	Cast Steel	Bronze
100-01 Available Sizes	1" - 36" 25 - 900 mm	1" - 16" 25 - 400 mm	1" - 16" 25 - 400 mm
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze
Trim: Disc Guide, Seat & Cover Bearing	Bronze is Standard Stainless Steel is Optional		
Disc	Buna-N® Rubber		
Diaphragm	Nylon Reinforced Buna-N® Rubber		
Stem, Nut & Spring	Stainless Steel		

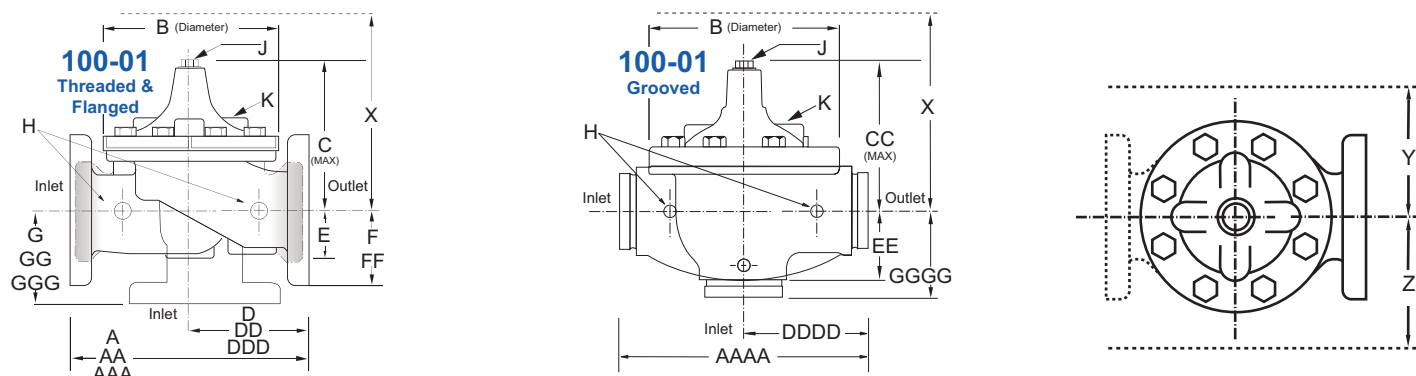
For material options not listed, consult factory.  
 Cla-Val manufactures valves in more than 50 different alloys.



### 131 Series Dimensions (In Inches)

Valve Size (Inches)	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24	30	36
A Threaded	7.25	7.25	7.25	9.38	11.00	12.50	—	—	—	—	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	8.50	9.38	11.00	12.00	15.00	20.00	25.38	29.75	34.00	39.00	41.38	46.00	52.00	61.50	63.00	72.75
AAA 300 ANSI	—	—	9.00	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50	47.64	53.62	63.24	64.50	74.75
AAAA Grooved End	—	—	8.50	9.00	11.00	12.50	15.00	20.00	25.38	—	—	—	—	—	—	—	—	—
B Diameter	5.62	5.62	5.62	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	41.50	45.00	53.16	56.00	66.00
C Maximum	5.50	5.50	5.50	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88	24.19	25.00	39.06	41.90	43.93	54.60	59.00
CC Maximum Grooved End	—	—	4.75	5.75	6.88	7.25	9.31	12.12	14.62	—	—	—	—	—	—	—	—	—
D Threaded	3.25	3.25	3.25	4.75	5.50	6.25	—	—	—	—	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	4.00	4.75	5.50	6.00	7.50	10.00	12.69	14.88	17.00	19.50	20.81	—	—	30.75	—	—
DDD 300 ANSI	—	—	4.25	5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75	20.25	21.62	—	—	31.62	—	—
DDDD Grooved End	—	—	—	4.75	—	6.00	7.50	—	—	—	—	—	—	—	—	—	—	—
E	1.12	1.12	1.12	1.50	1.69	2.06	3.19	4.31	5.31	9.25	10.75	12.62	15.50	12.95	15.00	17.75	21.31	24.56
EE Grooved End	—	—	2.00	2.50	2.88	3.12	4.25	6.00	7.56	—	—	—	—	—	—	—	—	—
F 150 ANSI	—	—	2.50	3.00	3.50	3.75	4.50	5.50	6.75	8.00	9.50	10.50	11.75	15.00	16.50	19.25	22.50	28.50
FF 300 ANSI	—	—	3.06	3.25	3.75	4.13	5.00	6.25	7.50	8.75	10.25	11.50	12.75	15.00	16.50	19.25	24.00	30.00
G Threaded	1.88	1.88	1.88	3.25	4.00	4.50	—	—	—	—	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	4.00	3.25	4.00	4.00	5.00	6.00	8.00	8.62	13.75	14.88	15.69	—	—	22.06	—	—
GGG 300 ANSI	—	—	4.25	3.50	4.31	4.38	5.31	6.50	8.50	9.31	14.50	15.62	16.50	—	—	22.90	—	—
GGGG Grooved End	—	—	—	3.25	—	4.25	5.00	—	—	—	—	—	—	—	—	—	—	—
H NPT Body Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
J NPT Cover Center Plug	0.25	0.25	0.25	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.50	2.00	1.00	1.00	1.00	2.00	2.00
K NPT Cover Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Stem Travel	0.40	0.40	0.40	0.60	0.70	0.80	1.10	1.70	2.30	2.80	3.40	4.00	4.50	5.10	5.63	6.75	7.50	8.50
Approx. Ship Weight (lbs)	15	15	15	35	50	70	140	285	500	780	1165	1600	2265	2982	3900	6200	7703	11720
Approx. X Pilot System	11	11	11	13	14	15	17	29	31	33	36	40	40	43	47	68	79	85
Approx. Y Pilot System	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	40	45
Approx. Z Pilot System	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	42	47

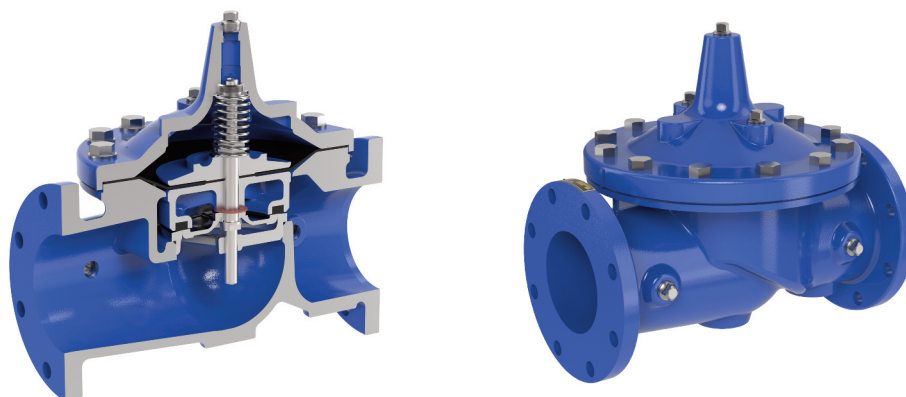
## 131 Series Metric Dimensions (Uses 100-01 Hytrol Main Valve)



### Model 131 Series Dimensions (In mm)

Valve Size (mm)	25	32	40	50	65	80	100	150	200	250	300	350	400	450	500	600	750	900
A Threaded	184	184	184	238	279	318	—	—	—	—	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	216	238	279	305	381	508	645	756	864	991	1051	1168	1321	1562	1600	1848
AAA 300 ANSI	—	—	229	254	295	337	397	533	670	790	902	1029	1105	1210	1326	1606	1638	1899
AAAA Grooved End	—	—	216	228	279	318	381	508	645	—	—	—	—	—	—	—	—	—
B Diameter	143	143	143	168	203	232	292	400	508	600	711	832	902	1054	1143	1350	1422	1676
C Maximum	140	140	140	165	192	208	270	340	406	435	530	614	635	992	1064	1116	1387	1499
CC Maximum Grooved End	—	—	120	146	175	184	236	308	371	—	—	—	—	—	—	—	—	—
D Threaded	83	83	83	121	140	159	—	—	—	—	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	102	121	140	152	191	254	322	378	432	495	528	—	—	781	—	—
DDD 300 ANSI	—	—	108	127	149	162	200	267	337	395	451	514	549	—	—	803	—	—
DDDD Grooved End	—	—	—	121	—	152	191	—	—	—	—	—	—	—	—	—	—	—
E	29	29	29	38	43	52	81	110	135	235	273	321	394	329	381	451	541	624
EE Grooved End	—	—	52	64	73	79	108	152	192	—	—	—	—	—	—	—	—	—
F 150 ANSI	—	—	64	76	89	95	114	140	171	203	241	267	298	381	419	489	572	724
FF 300 ANSI	—	—	78	83	95	105	127	159	191	222	260	292	324	381	419	489	610	762
G Threaded	48	48	48	83	102	114	—	—	—	—	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	102	83	102	102	127	152	203	219	349	378	399	—	—	560	—	—
GGG 300 ANSI	—	—	102	89	110	111	135	165	216	236	368	397	419	—	—	582	—	—
GGGG Grooved End	—	—	—	83	—	108	127	—	—	—	—	—	—	—	—	—	—	—
H NPT Body Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
J NPT Cover Center Plug	0.25	0.25	0.25	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.50	2.00	1.00	1.00	1.00	2.00	2.00
K NPT Cover Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Stem Travel	10	10	10	15	18	20	28	43	58	71	86	102	114	130	143	171	190	216
Approx. Ship Weight (kgs)	7	7	7	16	23	32	64	129	227	354	528	726	1027	1353	1769	2812	3494	5316
Approx. X Pilot System	280	280	280	331	356	381	432	737	788	839	915	1016	1016	1093	1194	1728	2007	2159
Approx. Y Pilot System	229	229	229	229	254	280	305	508	559	610	661	737	762	813	864	991	1016	1143
Approx. Z Pilot System	229	229	229	229	254	280	305	508	559	610	661	737	762	813	864	991	1067	1194

### Model 100-01 Full Port Hytrol Main Valve



for applications requiring a reduced port valve, please refer to the 631 Series Engineering Data Sheet

## 131 Series (Uses 100-01 Hytrol Main Valve)

131 Series Valve Selection	100-01 Pattern: Globe (G), Angle (A), End Connections: Threaded (T), Grooved (GR), Flanged (F) Indicate Available Sizes																		
	Inches	1	1¼	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
	mm	25	32	40	50	65	80	100	150	200	250	300	350	400	450	500	600	750	900
Main Valve 100-01	Pattern	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G	G	G, A	G	G
	End Detail	T	T	T, F, Gr*	T, F, Gr	T, F, Gr*	T, F, Gr	F, Gr	F, Gr*	F, Gr*	F	F	F	F	F	F	F	F	F
Suggested Flow (gpm)	Maximum	55	93	125	210	300	460	800	1800	3100	4900	7000	8400	11000	14000	17000	25000	42000	50000
	Maximum Intermittent	68	120	160	260	370	580	990	2250	3900	6150	8720	10540	13700	17500	21700	31300	48000	62500
	Minimum	1	1	1	1	2	2	4	10	15	35	50	70	95	120	150	275	450	650
Suggested Flow (Liters/Sec)	Maximum	3.5	6	8	13	19	29	50	113	195	309	442	530	694	883	1073	1577	2650	3150
	Maximum Intermittent	4.3	7.6	10	16	23	37	62	142	246	387	549	664	863	1104	1369	1972	3028	3940
	Minimum	.03	.03	.03	.06	.09	0.13	0.25	0.63	0.95	2.2	3.2	4.4	6.0	7.6	9.5	17.4	28.4	41.0

100-01 Series is the full internal port Hytrol.

For Lower Flows Consult Factory

\*Globe Grooved Only

## 131 Series Pilot System Specifications

### Temperature Range

Water: to 180°F

### Rubber Parts:

Buna-N® Rubber Synthetic

### Solenoid Control

#### Body:

Brass ASTM B283

#### Enclosure:

NEMA Type 1,2,3,3S,4,4X general purpose watertight\*

NEMA Type 6,6P,7,9 Watertight Explosion-Proof available.

Please consult factory for pilot system adjustment ranges

### Voltages:

110, 220, -50Hz AC

24, 120, 240, 480 - 60Hz AC

6, 12, 24, 120, 240 - DC

Others available at extra cost

Max. operating pressure differential: 200 psi unless otherwise specified

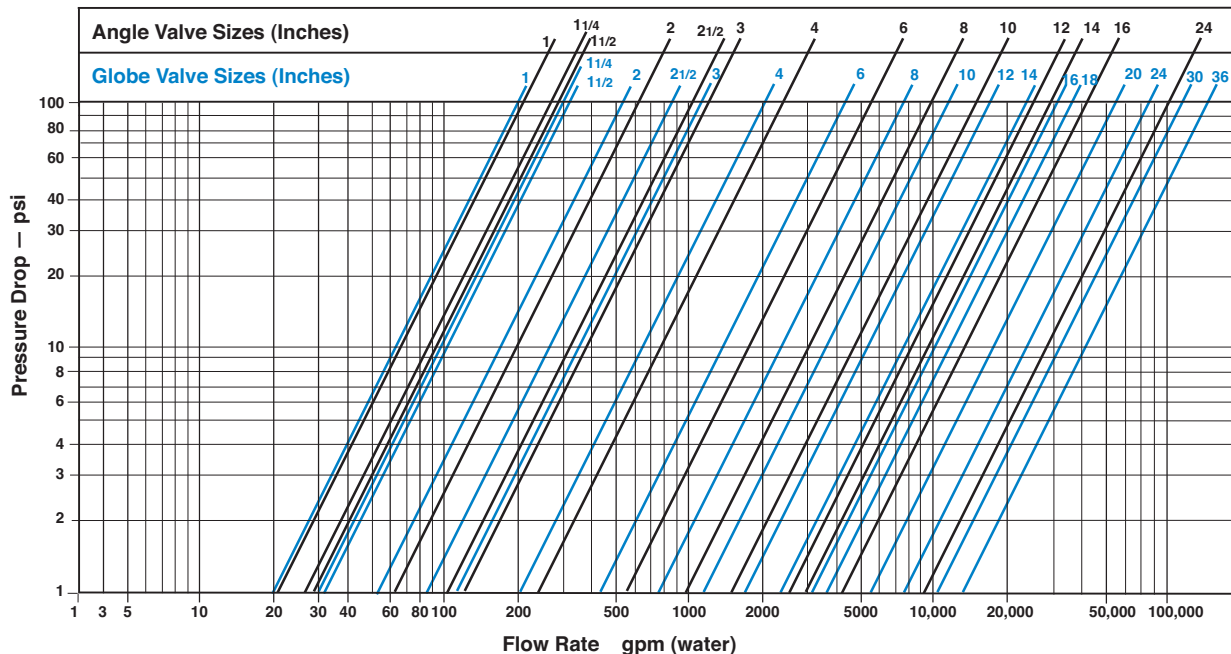
### Coil:

Insulation molded Class	F
Watts AC	6
AC Volt Amps Inrush	30
AC Volt Amps Holding	16
Watts DC	10.6

### When Ordering, Specify:

1. Catalog No. 131 Series
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded, Flanged or Grooved
6. Trim Material
7. Adjustment Range
8. Desired Options
9. When Vertically Installed

## 131 Series Flow Data

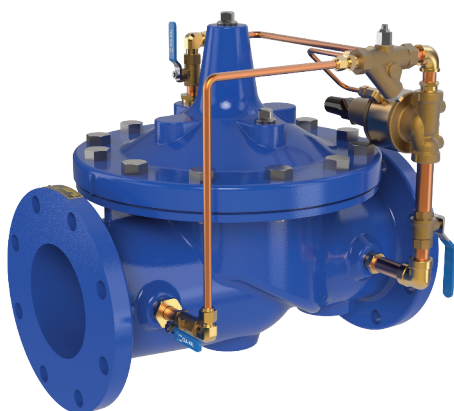






# MODEL 50-01

## Pressure Relief & Pressure Sustaining Valve



### Schematic Diagram

#### Item Description

- |   |                                |
|---|--------------------------------|
| 1 | 100-01 Hytrol Main Valve       |
| 2 | X42N-2 Strainer & Needle Valve |
| 3 | CRL-60 Pressure Relief Control |

### Optional Features

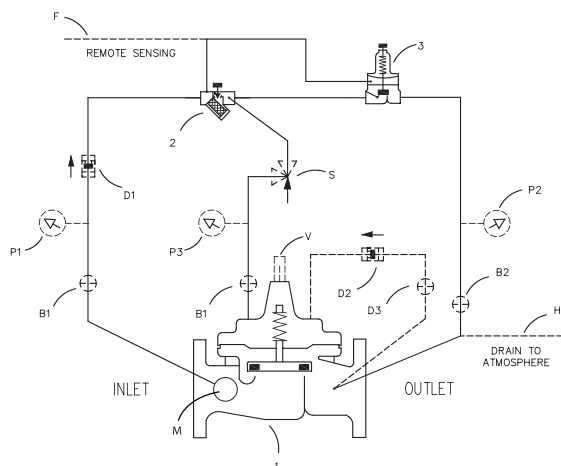
#### Item Description

- |   |                                   |
|---|-----------------------------------|
| B | CK2 Isolation Valve               |
| D | Check Valves with Isolation Valve |
| F | Remote Pilot Sensing              |
| H | Drain to Atmosphere               |
| M | X144 e-FlowMeter                  |
| P | X141 Pressure Gauge               |
| S | CV Speed Control (Opening)        |
| V | X101 Valve Position Indicator     |

- Accurate Pressure Control
- Optional Check Feature
- Fast Opening to Maintain Line Pressure
- Slow Closing to Prevents Surges
- Completely Automatic Operation

The Cla-Val Model 50-01 Pressure Relief Valve is actuated by line pressure through a pilot control system, opening fast to maintain steady line pressure but closing gradually to prevent surges. Operation is completely automatic and pressure settings may be easily changed. This valve can be used for pressure relief, pressure sustaining, back pressure, or unloading functions in a bypass system.

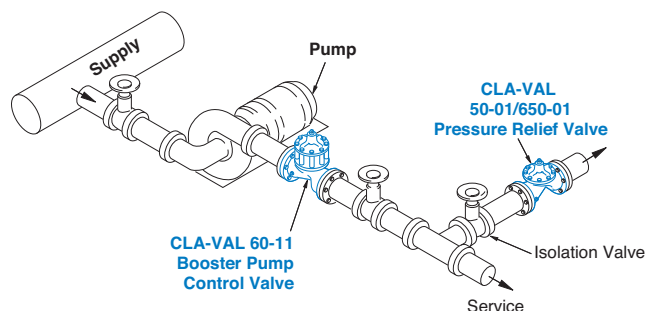
If a check feature is added, and a pressure reversal occurs, the downstream pressure is admitted into the main valve cover chamber, closing the valve to prevent return flow.



## Typical Applications

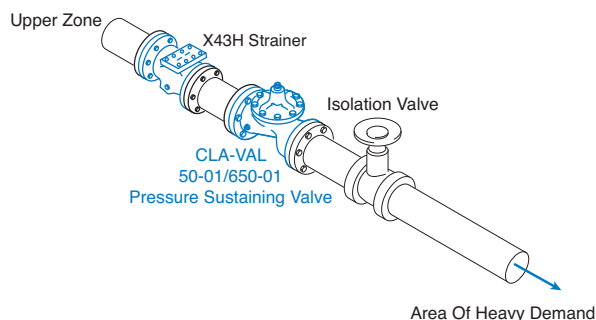
### Pressure Relief Service

This fast opening, slow closing relief valve provides system protection against high pressure surges on pump start up and pump shut down by dissipating the excess pressure to a safe location.



### Pressure Sustaining Service

When installed in a line between an upper zone and a lower area of heavy demand, the valve acts to maintain desired upstream pressure to prevent "robbing" of the upper zone. Water in excess of pressure setting is allowed to flow to an area of heavy demand, control is smooth, and pressure regulation is positive.



## Model 50-01 (Uses 100-01 Hytrol Main Valve)

### Pressure Ratings (Recommended Maximum Pressure - psi)

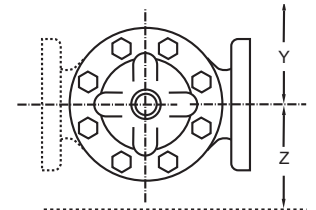
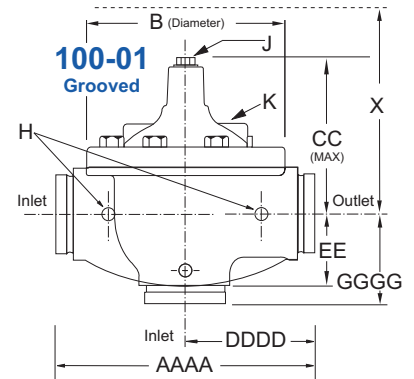
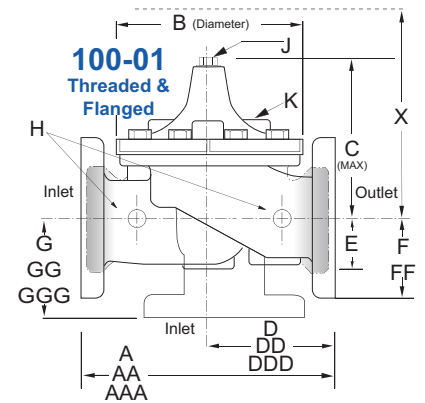
Valve Body & Cover		Pressure Class				
		Flanged			Grooved	Threaded
Grade	Material	ANSI Standards*	150 Class	300 Class	300 Class	End† Details
ASTM A536	Ductile Iron	B16.42	250	400	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400	400
UNS 87850	Bronze	B16.24	225	400	400	400

Note: \* ANSI standards are for flange dimensions only.  
 Flanged valves are available faced but not drilled.  
 † End Details machined to ANSI B2.1 specifications.  
**Valves for higher pressure are available; consult factory for details**

### Materials

Component	Standard Material Combinations		
Body & Cover	Ductile Iron	Cast Steel	Bronze
Available Sizes	1" - 36" 25 - 900mm	1" - 16" 25 - 400mm	1" - 16" 25 - 400mm
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze
Trim: Disc Guide, Seat & Cover Bearing	Bronze is Standard Stainless Steel is Optional		
Disc	Buna-N® Rubber		
Diaphragm	Nylon Reinforced Buna-N® Rubber		
Stem, Nut & Spring	Stainless Steel		

For material options not listed, consult factory.  
 Cla-Val manufactures valves in more than 50 different alloys.

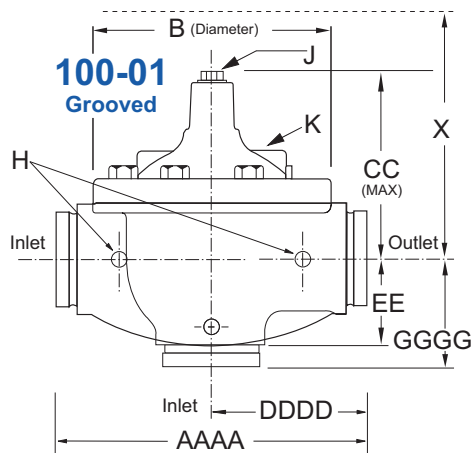
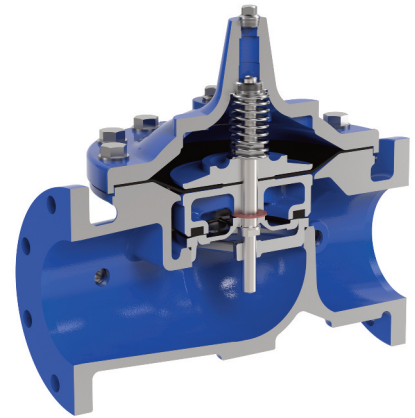
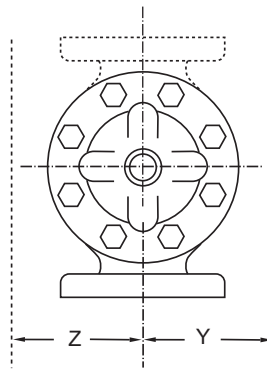
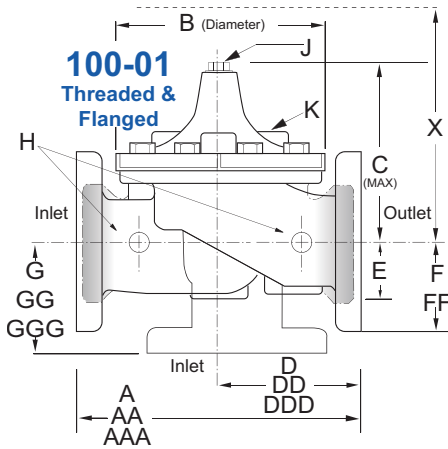


For sizes 18 - 36-inches, use 50-66 E-Sheet

### Model 50-01 Dimensions (In Inches)

Valve Size (Inches)	1	1¼	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
A Threaded	7.25	7.25	7.25	9.38	11.00	12.50	—	—	—	—	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	8.50	9.38	11.00	12.00	15.00	20.00	25.38	29.75	34.00	39.00	41.38	46.00	52.00	61.50	63.00	72.75
AAA 300 ANSI	—	—	9.00	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50	47.64	53.62	63.24	64.50	74.75
AAAA Grooved End	—	—	8.50	9.00	11.00	12.50	15.00	20.00	25.38	—	—	—	—	—	—	—	—	—
B Diameter	5.62	5.62	5.62	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	41.50	45.00	53.16	56.00	66.00
C Maximum	5.50	5.50	5.50	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88	24.19	25.00	39.06	41.90	43.93	54.60	59.00
CC Maximum Grooved End	—	—	4.75	5.75	6.88	7.25	9.31	12.12	14.62	—	—	—	—	—	—	—	—	—
D Threaded	3.25	3.25	3.25	4.75	5.50	6.25	—	—	—	—	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	4.00	4.75	5.50	6.00	7.50	10.00	12.69	14.88	17.00	19.50	20.81	—	—	30.75	—	—
DDD 300 ANSI	—	—	4.25	5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75	20.25	21.62	—	—	31.62	—	—
DDDD Grooved End	—	—	—	4.75	—	6.00	7.50	—	—	—	—	—	—	—	—	—	—	—
E	1.12	1.12	1.12	1.50	1.69	2.06	3.19	4.31	5.31	9.25	10.75	12.62	15.50	12.95	15.00	17.75	21.31	24.56
EE Grooved End	—	—	2.00	2.50	2.88	3.12	4.25	6.00	7.56	—	—	—	—	—	—	—	—	—
F 150 ANSI	—	—	2.50	3.00	3.50	3.75	4.50	5.50	6.75	8.00	9.50	10.50	11.75	15.00	16.50	19.25	22.50	28.50
FF 300 ANSI	—	—	3.06	3.25	3.75	4.13	5.00	6.25	7.50	8.75	10.25	11.50	12.75	15.00	16.50	19.25	24.00	30.00
G Threaded	1.88	1.88	1.88	3.25	4.00	4.50	—	—	—	—	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	4.00	3.25	4.00	4.00	5.00	6.00	8.00	8.62	13.75	14.88	15.69	—	—	22.06	—	—
GGG 300 ANSI	—	—	4.25	3.50	4.31	4.38	5.31	6.50	8.50	9.31	14.50	15.62	16.50	—	—	22.90	—	—
GGGG Grooved End	—	—	—	3.25	—	4.25	5.00	—	—	—	—	—	—	—	—	—	—	—
H NPT Body Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
J NPT Cover Center Plug	0.25	0.25	0.25	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.50	2.00	1.00	1.00	1.00	2.00	2.00
K NPT Cover Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Stem Travel	0.40	0.40	0.40	0.60	0.70	0.80	1.10	1.70	2.30	2.80	3.40	4.00	4.50	5.10	5.63	6.75	7.50	8.50
Approx. Ship Weight (lbs)	15	15	15	35	50	70	140	285	500	780	1165	1600	2265	2982	3900	6200	7703	11720
Approx. X Pilot System	11	11	11	13	14	15	17	29	31	33	36	40	40	43	47	68	79	85
Approx. Y Pilot System	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	40	45
Approx. Z Pilot System	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	42	47

## Model 50-01 Metric Dimensions (Uses 100-01 Hytrol Main Valve)



### Other 50 Series Products

- 50-01KO - Model 50-01 supplied with with KO Anti-Cavitation Trim
- 50-01H - Model 50-01 supplied with X43H Strainer
- 50-01KOH - Model 50-01 supplied with KO Trim & X43H Strainer
- 650-01 - Reduced Port Pressure Relief Valve
- 650-01KO - Reduced Port Pressure Relief Valve with KO Trim
- 650-01H - Reduced Port Pressure Relief Valve with X43H Strainer
- 650-01KO - Reduced Port Pressure Relief Valve with KO Trim and X43H Strainer

## Model 50-01 Dimensions (in mm)

Valve Size (mm)	25	32	40	50	65	80	100	150	200	250	300	350	400	450	500	600	750	900
A Threaded	184	184	184	238	279	318	—	—	—	—	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	216	238	279	305	381	508	645	756	864	991	1051	1168	1321	1562	1600	1848
AAA 300 ANSI	—	—	229	254	295	337	397	533	670	790	902	1029	1105	1210	1326	1606	1638	1899
AAAA Grooved End	—	—	216	228	279	318	381	508	645	—	—	—	—	—	—	—	—	—
B Diameter	143	143	143	168	203	232	292	400	508	600	711	832	902	1054	1143	1350	1422	1676
C Maximum	140	140	140	165	192	208	270	340	406	435	530	614	635	992	1064	1116	1387	1499
CC Maximum Grooved End	—	—	120	146	175	184	236	308	371	—	—	—	—	—	—	—	—	—
D Threaded	83	83	83	121	140	159	—	—	—	—	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	102	121	140	152	191	254	322	378	432	495	528	—	—	781	—	—
DDD 300 ANSI	—	—	108	127	149	162	200	267	337	395	451	514	549	—	—	803	—	—
DDDD Grooved End	—	—	—	121	—	152	191	—	—	—	—	—	—	—	—	—	—	—
E	29	29	29	38	43	52	81	110	135	235	273	321	394	329	381	451	541	624
EE Grooved End	—	—	52	64	73	79	108	152	192	—	—	—	—	—	—	—	—	—
F 150 ANSI	—	—	64	76	89	95	114	140	171	203	241	267	298	381	419	489	572	724
FF 300 ANSI	—	—	78	83	95	105	127	159	191	222	260	292	324	381	419	489	610	762
G Threaded	48	48	48	83	102	114	—	—	—	—	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	102	83	102	102	127	152	203	219	349	378	399	—	—	560	—	—
GGG 300 ANSI	—	—	102	89	110	111	135	165	216	236	368	397	419	—	—	582	—	—
GGGG Grooved End	—	—	—	83	—	108	127	—	—	—	—	—	—	—	—	—	—	—
H NPT Body Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
J NPT Cover Center Plug	0.25	0.25	0.25	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.50	2.00	1.00	1.00	1.00	2.00	2.00
K NPT Cover Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Stem Travel	10	10	10	15	18	20	28	43	58	71	86	102	114	130	143	171	190	216
Approx. Ship Weight (kgs)	7	7	7	16	23	32	64	129	227	354	528	726	1027	1353	1769	2812	3494	5316
Approx. X Pilot System	280	280	280	331	356	381	432	737	788	839	915	1016	1016	1093	1194	1728	2007	2159
Approx. Y Pilot System	229	229	229	229	254	280	305	508	559	610	661	737	762	813	864	991	1016	1143
Approx. Z Pilot System	229	229	229	229	254	280	305	508	559	610	661	737	762	813	864	991	1067	1194



50-01 Valve Selection	100-01 Pattern: Globe (G), Angle (A), End Connections: Threaded (T), Grooved (GR), Flanged (F) Indicate Available Sizes																		
	Inches	1	1½	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
	mm	25	32	40	50	65	80	100	150	200	250	300	350	400	450	500	600	750	900
Main Valve 100-01	Pattern	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G	G	G, A	G	G
	End Detail	T	T	T, F, Gr*	T, F, Gr	T, F, Gr*	T, F, Gr	F, Gr	F, Gr*	F, Gr*	F	F	F	F	F	F	F	F	F
Suggested Flow (gpm)	Maximum	55	93	125	210	300	460	800	1800	3100	4500	7000	8400	11000	14000	17000	25000	42000	50000
	Maximum Surge	120	210	280	470	670	1000	1800	4000	7000	11000	16000	19000	25000	31000	35000	56500	63000	85000
Suggested Flow (Liters/Sec)	Maximum	3.5	6	8	13	19	29	50	113	195	309	442	530	694	883	1073	1577	2650	3150
	Maximum Surge	7.6	13	18	30	42	63	113	252	441	693	1008	1197	1577	1956	2461	3560	3975	5360
100-01 Series is the full internal port Hytrol.																			*Globe Grooved Only

#### Notes:

- For sizes 18 through 36-inches / 450mm through 900 mm, use 50-66 E-Sheet
- Many factors should be considered in sizing pressure relief valves including inlet pressure, outlet pressure and flow rates.
- For sizing questions or cavitation analysis, consult Cla-Val with system details.

## Pilot System Specifications



#### Adjustment Ranges

- 0 to 75 psi Max.
- 20 to 105 psi
- 20 to 200 psi \*
- 100 to 300 psi

\*Supplied unless otherwise specified. Other ranges are available, please consult factory.

#### Temperature Range

Water: to 180°F

#### When Ordering, Specify:

1. Catalog No. 50-01
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded, Flanged, Grooved
6. Trim Material
7. Adjustment Range
8. Desired Options
9. When Vertically Installed

#### Main Valve Options

##### EPDM Rubber Parts

Optional diaphragm, disc and o-ring fabricated with EPDM synthetic rubber

##### Viton® Rubber Parts - suffix KB

Optional diaphragm, disc and o-ring fabricated with Viton® synthetic rubber

##### Epoxy Coating - suffix KC

NSF/ANSI 61 Fusion Bonded Epoxy Coating

##### Dura-Kleen® Stem - suffix KD

Fluted design prevents dissolved minerals build-up on the stem

##### LFS Trim

Designed to regulate precisely and smoothly at typical flow rates as well as lower than the industry standard of 1 fps, without decreasing the valve's capacity

#### Valve Options

X141 Pressure Gauge



X101AR Valve Position Indicator with Air Release



X101 Valve Position Indicator



X144 e-FlowMeter



X43H Strainer



Stainless Steel Pilot



#### Materials

##### Standard Pilot System Materials

Pilot Control: Low Lead Bronze  
Trim: Stainless Steel Type 303  
Rubber: Buna-N® Synthetic Rubber

##### Optional Pilot System Materials

Pilot Systems are available with optional Aluminum, Stainless Steel or Monel materials.



Low voltage AC drives

# ABB industrial drives ACS800, single drives 0.55 to 5600 kW Catalog

Power and productivity  
for a better world™



# Selecting and ordering your drive

Build up your own ordering code using the type designation key below or contact your local ABB drives sales office and let them know what you want. Use page 3 as a reference section for more information.

Type designation:

ACS800

-

01

11

31

02

07

07LC

17

17LC

37

37LC

-

XXXX

-

X

+

XXXX

Product series

Types and construction

Ratings

Voltages

Options



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### ABB industrial drives

ABB industrial drives are designed for industrial applications, and especially for applications in process industries such as the pulp & paper, metals, mining, cement, power, chemical, and oil & gas. ABB industrial drives are available both as complete AC drives and as modules to meet the requirements of the users, OEMs and system integrators. These drives are highly flexible AC drives that can be configured to meet the precise needs of industrial applications, and hence order-based configuration is an integral part of the offering. The complete drives and drive modules cover a wide range of powers and voltages, including industrial voltages up to 690 V. ABB industrial drives come with a wide range of built-in options. A key feature of these drives is programmability, which makes adaptation to different applications easy.

### Industrial design

ABB industrial drives are designed with current ratings to be used in industrial environment for applications requiring high overloadability. The heart of the drive is DTC, direct torque control, that provides high performance and significant benefits: e.g. accurate static and dynamic speed and torque control, high starting torque and long motor cables. Built-in drive options make the installation work fast and easy. The robust enclosures and cabinets, with a wide range of enclosure classes, as well as power terminals, are designed for harsh environments.

One of the most significant design criteria of ABB industrial drives has been the long lifetime. Wearing parts such as fans and capacitors have been selected accordingly. This means - together with extensive protection features - excellent reliability in the demanding industrial market.

### Single drives

The single drive configuration contains a rectifier, DC link and an inverter in one single AC drive unit.

The single drives are complete AC drives that can be installed without any additional cabinet or enclosure. The single drives are available as wall-mounted, free-standing and cabinet-built constructions. The protection degree of the single drives is at least IP21, and higher protection degrees are available as an option.

### Type designation

This is the unique reference number that clearly identifies your drive by construction, power rating voltage and selected options. By type designation you can specify your drives from the wide range of available options, customer specific ones are added to the type designation using the corresponding + code.

### Functional safety

The ABB functional safety solution complies with the requirements of the new European Union machinery directive 2006/42/EC. This directive is associated with standards like IEC 62061 (Safety Integrity Level) and ISO 13849-1 (Performance Level), which require both a documented and proven safety performance and lifecycle approach to safety. Safe torque-off (STO) is a certified solution offering SIL2 and PL d (Cat.2) safety levels.

ABB drives can be provided, as an option, with the safe torque-off function. Safe torque-off (STO) can be used for the prevention of unexpected startup and represents a cost-effective and certified solution for basic safety. Other safety functions for cabinet-built drives include Safe Stop 1 (SS1) and Safely-Limited Speed (SLS), which can be used to achieve SIL2 or PL d (Cat.2) safety levels.

Other products  
Please also see the separate technical catalogues  
ACS800, multidrives, code 3AFE68248531 EN and  
ACS800, drive modules, code 3AFE68404592 EN.

# ABB industrial drives



## Wall-mounted drives, ACS800-01

The wall-mounted drive, ACS800-01 offers all that you need up to 200 kW. All important features and options are built inside the drive: line choke, EMC filter, brake chopper etc. The user gets everything in a single and complete IP21 or IP55 package. Still the drive is also extremely small. A wide range of software alternatives makes this drive suitable for any application.

## Wall-mounted drives, ACS800-01 for marine applications

The type approved ACS800-01 marine drive provides advanced reliability and availability at sea. The drive fulfils marine and offshore requirements, and the design and operation have been tested according to marine type approval requirements. The ACS800-01 has marine type approvals from ABS, BV, DNV, GL, Lloyd's, and RINA.

## Wall-mounted regenerative drives, ACS800-11

The wall-mounted regenerative drive, ACS800-11 is equipped with active supply unit. It offers a full performance regenerative drive in a single compact package. All important features and options including an LCL line filter and EMC filter are built inside the drive. The power ratings start from 5.5 kW and go up to 110 kW. It is available with IP21 protection degree.



ACS800-01,  
IP21 construction



ACS800-01, IP55 construction



ACS800-11





## Wall-mounted low harmonic drives, ACS800-31

The wall-mounted low harmonic drive, ACS800-31 offers a unique harmonics solution that is incorporated into the drive. It has exceptionally low line harmonic content and it fulfils even the strictest harmonic requirements without external filtering devices or multi-pulse transformer arrangements.

The wall-mounted ACS800-31 offers a low harmonic drive in one complete package up to 110 kW. Similar to other wall-mounted drives, it has all the important features and options built inside the drive. It is available with IP21 protection degree.

## Free-standing drives, ACS800-02

The free-standing drive, ACS800-02 is an innovative bookshelf enclosure. The power ratings start from 45 kW and go up to 560 kW. The ACS800-02 is available in an extremely compact IP21 enclosure and uniquely offers two mounting directions. It also offers a wide range of built-in options including EMC filters, brake choppers and fieldbus modules.

ACS800-31



ACS800-02



# ABB industrial drives



## Cabinet-built drives, ACS800-07

The cabinet-built drive, ACS800-07 offers standardized configurations that can be adapted to any application. It covers a wide power range up to 2800 kW and is very compact, the largest drive is only 3.2 meters wide. It is available with IP21, IP22, IP42, IP54 and IP54R protection degrees. A wide range of built-in options is available and application engineering services can be offered when customization is needed.

## Liquid-cooled drives, ACS800-07LC

ACS800 liquid-cooled frequency converter offers robust design for medium and high power applications. The compact size with a totally enclosed cabinet is optimised for harsh environmental conditions. The ACS800 liquid-cooled product series provides advanced reliability for both industrial and marine sector. Liquid cooling minimises the noise level and improves heat transfer without a need for air conditioning equipment. A wide range of built-in options is available.



ACS800-07



ACS800-07LC



## Cabinet-built regenerative drives, ACS800-17

The cabinet-built drive, ACS800-17 is equipped with active supply unit. It is intended to drive applications where regenerative operation is required. It covers a wide power range from 45 to 2500 kW and has an extensive range of standardized configurations that can be adapted to any application. It is available with IP21, IP22, IP42, IP54 and IP54R protection degrees. A wide range of built-in options is available and application engineering services can be offered when customization is needed.

## Cabinet-built liquid-cooled regenerative drives, ACS800-17LC

The ACS800 liquid-cooled regenerative drive incorporates two technologically advanced solutions in one compact, totally enclosed cabinet: liquid cooling provides high reliability while regeneration delivers significant energy savings. Covering a wide power range from 55 to 5200 kW, the drive is available with IP42 as standard and IP54 as an option. The design is marine type approved. A wide range of built-in options is available.



ACS800-17



ACS800-17LC





## Cabinet-built low harmonic drives, ACS800-37

The ACS800-37 cabinet-built drive is a low harmonic solution in the power range of 37 kW up to 2700 kW. It offers a unique harmonics solution that is incorporated into the drive. Like other cabinet-built single drives, it has a wide range of standardized configurations and is available with IP21, IP22, IP42, IP54 and IP54R protection degrees. Application engineering services can be offered when customization is needed. A wide range of built-in options is available and application engineering services can be offered when customization is needed.

## Cabinet-built liquid-cooled low harmonic drives, ACS800-37LC

The ACS800-37LC is a cabinet-built liquid-cooled low harmonic drive and therefore offers a solution for both low harmonic needs and harsh ambient conditions. Liquid cooling removes 98% of the heat generated, so the totally enclosed cabinet requires no additional air conditioning. With a power range from 55 to 5200 kW, this drive meets the requirement of many applications. It is especially suitable for use in the marine sector. A wide range of built-in options is available.



ACS800-37



ACS800-37LC

# Single drive main features

Feature	Advantage	Benefit
<b>Compact and complete</b>		
Compact size, everything integrated	Less space and installation work required.	No need to install extra components such as input chokes or EMC filter.
Built-in harmonic filter in all ACS800 drives	Low harmonics, meaning less interference and less heating in cables and transformers. Filter also protects the drive from line side transients.	For the lowest harmonic level, ACS800-31/-37/-37LC offer almost a harmonic free solution.
Wide range of options available	Standard solutions available from ABB that meets most of the customer needs.	Custom made solutions are available in the ACS800-07/-17/-17LC/-37/-37LC.
Versatile braking options	Always the optimal braking option available.	Brake chopper built-in in all frame sizes (standard/optional).
	No need for external braking chopper thus reducing size and installation cost.	Regenerative braking with ACS800-11/-17/-17LC.
<b>User interface</b>		
User friendly customer interface	Easy and fast commissioning and operation.	Clear, alphanumeric display with startup assistant that guides through the startup procedure. Easy to use PC tools available for commissioning, maintenance, monitoring and programming.
Versatile connections and communications	Standard I/O covers most requirements. Connectable to commonly used fieldbuses.	Extensive standard and optional I/O. I/O fulfills PELV (EN 50178).
Extensive programmability	Flexibility. Possible to replace relays or even PLC in some applications.	Two levels of programmability: 1. Parameter programming (standard) 2. Adaptive programming (free block programming) <ul style="list-style-type: none"> <li>- standard feature</li> <li>- more blocks available as options</li> <li>- all I/Os are programmable</li> </ul>
<b>Industrial design</b>		
Wide power and voltage range	One product series suits everywhere, meaning less training and spare parts and standardized interface to drives.	
Wide range of robust enclosures available	Suitable solutions available for different environments.	IP21 - IP55.
Robust main circuit design	Suitable for heavy industrial use. Reliable. Long motor cables can be used without extra output filters.	Components dimensioned for heavy duty and long lifetime. Advanced thermal model allows high overloadability.

Feature	Advantage	Benefit
<b>Industrial design</b>		
Extensive protections	Enhanced reliability, fewer process interruptions. Possibility also to protect motors and process.	Several adjustable limits to protect other equipment also.
Galvanic isolation of I/O	Safe and reliable operation without separate isolators and relays.	Isolated input signals and relay outputs as standard.
All terminals designed for industrial use	Sufficient size even for large aluminum cables. No need for special tools in I/O cabling.	
Worldwide approvals: CE, UL, cUL, CSA, C-Tick, GOST R	Safe products that can be used everywhere in the world.	
<b>Right performance for every application</b>		
DTC, accurate dynamic and static speed and torque control	Excellent process control even without pulse encoder - improved product quality, productivity, reliability and lower investment cost.	
DTC - allows high overloadability and gives high starting torque	Reliable, smooth start without overdimensioning the drive.	
DTC, fast control	No unnecessary trips and process interruptions.	Fast reaction to load or voltage variations prevents tripping. Rides through power interruptions by using kinetic energy of the load.
DTC, flux optimization and sophisticated motor model	Excellent motor and drive efficiency - cost savings.	Optimal flux in the motor reduces losses.
DTC, mechanics friendly	Less stress for mechanics improves reliability.	No shock torques. No torque ripple - minimized risk for torsional vibration. Active oscillation damping.
DTC, line supply control	High performance and robust control in active supply unit.	Applies for ACS800-11/-17/-17LC.
<b>Made in ABB</b>		
Global market leader in AC drives. Long experience.	Well proven, safe and reliable solutions. Application know-how.	
World wide service and support network	Professional support available around the world.	

# Technical data

Mains connection	
<b>Voltage and power range</b>	3-phase, $U_{2IN} = 208$ to $240$ V, $\pm 10\%$ , except -07, -07LC, -17, -17LC, -37, -37LC 3-phase, $U_{3IN} = 380$ to $415$ V, $\pm 10\%$ 3-phase, $U_{5IN} = 380$ to $500$ V, $\pm 10\%$ 3-phase, $U_{7IN} = 525$ to $690$ V, $\pm 10\%$ (600 V UL, CSA)
<b>Frequency</b>	48 to 63 Hz
<b>Power factor</b>	$\cos\phi_1 = 0.98$ (fundamental) $\cos\phi = 0.93$ to $0.95$ (total)
<b>Power factor (ACS800-11/-31/-17/-17LC/-37/-37LC)</b>	$\cos\phi_1 = 1$ (fundamental) $\cos\phi = 0.99$ (total)
<b>Efficiency (at nominal power)</b>	
ACS800-0x	98%
ACS800-1x/-3x	97%

Motors connection	
<b>Voltage for &gt; 500 V units</b>	3-phase output voltage 0 to $U_{2IN}/U_{3IN}/U_{5IN}/U_{7IN}$ please see "Filter selection table for ACS800" under the du/dt filters on page 46
<b>Frequency</b>	0 to $\pm 300$ Hz (0 to $\pm 120$ Hz with optional du/dt filters)
<b>Field weakening point</b>	8 to 300 Hz
<b>Motor control</b>	ABB's direct torque control (DTC)
<b>Torque control:</b>	Torque step rise time:
Open loop	<5 ms with nominal torque
Closed loop	<5 ms with nominal torque
	Non-linearity:
Open loop	$\pm 4\%$ with nominal torque
Closed loop	$\pm 3\%$ with nominal torque
<b>Speed control:</b>	Static accuracy:
Open loop	10% of motor slip
Closed loop	0.01% of nominal speed
	Dynamic accuracy:
Open loop	0.3 to 0.4%sec. with 100% torque step
Closed loop	0.1 to 0.2%sec. with 100% torque step

Product compliance	
CE	
Low Voltage Directive 2006/95/EC	
Machinery Directive 2006/42/EC	
EMC Directive 2006/108/EC	
Quality assurance system ISO 9001 and	
Environmental system ISO 14001	
UL, cUL 508A or 508C and CSA C22.2 NO.14-95, C-Tick, GOST R	

EMC according to EN 61800-3/A11 (2000), EN 61800-3 (2004)	
2 <sup>nd</sup> environment, unrestricted distribution, category C3 - standard in -07 (frame size n×R8i), -07LC, -17, -17LC, -37 and -37LC (frame sizes R7i-n×R8i), option in the others.	
1 <sup>st</sup> environment, restricted distribution (category C2) as options up to 1000 A input current.	

Environmental limits	
<b>Ambient temperature</b>	
Transport	-40 to +70 °C
Storage	-40 to +70 °C
<b>Operation</b>	
Air cooled	-15 to +50 °C, no frost allowed +40 to +50 °C at reduced output current (1%/1 °C)
Liquid-cooled	0 to +55 °C, no frost allowed +45 to +55 °C at reduced output current (0.5%/1 °C)
<b>Cooling method</b>	
Air cooled	Dry clean air
Liquid-cooled	Direct liquid-cooling
<b>Altitude</b>	
0 to 1000 m	Without derating
1000 to 4000 m	With derating ~ (1%/100 m) (690 V units 1000 to 2000 m with derating)
<b>Relative humidity</b>	5 to 95%, no condensation allowed
<b>Degree of protection</b>	
IP21	Standard for -01, -11, -31, -02, -07, -17, -37
IP22	Option for -07, -17, -37
IP42	Standard for -07LC, -17LC, -37LC, option for -07, -17, -37
IP54	Option for -07, -07LC, -17, -17LC, -37, -37LC
IP54R	Option for -07, -17, -37
IP55	Option for -01
<b>R = outlet air duct connection</b>	
<b>Paint colour</b>	-07, -07LC, -17, -17LC, -37, -37LC: RAL 7035 -01, -11, -31, -02: NCS 1502-Y (RAL 9002, PMS 420 C)
<b>Contamination levels</b>	No conductive dust allowed
<b>Storage</b>	IEC60721-3-1, Class 1C2 (chemical gases), Class 1S2 (solid particles)
<b>Transportation</b>	IEC60721-3-2, Class 2C2 (chemical gases), Class 2S2 (solid particles)
<b>Operation</b>	IEC60721-3-3, Class 3C1/3C2* (chemical gases), Class 3S2 (solid particles)
<b>Vibration marine classification</b>	3 to 13.2 Hz: $\pm 1$ mm amplitude (peak) 13.2 to 100 Hz: 0.7 g acceleration

C = Chemically active substances  
S = Mechanically active substances  
\* coated circuit boards

Available options are shown in the Summary of features and options table. Please see pages 62-63.





# Diesel generator set QSK23 series engine

600 kW - 800 kW 60 Hz  
Standby



## Description

Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary Standby and Prime Power applications.

## Features

**Cummins heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Permanent Magnet Generator (PMG)** - Offers enhanced motor starting and fault clearing short circuit capability.

**Circuit breakers** - Option for manually-and/or electrically-operated circuit breakers.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency, and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Peer-to-peer paralleling** - For applications where two or more generators with PowerCommand 3.3 control can be combined with an electrically operated circuit breaker and a combination of transfer switch(s).

**Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating	Prime rating	Continuous rating	Data sheets
	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz
DQCA	600 (750)	545 (681)		D-3352
DQCB	750 (938)	680 (850)		D-3353
DQCC	800 (1000)	725 (906)		D-3354

## Generator set specifications

Governor regulation class	ISO8528 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	IEC 61000-4-2: Level 4 electrostatic discharge IEC 61000-4-3: Level 3 radiated susceptibility

## Engine specifications

Bore	169.9 mm (6.69 in)
Stroke	169.9 mm (6.69 in)
Displacement	23.15 liters (1413 in <sup>3</sup> )
Configuration	Cast iron, in line 6 cylinder
Battery capacity	1400 amps minimum at ambient temperature of 0 °C to 10 °C (32 °F to 50 °F)
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff
Fuel filter	Spin-on fuel filters with water separator
Air cleaner type	Dry replaceable element with restriction indicator
Lube oil filter type(s)	Fleet guard dual venturi spin-on, combination full flow and bypass filters
Standard cooling system	High ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Single bearing flexible disc
Insulation system	Class H
Standard temperature rise	125 °C Standby at 40 °C ambient
Exciter type	Permanent Magnet Generator (PMG)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform Total Harmonic Distortion (THDV)	< 5% no load to full linear load, < 3% for any single harmonic
Telephone Influence Factor (TIF)	< 50 per NEMA MG1-22.43
Telephone Harmonic Factor (THF)	< 3%

## Available voltages

### 60 Hz Line-Neutral/Line-Line

• 110/190	• 127/220	• 230/380	• 277/480
• 115/200	• 139/240	• 240/416	• 347/600
• 120/208	• 220/380	• 255/440	

Note: Consult factory for other voltages.

## Generator set options and accessories

### Engine

- 208/240/480 V coolant heater for ambient above 4.5 °C (40 °F)
- Fuel/water separator
- Heavy duty air cleaner

### Alternator

- 80 °C rise
- 105 °C rise
- 125 °C rise

- 120/240 V anti-condensation heater
- Temperature sensor - alternator bearing RTD

### Control panel

- PC3.3
- PC3.3 with MLD
- 120/240 V 100 W control anti-condensation heater
- Ground fault indication
- Remote fault signal package
- Run relay package

- Run time display

### Cooling system

- 50 °C ambient

## Generator set options and accessories (continued)

### Exhaust system

- Industrial grade exhaust silencer (12 to 18 dBA)
- Residential grade exhaust silencer (18 to 25 dBA)
- Critical grade exhaust silencer (25 to 35 dBA)
- Super critical exhaust silencer (35 to 45 dBA)

### Generator set

- AC entrance box
- Battery
- Battery rack with hold-down
- Circuit breaker - set mounted
- Remote annunciator panel
- Spring isolators

- 2 year warranty
- 5 year warranty
- 10 year major components warranty

Note: Some options may not be available on all models - consult factory for availability.

## PowerCommand 2.3 – control system



**PowerCommand 2.3 control** - An integrated generator set control system providing voltage regulation, engine protection, generator protection, operator interface, and isochronous governing (optional).

**Control** - Provides battery monitoring and testing features and smart-starting control system.

**InPower™** - PC based service tool available for detailed diagnostics.

**PCCNet RS485** - Network interface (standard) to devices such as remote annunciator for NFPA 110 applications.

**Control boards** - Potted for environmental protection.

**Ambient operation** - Suitable for operation in ambient temperatures from -40 °C to +70 °C and altitudes to 13,000 feet (5000 meters).

**Prototype tested** - UL, CSA, and CE compliant.

### AC protection

- AmpSentry protective relay
- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload
- Overload warning
- Reverse kW shutdown
- Reverse Var shutdown
- Short circuit protection

### Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (over crank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout

- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown

### Operator/display panel

- Manual off switch
- 128 x 128 alpha-numeric display with push button access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating generator set running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20 °C to +70 °C

### Alternator data

- Line-to-Neutral AC volts
- Line-to-Line AC volts
- 3-phase AC current
- Frequency
- kVA, kW, power factor

### Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature

### Other data

- Generator set model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)
- Total kilowatt hours
- Load profile

### Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

### Digital voltage regulation

- Integrated digital electronic voltage regulator
- 3-phase Line-to-Line sensing
- Configurable torque matching
- Fault current regulation under single or three phase fault conditions

## Control functions

- Time delay start and cool down
- Glow plug control (some models)
- Cycle cranking
- PCCNet interface
- (4) Configurable inputs
- (4) Configurable outputs
- Remote emergency stop
- Battle short mode
- Load shed
- Real time clock with exerciser
- Derate

## Options

- Auxiliary output relays (2)
- 120/240 V, 100 W anti-condensation heater
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand for Windows® remote monitoring software (direct connect)
- AC output analogue meters
- PowerCommand 2.3 and 3.3 control with AmpSentry protection

For further detail on PC 2.3, see document S-1569.

For further detail on PC 3.3, see document S-1570.

## Ratings definitions

### Emergency Standby Power (ESP):

Applicable for supplying power to varying electrical loads for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-Time Running Power (LTP):

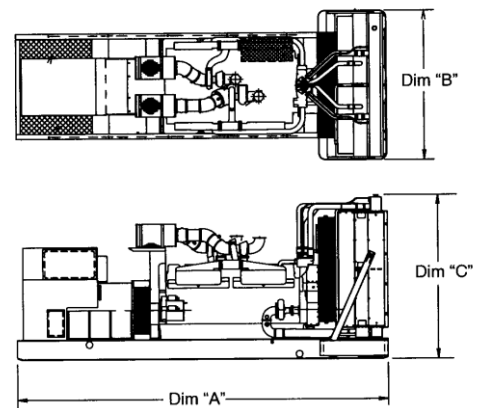
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

### Prime Power (PRP):

Applicable for supplying power to varying electrical loads for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base Load (Continuous) Power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

## Dimensions and weights with standard cooling system

Model	Dim 'A' (mm) (in.)	Dim 'B' (mm) (in.)	Dim 'C' (mm) (in.)	Set weight* dry (kg) (lbs)	Set weight* wet (kg) (lbs)
DQCA	4395.4 (173)	1855.5 (73)	2065.7 (81)	6075 (13395)	6337 (13973)
DQCB	4395.4 (173)	1855.5 (73)	2065.7 (81)	6075 (13395)	6337 (13973)
DQCC	4395.4 (173)	1855.5 (73)	2065.7 (81)	6075 (13395)	6337 (13973)

## Dimensions and weights with optional cooling system with seismic feature codes L228-2 and/or L225-2





Model	Dim 'A' (mm) (in.)	Dim 'B' (mm) (in.)	Dim 'C' (mm) (in.)	Set weight* dry (kg) (lbs)	Set weight* wet (kg) (lbs)
DQCA	4395.4 (173)	1715 (68)	2060.1 (81.1)	6377 (14061)	6518 (14372)
DQCB	4395.4 (173)	1715 (68)	2060.1 (81.1)	6377 (14061)	6518 (14372)
DQCC	4395.4 (173)	1715 (68)	2060.1 (81.1)	6377 (14061)	6518 (14372)

\* Weights represent a set with standard features. See outline drawings for weights of other configurations.



## Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

	<p>This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.</p>		<p>The generator set is available listed to UL 2200 for all 60 Hz low voltage models, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment.</p>
	<p>The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.</p>	<p><b>U.S. EPA</b></p>	<p>Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.</p>
	<p>All low voltage models are CSA certified to product class 4215-01.</p>	<p><b>International Building Code</b></p>	<p>The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009, and IBC2012.</p>

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

For more information contact your local Cummins distributor  
or visit [power.cummins.com](http://power.cummins.com)

**Our energy working for you.™**



## ControlLogix 5580 Controllers

### Future-proofing your system and enabling The Connected Enterprise

ControlLogix® 5580 controllers help enable faster system performance, capacity, productivity and security to meet the growing demands of smart machines and equipment for manufacturing.

All ControlLogix 5580 controllers use the same development environment, Studio 5000® software, combining elements of design into one standard framework that can optimize productivity and reduce time to commission. Studio 5000 also manages safety, so you don't have to be concerned about separation of standard and safety memory, or worry about partitioning logic to isolate safety – the software does it for you. Learn more about [Studio 5000](#).

### Features and Benefits

#### Enhanced Performance and Troubleshooting

- Provides up to 45% more capacity
- 1 gigabit (Gb) embedded Ethernet port enables high-speed I/O and motion control
- Optimized to enable maximum system performance
- Enhanced diagnostics and troubleshooting

#### Scalable Safety Solution

- Achieve SIL2/PLd or SIL3/PLe performance
- Optimized for faster safety reaction time
- Support for new Compact 5000™ safety I/O
- Networked Safety Functions with Drives and Motion

#### Added Security and Capabilities

- Energy storage module removes the need for a battery
- Controller-based change detection and logging enable added security
- Digitally-signed controller firmware adds another layer of security
- Provides role-based access control to routines and Add-On Instructions
- Conformal Coating options to help protect in harsh environments



1 Gb



LISTEN.  
THINK.  
SOLVE.



## ControlLogix 5580 Controller

The ControlLogix 5580 controller's high performance capabilities enhance your automation control system in several ways.



### Smart

- Display provides enhanced diagnostics and troubleshooting
- Integrated Motion over EtherNet/IP™ for up to 256 axes
- 1 Gb embedded Ethernet port enables high performance, communications, I/O and motion control

### Productive

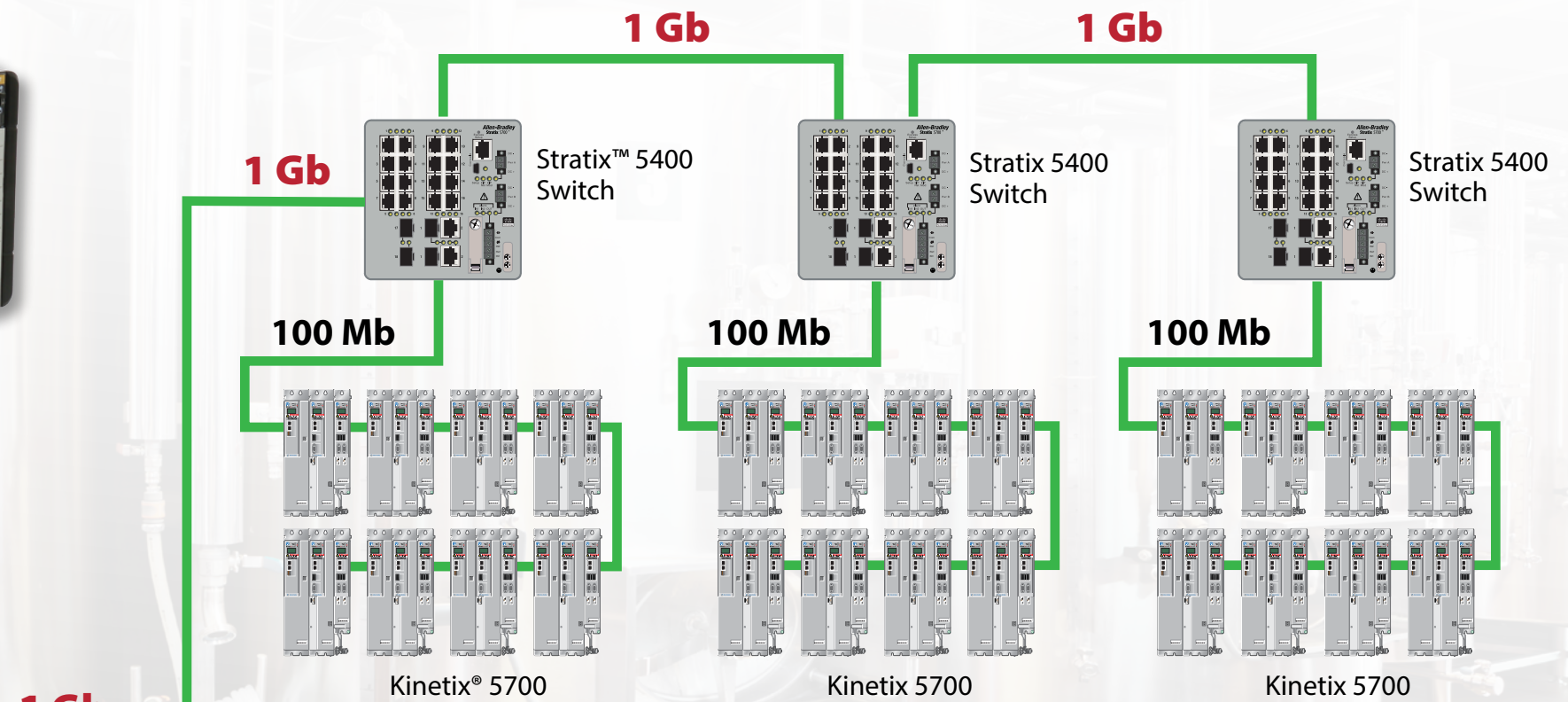
- Secure Digital (SD) card provides optional nonvolatile memory to permanently store user program and tag data on the controller
- Energy storage module removes the need for a battery
- Studio 5000 design and configuration environment provides ease of system design and commissioning



### Secure

- Mode change switch adds a physical layer for security
- Digitally-signed and encrypted firmware helps protect against malicious intent
- FactoryTalk® Security provides centralized authentication and access control by verifying the identity of each user-access attempt to the system

## Integrated Motion and Safety over EtherNet/IP





## GuardLogix 5580 Controller

### Right-sizing your Safety Solutions to Optimize Cost and Performance

Manufacturers are continually looking for control solutions that adhere to the latest global safety standards while dealing with competitive pressures to reduce costs and improve productivity. As the latest addition to the ControlLogix 5580 family of controllers, the GuardLogix® 5580 delivers scalable options for high performance, integrated safety in standard and conformally coated formats.

Learn more about [Safety Solutions](#) at Rockwell Automation.

#### Scalable

- Achieve SIL2 / PLd with Primary Controller
- Achieve SIL3 / PLe with Primary Controller + Safety Partner
- Standard memory options from 3 - 20 MB
- Safety memory options from 1.5 - 6 MB
- Communication options from 100 – 250 EtherNet/IP nodes
- Conformal coated options for harsh environments



#### Integrated

- Single controller for standard and safety control
- Single software for standard and safety control
- Single network for standard and safety control
- Mix and match safety and standard I/O
- Networked Safety Functions with Drives and Motion

#### High Performance

- Optimized for faster safety reaction time to achieving protective device coverage and reducing the risk of injury.

# ControlLogix 5580 Standard Controller

Catalog Number		Memory Size (MB)	Total number of Controller EtherNet/IP Nodes*
Standard	Conformal Coated		
1756-L81E	1756-L81EK	3 MB	100
1756-L82E	1756-L82EK	5 MB	175
1756-L83E	1756-L83EK	10 MB	250
1756-L84E	1756-L84EK	20 MB	250
1756-L85E	1756-L85EK	40 MB	300

\* Total includes nodes connected using 1756-ENxT modules

# GuardLogix 5580 Safety Controller

Catalog Number		Memory Size (MB)		Total Number of Controller EhterNet/IP Nodes*
Safety	Conformal Coated	Standard	Safety	
1756-L81ES	1756-L81ESK	3	1.5	100
1756-L82ES	1756-L82ESK	5	2.5	175
1756-L83ES	1756-L83ESK	10	5	250
1756-L84ES	1756-L84ESK	20	6	250
1756-L8SP	1756-L8SPK	–	–	–

\* Safety Controllers adhere to functional safety standards IEC 61508, ISO 13849, and IEC 62061



## Environmental Specifications and Certifications

Temperature	Operating: 0-60°C (32-140°F)    Storage: -40-85°C (-40-185°F)
Relative Humidity	5-95% non-condensing
Vibration	2 g at 10-500 Hz
Shock	Operating: 30 g    Nonoperating: 30 g
Certifications	UL, ULH, cUL, cULH, CE, ATEX, EAC, FMH, KOREA, MARINE, RCM For more details and a full list of product certifications, visit <a href="http://www.ab.com">www.ab.com</a>

See the [ControlLogix and GuardLogix Technical Data](#) additional information.

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